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THE NEW YEAR.

On this the first day of the new year we desire cordially to greet our numerous readers, and to reciprocate the many kindly-expressed good wishes which have of late been bestowed upon us.

As journalists we look back upon our efforts during the past year with satisfaction, for we find that in our pages have been embodied the freshest and best thoughts of the most eminent writers on photographic science. We have suffered nothing worthy of a place in our columns that has transpired during the year to remain unrecorded, and we could point to features of special interest and value which have during the past year appeared in our pages; but on the first day of a new year it will prove more interesting to indicate our intentions for the future than sing a pæan over our doings in the past.

Our arrangements for having the sayings and doings of our photographic brethren, both in Europe and America, duly and fully brought under the notice of our readers will be even more perfect than formerly. And let us here acknowledge how ably our correspondents at Paris and Philadelphia do their part in keeping us *au courant* with all photographic intelligence in the respective countries which they represent. "I learn more of what transpires in Paris," writes a correspondent who resides in that city, "from Mr. Fowler's letters in The British Journal of Photography than from all the other Continental journals, those of Paris itself included." Our foreign intelligence will certainly not be neglected.

Arrangements have been made with the most eminent writers in their several departments to supply practical articles on the chemistry, optics, art, and practice of photography; among which topics will be found the production of enlargements by the various methods now capable of successful application; on positive printing paper, having special reference to its keeping sensitive with its good qualities remaining unimpaired for several weeks. The importance of this to all classes of the photographic community will be easily appreciated.

We have already in a recent number alluded to our arrangements for having an illustrated series of articles on posing one or more figures, to be intended as a guide to the portrait photographer; hence we need not again refer to it. We also purpose giving a detailed account of the various kinds of lenses at present in use throughout the world, with drawings showing their optical and mechanical construction; and, while remembering the lenses, we do not intend to omit giving a similar series of illustrated articles on the cameras most approved of by both indoor and outdoor artists. In order to do this we solicit the co-operation of makers and others who have specialities which they consider worthy of receiving public attention.

Seeing that the subjects of enamels, transparency printing, and artificial lighting are claiming so much attention, we have arranged that these topics will in turn be exhaustively treated.

There are other features which we intend to introduce, of which due intimation will be made.

THE FOCUSSING SCREEN—AN IMPROVEMENT.

Of all the pieces of photographic apparatus in daily use the focussing glass receives least attention at our hands. The opinion, we know, widely obtains amongst photographers, that any tolerably fine piece of muffed glass is "good enough" for a focussing screen, and that any extra care on the subject is so much time or trouble thrown away.

Without wishing to attach undue importance to a matter which some treat so lightly, we think it is easy to show that we can gain some important practical advantages by paying a little more attention than usual to our sometime neglected, but always useful ally, the focussing glass; and we now intend offering the results of the observations of ourselves and others on this eminently practical subject more particularly since we are in a position to recommend an improvement upon the muffed glass screen, which is of peculiar service in particular cases.

When a photographer speaks of the focussing screen he now means a plate of glass the surface of which has been broken up by grinding with very fine emery or other hard powder, until the original polish of the plate has been so far destroyed as to interfere with the transparency of the material. The surface now consists of an immense number of facets which, by their independent action, more or less completely scatter the rays of light, which in its ordinary state the glass plate would transmit. We thus have a translucent screen, *upon* which is received the image formed by the lens, and *through* which we can view it. This is the ordinary screen; but we recently had the pleasure of calling the attention of our readers to an improvement on the usual focussing glass, produced by substituting for the surface broken up by grinding with a scratching powder one which had been etched by hydrofluoric acid. To the advantages gained in using this screen we have already sufficiently called attention.

Again: we have a class of screens which are obtained by coating a plate with iodised collodion, sensitising, washing, and drying the film; or by obtaining a layer of varnish by evaporation on a glass plate, and subsequently rendering the surface dull by friction with any powder capable of making extremely fine scratches. These are all useful plans which may advantageously be employed under peculiar circumstances, but none of the surfaces obtained in this way are absolutely structureless, and wholly scatter the rays falling upon them. This may be illustrated by a very simple experiment. If we take an ordinary camera with its focussing slide *in situ*, and obtain an image of a lighted candle upon the muffed glass, we find that a very bright spot of light is observed when the eye is placed directly in the path of the rays emitted by the candle; but, according as we move round to the side of the camera, and so look on the focussing glass at a lessening angle, we find the apparent brilliancy of the image to rapidly diminish. This defect is much more marked with muffed glass than with most other substances employed for the purpose of focussing; and this peculiarity often causes considerable annoyance when we have to photograph a badly-lighted subject.

Only very recently Mr. Grubb, F.R.S., drew our attention to the remarkable power which fine white sheet gutta-percha possesses of completely scattering the rays which fall upon it, and we at once sought to utilise this property. The following was the plan adopted:—Five grains of ordinary sheet gutta-percha were dissolved in an ounce, by measure, of bisulphide of carbon, with frequent agitation, and the liquid then laid aside in a well-corked bottle for some days. The whole of the colouring matter of the gutta-percha separates as a pre-

cipitate, and the bright solution may then be drawn off for use. The liquid now yields a pure white residue on evaporation.

A large plate was now carefully levelled, and the surface flooded, without spilling, with a good stratum of the gutta-percha solution. The whole was left at rest for a few hours, and the bisulphide allowed to evaporate as slowly as possible. A beautiful, white, translucent film was then obtained, which was found to obstruct rather too much light. The gutta-percha solution was diluted with more bisulphide of carbon, and the evaporation of a portion of this conducted as before; the residue was now obtained of the right degree of translucency.

When a plate, coated in the manner just described, is placed in the camera in the place of the ordinary focussing glass, the image of a candle formed by the lens is almost equally bright, whatever the angle at which it may be viewed, and which answers admirably in ordinary work; but it is in the interesting branch of our art, known as photomicrography, that the advantage of this focussing screen comes fully into view. Here the coarse texture of the muffed glass interferes with accurate focussing; but with the pearly gutta-percha screen we obtain a bright image, which may be viewed at any angle without affecting the result.

PINHOLES.

My reason for adding the bath solution to the water instead of the water to the bath, in order to free it from excess of iodide of silver, is not for the purpose of producing a more copious precipitate at all, but merely to effect the object with a very much smaller quantity of water than would be found necessary if the second course were adopted.

Say you wish to operate on thirty ounces of bath solution (forty grains of silver to the ounce), I think it would be found necessary to pour at least eight or ten ounces of distilled water into it before the precipitation of the iodide would commence; whereas, if you place *one ounce or even less distilled water* in a clean bottle, and pour the silver solution on to it gently, the precipitation of the iodide of silver commences *at once*.

A little pure distilled water is an innocent thing enough, I believe, to add to an old bath, so that this may easily be verified.

R. Manners Gordon.

[It is interesting to notice here, in connection with this subject, that Mr. M. Carey Lea, in his new *Manual of Photography*, advises the same order of proceeding as that recommended by Mr. Gordon. Mr. Lea says:—

"Take *one-half* the bath, and pour *it* slowly *into* a quantity of water about its own bulk (do not reverse this); that is, if you have a thirty-ounce bath, pour fifteen ounces of it into fifteen ounces of water and filter. Add the rest of the bath, without filtration, and then add, in summer thirty, in winter forty, grains of nitrate of silver for each ounce of water added, unless the bath was at the time impoverished, in which case, of course, the addition must be larger. Sun it, and filter."

—Eds.]

DALLAS'S PHOTELECTRIC AND OTHER PROCESSES OF ENGRAVING.

The Almanac issued this year in connection with The British Journal of Photography is illustrated by a portrait of the famous Parisian photographic artist, M. Adam-Salomon, whose pictorial works occupy so high a position.

The portrait, as will be seen, is of the kind known as mezzotint; that is to say, the surface of the plate consists of a number of granulated spots which in the shadows are both deeper and more numerous than in the finer tints. These microscopic cavities increase in depth and size by imperceptible gradations from the highest light, which is polished copper, to the deepest shadow represented by the maximum of roughness.

When a copper surface of this kind is charged with printing-ink and carefully wiped, the ink adheres in proportion to the number and depths of the cavities; and when printed, by being passed through rollers (as in the method pursued in ordinary copperplate printing), the ink is left on the paper in exact proportion to the depth of the engraving. This is the *rationale* of the printing process in question.

It is here necessary that we explain the difference between mezzotint and aquatint engraving; for the process in question, although not mezzotint in the usual acceptation of the term (being, indeed, more allied to aquatint), produces pictures having effects similar to mezzotint. Examined by a magnifying glass the Dallas print exhibits an aquatint grain, but the print, as a whole, resembles one of the original mezzotints.

In the original mezzotint style of engraving a smooth copperplate is made rough all over by means of a peculiar tool constructed for the purpose. The surface, by means of this tool, is so toothed or roughened that, if charged with ink and printed at the copperplate press, it would yield quite a black impression. On a plate so prepared the design of the drawing is laid, and the high lights are fully scraped out so as to leave a smooth, bright surface that can hold no ink, the middle tints and shadows being similarly scraped in order to produce exactly the kind of effect required, for the plate holds ink just in proportion as the rough surface is scraped down.

Modern mezzotinting differs in some respects from that described. In it the outlines of the picture are first etched by the means we described in an article devoted to the subject in page 445 of our volume for last year, to which we again invite reference in order to facilitate a thorough understanding of the subject. The etching ground is then removed, and the "rocking tool" is employed to roughen the surface of the plate. By this method all difficulty of losing the subject is avoided. The scraper and burnisher must be employed to reduce special parts to the tone required, bearing in mind the principle already laid down. This, as we have said, is the *modern* method of engraving in mezzotint.

The mezzotinter, after proving his plate, may find that some of the blacks are not deep enough, or that he has over-scraped some of the finer tints. Defects of this kind he remedies by the application of the "rocking tool" or roulette.

We now come to consider *aquatint* engraving. In this process a grain is produced on the plate in a somewhat different manner, which will be readily understood by the following explanation:—

If a polished plate of copper were dusted over with finely-pulverised resin, the plate then heated to such a degree as would cause those pulverulent atoms in contact with it to adhere without melting; and if the surface in this state were "bitten in" by aquafortis, it is very evident that it would be uniformly rough and granular, and, if inked over, would print black exactly in the same manner as the mezzotint already described. It will be apparent that the depth of the ink-holding cavities will be dependent upon the long or short continuation of the biting, and the strength of the etching solution.

Another aquatint etching ground is produced by pouring over a plate a solution of resin in alcohol. It is important, however, to observe that the alcohol must contain a certain quantity of water, for the evaporation of the spirit leaves the resin to be precipitated on the plate by the water in minute globules. The size of these precipitated globules being regulated by the proportion of water in the alcohol, it is obvious that the skilled artist can, at pleasure, produce a grain to suit any special class of subject. Artists employ shellac, mastic, asphaltum, and other resinous bodies, in the production of the "resist" for the aquatint ground. It can be so managed that a series of cracks or fissures can be produced, which, when etched and printed from, give quite a different-looking grain from that produced by any other means. The dotted as well as the reticulated ground, therefore, may be produced at the will of the operator.

Bearing these things in mind, let us now see how the aquatinter proceeds to produce an engraving upon a polished copperplate. He commences by laying a fine ground, which is to give him his *finest* tint. The old mezzotinter laid his ground of a certain strength, and scraped up his lights. The modern aquatinter can do the same, although it is not usual. If he decide upon this course, he must lay the strongest ground so as to obtain his deepest shadows at first. The method usually practised, however, is to produce an *etching*, as the modern mezzotinters do. The outline of the subject having been thus secured in lines, the etching ground is completely cleared off, and an aquatint ground is laid, of a nature suitable for the most delicate tints adjoining the highest lights. After biting the plate with acid, the strength of which is carefully adjusted for the purpose in hand, the plate is washed and dried, and the delicate tints referred to are covered over with a stopping-out varnish, so as to prevent the further action of the acid on them in the subsequent bitings.

After another application of the acid, for the purpose of securing a deeper etching of the whole plate, the portions next in vigour to those already stopped out are similarly covered with the stopping-out varnish; and this method of procedure is continued until the deepest portions are bitten to a sufficient depth. In due course of these bitings both the etching ground and the stoppings may have to be removed once, twice, or three times, in order to have impressions printed from the plate, so that the progress may be noted, and modifications made wherever found necessary.

As in aquatint engraving, Mr. Dallas in his photelectric process commences with a fine tint as a basis. This tint is of great impor-

tance, for upon it depends the richness of the blacks as well as the delicacy of the whites. The grain is essentially an aquatint one, and is produced by means which are chiefly mechanical, its character depending—first, upon the proportion and description of solvent; and, secondly, upon the quality of the solid material. Both these greatly influence the grain. The action of the light merely determines the places and quantities in which the particles aggregate. Some of these, coalescing, produce deeper shadows.

The specimen in the ALMANAC is unsophisticated, no work having been done upon it with the graver. Mr. Dallas does not pretend that it requires no work from the *en*graver. The surface requires an extra tint, a dirty one, in the process of electrotyping. This has to be removed by a careful hand, but is the work of only a few hours, and is done by scraping the surface as in mezzotint work. In the highly-skilled hands of a Cousens the finest effects may be produced, and deficiencies in light and shade in the original photograph corrected without losing truth. In this respect this photo-engraving process will, we think, render good service in furthering the art-progress of photography. In another aspect its value is indisputable—its productions are as permanent as printing-ink and paper can make them. We recommend our readers to examine the print under a very powerful magnifying glass, so as to note the various peculiarities in its grain.

SOMETHING ABOUT ZIRCONIA.

As the rare earth zirconia promises to engage the attention of all interested in the improvement of our present means of artificial illumination, whether for photographic or ordinary purposes, we now propose to give a brief synopsis of the chemistry of this rare substance, as we have good reason to believe that many of our readers never even heard the name "zirconia" before it was brought forward in proposing the earth as a valuable substitute for lime in the cylinders used in producing the well-known oxyhydrogen light.

We may most conveniently divide what we have to say upon the subject into three portions, viz., the sources from which the earth can be obtained, its preparation, and properties.

Sources of the Earth.—The metal zirconium was discovered by Klaproth, in 1789, in the mineral called zircon or hyacinth, whence the metal derived its name. The zircon is now one of the chief sources of the oxide of the metal zirconia, and is found in Ceylon in alluvial sand, and in most gold districts, such as those of California, the Ural Mountains, and in Irish gold-bearing deposits at Wicklow. Zircons, both of the ordinary nearly colourless variety, and hyacinth, the name given to reddish-brown specimens, occur in comparatively large quantities in Sweden and Norway, in some cases occurring so largely scattered through great rock masses as to characterise the rocks. We thus have the zircon-syenite of Laurvig, and the analagous rock occurring at Fredericksvärn. The next source of zirconia is the mineral endyalite, which, however, is rare and difficult to obtain, since its chief locality is Kangerdluarsuk, in West Greenland, where it was discovered by the late Sir Charles Giesécke, Professor of Mineralogy to the Royal Dublin Society. Zirconia also occurs in many of the minerals of Norway and Sweden, but usually in very small quantity; however, the chief source of the earth is at present the zircon itself.

Preparation.—We shall only give here an outline of the treatment to which zircon is subjected in order to separate the earth, as a description of the mode of preparation from other minerals would only be tedious and uninteresting. Zircon contains about thirty-three per cent. of silica, and the remaining sixty-seven parts of the earth zirconia are mixed usually with small quantities of iron. It is to the separation of the silica and iron, therefore, that we have to pay attention, and the first step in this direction is to get the zircon into the state of solution; but since the mineral is undissolved even by the most concentrated acids, we have to decompose it in another way before it will yield up the valuable product we seek to obtain from it.

The treatment commences by making the zircons red-hot and suddenly throwing the fragments into water, by which means the mineral becomes very friable and brittle, and can then be reduced to a very fine powder—a condition which has a large influence on the success of the succeeding operations. The finely-powdered zircon, when quite dry, is mixed with its own weight of dry carbonate of soda and twice that amount of pure carbonate of potash. When these materials have been intimately mingled, the mixture is placed in a lined earthen crucible, and the latter, with its contents, rapidly heated until the mixture fuses. When this point has been reached, the heat is kept up for fifteen or twenty minutes, and the crucible removed and allowed to cool rapidly. The result of this treatment is to completely decompose the zircon, and enable its constituents to be separated. It is always advisable, in this process, to conduct the fusion as rapidly as possible, in order that the product may be as little contaminated as may be with impurities derived from the crucible itself. When the cooled mass has sufficiently cooled down it is broken up and digested with hydrochloric acid, which must be added in sufficient quantity to render the pasty mass resulting from this treatment very acid. The whole is now evaporated nearly to dryness, and then digested with boiling water containing fine hydrochloric acid; this takes up the zirconia, iron, and the chlorides of potassium and sodium, leaving the silica behind in an insoluble condition. By this treatment, then, we have got rid of the silica; it now remains but to separate the iron from the zirconia. For this purpose we take the solution, which we have already stated is acid, and nearly, but not quite, neutralise the free acid with carbonate of soda; we next add to this liquid excess of hyposulphite of soda, and boil the solution in a porcelain vessel for a considerable time. By this means the iron is reduced to the state of protosalt, while the zirconia precipitates on continuance of the boiling in an insoluble condition, together with some sulphur. This precipitate is caught on a filter, thoroughly washed with pure water, and then dried; on ignition the sulphur is driven off and pure zirconia remains, which is then in a condition for use in preparing cylinders for the oxhydrogen blowpipe.

We may add that another process may be adopted for purifying the zirconia without prolonged boiling, since after separating the silica the solution might be at once precipitated by ammonia, and the precipitate after washing be treated with excess of oxalic acid. This would at once dissolve any peroxide of iron present, and would form an oxalate of zirconia, which is completely insoluble even in excess of oxalic acid. The precipitate could then be filtered off, washed, dried, and ignited. The residue would then be pure zirconia, the oxalic acid being burnt off when the oxalate of zirconia is heated strongly in contact with the air.

We now have to say a few words about the process employed by Messrs. Tessie du Motay & Co. for separating zirconia, and described in the specification of the patent; but we must here mention that the process claimed is one which cannot give a zirconia free from silica or alumina, and so long as the latter bodies are present there will still remain the risk of fusion on prolonged exposure of the earth to an intense heat. The patentee takes any of the minerals of zirconia, mixes the powdered substance with charcoal, &c., and passes chlorine gas over the red-hot mixture. Chlorides of silicium and zirconium are formed, distil over, and are condensed in a suitable apparatus. The mixture of chlorides is heated, and the more volatile chloride of silicium is volatilised, the chloride of zirconium remaining behind. The latter body is dissolved in boiling water, and excess of ammonia added. The hydrated earth so precipitated is then dried and ignited. We should have much more confidence in the stability of the product yielded by the first process which we gave.

Properties, &c.—The zirconia prepared by any of the above processes is regarded by chemists as a binoxide, or a compound of one equivalent of the metal zirconium with two of oxygen, and its symbol is $Zr\,O_2$. It is a white, dense, inodorous, and tasteless powder, insoluble in ordinary acids, being but little attacked even by hydrofluoric acid. Its chief solvent is concentrated sulphuric acid, which soon takes up the base when digested with it. Zirconia can be obtained in crystals of considerable hardness, and having a specific gravity of about 5·5. The powder, also, is much more dense than lime, perfectly infusible even in very prolonged exposure to the oxyhydrogen flame, and when ignited in the gas jet the earth glows with intense brilliancy. The intensity of the light emitted under these circumstances is so great, and the unalterable character of the earth itself so remarkable, that strong efforts are now being made to introduce the zirconia cylinder instead of the lime blocks for the lantern. We therefore cannot do better than complete our history of zirconia itself by an extract from the specification of the patent of M. Tessie du Motay, in which the mode of preparing these cylinders is described:—

"The zirconia is first calcined, then moistened, and submitted in moulds to the action of a press with or without the intervention of agglutinant substances, such as borax, boracic acid, or clay. The sticks, cylinders, discs, or other forms thus agglomerated are brought to a high temperature, and thus receive a kind of tempering or preparing, the effect of which is to increase their density and molecular compactness.

"I can also compress in moulds shaped for the purpose a small quantity of zirconium capable of forming a cylinder or piece of little thickness, which may be united by compression in the same mould to other refractory earths, such as magnesia and clay. In this manner I obtain sticks or pieces of which only the part exposed to the action of the flame is of pure zirconia, while the remaining portion which serves as a support to it is composed of a cheap material."

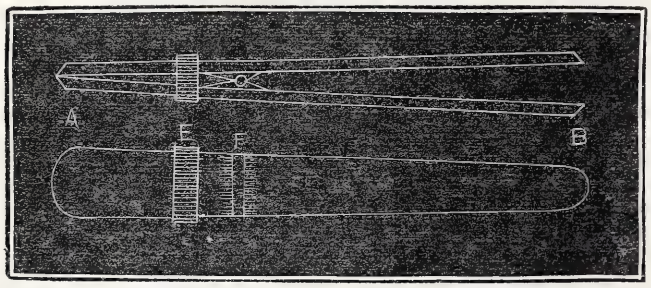
COLLODION FILTERS.—SPRINGS IN CAMERA FRAMES, &c.

As late is better than never, I beg to offer you, after a long delay, a description of my glass forceps and collodion filter, *apropos* of those mentioned by you lately in The British Journal of Photography, at pages 527, 549, and 596.

You will remember I showed them both at a meeting of the South London Photographic Society two years ago, and they are also described by you in the Journal (page 27, Jan. 18, 1867; but I now send you illustrations.

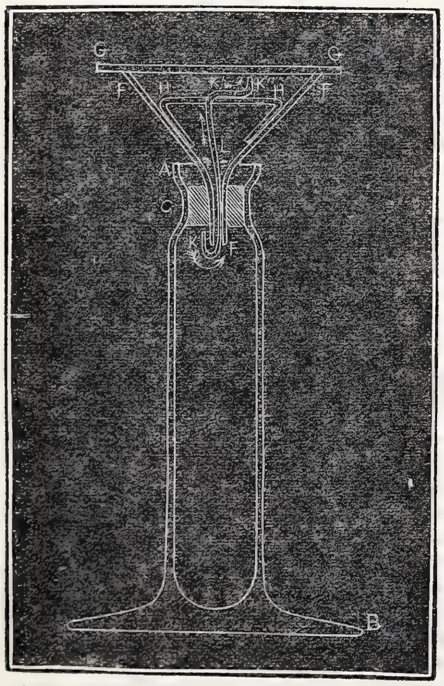
Fig. 1 represents the forceps—side and top view. A B are two flat pieces of glass, ends ground, rounded, and bevelled. F a piece of

FIG. 1.



glass tube or rod, imbedded in marine glue or gutta-percha on the one blade, but playing in a corresponding groove on the other, and so forming the fulcrum. E an India-rubber band. The end B is the forceps; the end A may be used as a clip.

FIG. 2.



A B, collodion pourer; C a cork inserted in the neck; the stem, F, of funnel F F F fits in the hole of the cork; H H glass rod bent so as to fit loosely in the interior of the funnel; K K′ K″ a thin glass tube so bent at K′ as to rest, without slipping, on the horizontal part of H H; the one end, K,″ is bent upwards, and the other end, K, also returns upwards, ending about a quarter of an inch above the aperture of the funnel. The funnel is ground flat at the top, upon which fits, air tight, the glass plate G G; L is cotton wool, packed, not too tightly, between the tube K and the funnel. The collodion is poured into the funnel (but must not reach the opening K″), and the plate is laid on the funnel.

Fig. 2 is the section of the collodion filter.

Your tyro readers may experiment with a funnel inserted air-tight in the neck of a bottle (leaving out the air-tube K) and they will find that not a drop of fluid will escape from the funnel into the bottle, the latter being full of air. The office of the tube, then, is, first, to allow this air to escape into the funnel, then the vapour of ether. The latter, being specifically heavier than air, will occupy the lower stratum, *i.e.*, nearly all will be condensed into the body of the collodion. There is no waste, except the few drops that remain in the cotton wool. Time required to manufacture three forceps, twelve to fifteen minutes; expense, *nil*. The bending of the tube and support, &c., for the collodion filter might take twenty minutes; cost, as above, *nil*.

Apropos of Mr. W. H. Harrison's micrometrical arrangement, I quite agree with your valuable correspondent "Aliquis," that it has no control over the yielding of the carriers to the undue pressure of the spring; nor must we forget the necessary play between the endless screw and its matrix, which will render the enlarged scale non-effective—or at least inaccurate, not precise.

Reverting to the spring, camera makers generally give us too much of it for the money, and I have reduced its strength in all my cameras where needed. Being short-sighted, I find no difficulty in focussing sharply with my naked eye—sharper, indeed, than any one I know even with focussing lenses and other contrivances. But at one time I was sorely puzzled with two successive fuzzy negatives. The camera was new, the plate (12 × 10) thin, and, as I found afterwards, the spring too strong. A thick plate, in the first instance, and then the reduction of the strength of the spring, never showed the indistinct image again.

I have two or three *glass* carriers, *i.e.*, strips of glass held together by marine glue. They are most rigid indeed; but in the heat of summer I must be on my guard lest they get out of shape. I made them as a makeshift for certain sizes of plates for which I had no carriers. Neither they nor the wooden carriers ever yield to the slight pressure of my springs.

We cannot dispense with the spring being attached to the door, as Mr. Raine (page 609) seems to think. According to his plan the carrier, with the plate fixed to it, would rattle to and fro unless kept *in situ* by the spring on the door, which, I repeat, must not press too hard.

Ennel.

THE ABSORPTION OF CHEMICAL RAYS BY GLASS.

Shortly before the apparatus invented by Professor Roscoe for measuring the chemical intensity of daylight was removed from the Observatory of the British Association at Kew, at my request the assistant who was experienced in its use measured the amount of actinism stopped by some different kinds of common window glass. These pieces of glass had, as usual, more or less of a green tinge. My object was to see whether different kinds of glass stopped light to such an extent as to appreciably retard the darkening of photographic paper. The four pieces of glass chosen for the experiment were placed side by side upon a slip of Professor Roscoe's standard paper, and a little flat plate of rock crystal, of the same thickness as the glasses, was also pressed upon the sensitive surface. All of them were then exposed to daylight for a few seconds, and in every instance the paper under the rock crystal darkened first, and next darkened under the glasses in proportion to their actinic transparency. The differences were at once plainly visible to the eye.

The strip of paper with its different impressions was then taken into the dark room, and the depth of each shade produced by the light was compared with Professor Roscoe's standard scale, described by me a long time ago in these columns. This comparison was made by the light of a monochromatic flame. produced by the fusion of a bead of carbonate of soda upon a loop of platinum wire, held by a little brass support in the flame of a Bunsen's burner. The following were the results:—

First Experiment.

Exposure to Daylight—Five Seconds.

	Intensity of Impression.	Ray's Intensity.
Rock crystal	·080	—
Glass No. I.	·064	·016
,, ,, II.	·064	·016
,, ,, III.	·062	·018
,, ,, IV.	·052	·028

Second Experiment.

Exposure to Daylight—Six Seconds.

	Intensity of Impression.	Ray's Intensity.
Rock crystal	·105	—
Glass No. I.	·093	·012
,, ,, II.	·089	·016
,, ,, III.	·077	·028
,, ,, IV.	·073	·032

The "ray's intensity" is the difference in transmissive power between the rock crystal and the several pieces of glass. It will be noticed that in the first experiment no difference is manifest between glasses one and two, and that in the second experiment there is a difference. This appears to have been caused by a change in the quality of the incident light, and by the fact that Professor Roscoe's actinometrical process, though perfectly competent to show the great differences between glasses one and four, is a less accurate measurer of slight differences, like those between one and two; in fact, for fine results, it is unreliable over two or three divisions of the scale, although it is the best attempt yet practically worked to surmount the great difficulties of actinometrical measurement.

The best glass for photographic processes can easily be ascertained by cutting a strip from across the centre of a sheet of sensitised albumenised paper. Across the centre it is likely to be more evenly sensitised than if a strip were cut from the top of the sheet downwards, because in the process of drying there is more silver solution at the bottom than the top. The pieces of glass to be examined may then be laid on the slip, and exposed for a few seconds to daylight. The differences in the glasses, as regards transparency to actinic rays, will at once become visible to the eye. A few seconds' exposure is plenty, because after a given slight depth of colour is passed, the eye is less competent to see the differences in shade.

William H. Harrison.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The "passing event" of most importance at the present time is the year 1868, which in a few more hours will be past. But as I am expected to spend the last moments of the year in the society of a few "jolly good fellows," the majority of them members of the black-fingered art, I cannot afford to stop and moralise over the year so nearly closed. I shall drink a toast to my readers, and hope that they will all be as fortunate and happy during the approaching year as I wish them to be; and my good wishes are not stinted.

The Goddard fund has at last been settled, and with much credit to the trustees. I consider their report a highly satisfactory one, displaying excellent management in a most thankless undertaking; for I learn from undoubted sources that the behaviour of both the recipient and his advisers towards some of the trustees was not of a nature calculated to imbue them with love for the task they had undertaken.

Mr. W. H. Harrison—a word with you if you please. The micrometrical adjustment you propose for cameras is really not required, and I give you the "reason why." *Absolute* accuracy in cameras cannot be obtained unless slides be discarded altogether, for no one knows better than you that the wood of which the camera and slides is composed is constantly changing, according to the hygroscopic and thermal conditions of the atmosphere. The remedy for this would be obvious, viz., having a metal-bodied camera and dispensing with the use of slides altogether; but absolute accuracy cannot even be thus obtained, for the actinic and chemical foci of a lens occasionally vary in the course of a few hours, according to the atmosphere. This has been proved and, if necessary, might be demonstrated. A lens that may work intensely sharp to visual focus in a cool, grey morning, may have an appreciable difference between these foci established when wrought with in the warm, red evening of the same day. Hence it will be seen that if *absolute* sharpness be desired a number of points will have to be considered. In practice, I believe with "Aliquis" that our camera makers can do everything that is *really* necessary to secure good definition, and trust that they will not introduce the proposed micrometrical movement to complicate their already good and beautiful instruments.

Your article on Mr. Mayall's suggestion concerning a slit instead of a stop in front of the landscape lens reminds me of a similar fallacy that has been a good deal indulged in by others. It is the adoption of a diaphragm something in the shape of a bottle. This, in turn, has been modified by others into something like a round hole with a tail-piece, as it were, cut out of one side, not unlike a keyhole in shape. The object of this is said to be to give the sky less exposure than the foreground, and thus obtain a more evenly-lighted picture, or one possessing natural clouds. It is very evident, however, that the reasoning by which you demolished Mr. Mayall's suggested slit-stop also applies to these keyhole or bottle diaphragms. I really think that in such matters we are quite safe in the hands of the opticians, who, being possessed of theoretical as well as practical knowledge, can very well determine the best shape of the stop.

There are two subjects on which I, and doubtless many others, wait with as much patience as possible for more light from Mr. Fowler—one is some further details concerning the behaviour of the zirconia light; the other being more information on carbonate of silver paper. From such reasoning as I can at present bring to bear upon this latter subject, I am inclined to think that it will prove to be of an importance not at present dreamed of by photographers. A pertinent question arises—Where can one get a sheet or two of carbonate of silver paper—I mean in this country? I should very much like to try it, but have not leisure at present to determine by experiment the best method of preparing it. Is there no dealer in London sufficiently enterprising to keep a supply of these foreign novelties? Surely it would pay well enough, for no one would grudge a price considerably in advance of that charged abroad in order to gratify their curiosity by examining novelties of this kind.

The meetings of the societies this month have had their usual share of interest. At the Photographic Society, the subject of the photographic appliances used in connection with the recent Abyssinian expedition formed the topic of the evening's consideration. At the North London Photographic Association no business appears to have been formally introduced; the South London Photographic Society, however, among other things, had the subject of pinholes in dry-plate photography introduced for discussion by Mr. Sebastian Davis. The Edinburgh Photographic Society was favoured by what is stated to be a valuable paper, by Mr. Norman Macbeth, on one of the art aspects of photography, and I expect to receive much pleasure from its perusal when published.

ALLEGED IMMORALITY OF PHOTOGRAPHERS.

It is by no means pleasant to be told that photographers are contributing largely to the immorality which is so prevalent at the present day. They have doubtless many sins to answer for, but we think it too bad that they should be preached *at*, if not *to*, by the daily press during the closing days of 1868; for photographers might carry the war into such camps with much justice and good effect. This, however, it is not at present our intention to do, but rather to hold the mirror up to the profession in order that they may see themselves as others see them, which they may do through the medium of the following leading article of the *Daily News*:—

"Complaints of the growth of immorality, and of what tends to it, are so common that unless a special set of cases is indicated the topic had best be avoided altogether. In a series of papers on women a contemporary has presented us with certain types of the sex; and his figures have furnished innumerable artists and photographers with corresponding designs. These gentry, endeavouring to realise the literary idea held up to them, drew upon a consciousness cultivated by the contemplation of burlesque actresses, and succeeded in exhibiting portraits of women as true to facts as their text, and quite as entertaining to a special section of the public. But we cannot allow the leg-esque artists the credit of entire originality. The custom, like many others of an equally irregular, if attractive, character, was imported. It came over in French novels, in French prints, and in French pocket handkerchiefs. The golden youth on the other side of the channel have for years been accustomed to those striking *cartes* and groups which have recently been decorating our magazines. Not only were their purses and cigar cases thus ornamented, but upon their shirts and wristbands appeared a representation of the favourite can-can; so that, if a little dandy was being examined in such matters, he had only, like Mr. Bouncer, to turn up his cuff, and book his reply. The attempt made to introduce these illustrated vestments here has failed, and happily it is not good form even to purchase the Bacchanalian handkerchiefs of the Burlington Arcade. Our own artists and our own photographers—that is, our artists and photographers who are quite of the period—have not been so neglected. This month an almanac appeared, the illustrators of which confined themselves to the delineation of ladies either in men's clothes or in clothes which might best be described as no clothes. Another almanac and a magazine, in both of which there is considerable smartness of writing, have adopted the same mode of amusing the public. A regular branch of industry has arisen, the professors of which are employed in copying the portraits of female acrobats and harlequins, and in furnishing correct cards of the ballet to the patrons of the fast almanacs and the fast magazines.

"Now, the photographers have gone very far indeed. We are disposed to believe that, for some of their doings, they might be netted in the meshes, wide as they are, of Lord Campbell's Act. Not to be behind their friends in the press, they have brought out several novelties less audacious, to which we intend to devote a few words. We are all aware of the passion of youth for ladies on the stage, and it is natural enough, perhaps, that this greenhorn sentiment should have its requirements satisfied by pictures of the enslavers. Not only youth, indeed, but stern critics have of late years burst into ecstasies about Miss Lilly That and Miss Molly This, and a rage for the likeness of Miss Lilly and Miss Molly descended upon the town. First we had the romantic head and profile, or perhaps the full length, of a clever and respectable actress. Then we had brazen burlesque pages, lolling opera dancers, and small female notorieties—notorious for immodesty on the stage rather than for dramatic capacity. This was a lower deep, and yet it was not positively a descent into Holywell-street. A few months ago the face of a pensive and good-looking girl was noticed constantly amongst theatrical *cartes*, and underneath it was a name fanciful and romantic enough for the stage, though not in the possession of any known actress. It was the portrait of a West-end courtesan, and its sale was organised and promoted by a woman who lends and sells clothes to prostitutes, and by the keeper of a casino. A capital business seems to have been made out of this *carte*. The subject of it was paraded nightly at one of our dancing houses, where she held what was ironically termed a "court," to which hundreds of people went out of curiosity to see her. We mention this because it is the commencement of a Parisian fashion against which we must protest in the strongest terms. The Anonyma business some years ago was not so impudent. In Paris there are constant favourites of this description. Now it is Cora Pearl, now some other brilliant dame or fortunate flower girl; but we have been hitherto free from such goddesses. We regret to say that one English journal, of large circulation, although that circulation is in a great measure amongst servants, has so far disgraced itself as to print as an illustration to its Christmas number a copy of the portrait of this woman.

The statement that she was engaged to appear in a forthcoming pantomime at one of the West-end theatres is simply incredible.

"The downward progress is rapid. Female acrobats have multiplied tenfold, the can-can is becoming a regular feature of music-hall entertainments, ballets are increasing in coarseness, the songs of the comic singer, which used to be merely idiotic, now combines idiotcy with smuttiness. We cannot control our amusements, it would seem. Would it not be well, however, to ask the artists and writers who claim to be gentlemen, to distinguish themselves from swarms of semi-pimps who pander to coarse and vitiated tastes?"

Our Editorial Table.

A Manual of Photography. By M. Carey Lea.
Philadelphia: Benerman and Wilson.

"O that mine enemy would write a book!"—sighed the stricken Arabian patriarch; similarly, when considering the many good things that have emanated from the fertile brain of Mr. M. Carey Lea, our desire, although in a different spirit, has many times thus found mental utterance—"O that our friend would write a book!" This, we rejoice to say, he has now done.

Several weeks ago, while the work now to be noticed was under preparation, we gave some extracts, in advance, from which the public would be enabled to judge of its eminently high and practical character. The completed volume is now before us.

In size the *Manual of Photography* is that known as royal octavo, the number of pages being 336. It will thus be seen that Mr. Lea has had ample space in which to ventilate the subject; let us now consider in what way the author has dealt with it.

Intended to serve both as an introduction to photography for the beginner and as a work of reference to the more advanced practitioner, the scope of the manual is of the most comprehensive nature.

Part I. is what may be called "introductory." It embraces upwards of forty pages, and is devoted to the selection of the materials, making negatives and positives, with general rules for the beginner.

Part II. is specially devoted to photographic optics and perspective, and in it we find detailed descriptions of lenses, with practical observations on the various features of special objectives, whether faults or virtues. Photographic perspective is here treated at some length.

Part III. is the *piece de resistance;* for under the general heading, *Photographic Manipulation*, we find (extending over 200 pages) what are designated "practical subjects" treated in a very masterly manner—although not more masterly than we expected from the well-known ability of the author. Among these subjects will be found articles on the Glass Room—the Dark Room—Pyroxyline and Collodion—the Negative—Ambrotypes and Ferrotypes—Portraiture—Landscape and Architectural Photography—Composition—On Copying—the Stereoscope—Microscopic Photography—Development on Paper—Silver Printing—Carbon Printing—Out-Door Photography—DryProcesses—Residues—Transparencies, &c., &c. The "theoretical considerations" are embodied in—

Part IV., which consists of three by no means long chapters, but which contain the pith of Mr. Lea's writings on the subject of the action of light.

The concluding part treats of photography in its relation to health, and also of various chemical manipulations—a knowledge of which is required by every photographer.

Such, then, is the bill of fare presented by Mr. Lea, and, as we have stated, a most comprehensive one it is.

From the chapter in Part I., entitled *How to Make the Negative*, we select as a specimen of the treatment of the various subjects the following:—

"*Focussing.*—If the photographer has not done his focussing beforehand, he may do it while his plate is in the bath, and should never, if possible, delay it until the plate is in the slide and waiting. As a general thing, the less time that elapses between the placing of the plate in the dark slide and the taking it out to develope the greater will be the chance of a good negative.

"Throwing an ample black cloth over the camera, and placing his head beneath it, the photographer proceeds to take his focus. Few persons have unassisted sight so sharp as to enable them to take a thoroughly good focus, although a delusion to the contrary is very widespread. It is always better to examine the image on the ground glass through a microscope, as a better focus can be got more quickly, and with less strain upon the eyes. The microscope should consist of two lenses in the same cylinder, *at least* an inch in diameter. The difference of fatigue to the eyes in using large and small lenses is enormous. A magnifier, with lenses of one and a-half to two inches in diameter, is the best; its expense is small, as it is not absolutely necessary that the lenses should be achromatised. The little doublets used by engravers are good, and larger ones can be got of any optician of the same pattern. The writer does not advise the system of focussing on clear glass with an adjusted eyepiece.

"The operator is not to take his focus on any point of the picture indifferently, but according to the following rules:—

"In taking a single portrait focus on the face as the most important point.

"In taking two heads equidistant from the centre, focus on either head, not on any more central object.

"In taking a group, focus on one of the heads, occupying a position midway between the centre and the extremity of the group.

"In focussing a landscape, focus *on the foreground* at a point midway between the centre and the edge of the plate.

"These directions are important, and cannot be disregarded with impunity. Careless focussing is almost the worst fault that a photographer can have, and will counteract every care of precaution that he can take in other parts of the process.

"*Development and Redevelopment.*—The operator brings back his dark slide without loss of time to the dark room, never forgetting for an instant to keep that part of the slide down which was lowest in the camera and in all previous stages. Holding the slide with the left-hand edge in his left hand, he opens the door with his right, places his thumb on the upper edge of the plate with the fingers touching it lower down, and, by inclining the slide a little backwards, brings out the plate. This is now transferred to the left hand, always keeping the lower edge downwards. He now turns the plate up nearly to a horizontal position; a proper quantity of the developer (about an ounce for a whole-sized plate, or for a beginner a little more) has previously been placed in a suitable vessel. This the operator takes in his right hand, and, holding it a little inclined, and at the upper edge of the plate near the left hand, pours out the liquid, at the same time drawing the vessel towards the right, so that the liquid may spread rapidly and evenly over the whole surface of the plate. Some dexterity is required to do this, except with very small plates. Just as the developer spreads over the plate and reaches the lower edge, the plate is carried to a horizontal position, for it is an object not to let more than can be helped run over. The developer becomes mixed on the surface of the plate with the bath solution with which the film is impregnated, and this mixture provokes the development. If a portion is wasted by washing over the side, the image will come out less strong, and a redevelopment will be more likely to be necessary.

"The rapidity of development under the action of the developer will depend on the exposure. If the picture flashes up instantly the exposure has been too long, and the picture will want contrast. If the picture comes out slowly, reluctantly, so that after a minute or two only the strongest-marked points of the subject are visible, the exposure has been too short, and the picture will probably be too full of contrast, wanting in detail, and hard and blocky. If the picture soon begins to show itself, and instead of flashing out suddenly grows steadily and even rapidly in strength, a good result may be anticipated. As the development goes on the operator inclines the plate in different directions, so as to keep the developer in a state of constant motion, thereby rendering its action regular and even. When the plate has reached, or nearly reached, the desired strength, the operator pours off the developer from one corner into its vessel again, and as he drains the last drop he raises the plate perpendicularly between himself and the light, and judges of its strength and character. If these appear satisfactory, he stops the operation by washing off the plate; if not, he pours on the developer again (provided this last has remained active and clear), and keeps it on a few moments longer. But if it seems to have ceased its effects, and, still more, if the slightest tendency to fog manifests itself, or if the developer looks in the least muddy, the operator quickly washes the plate, and if on a further careful inspection he finds that it still wants strength, he proceeds to redevelope.

"*Redevelopment* may be done either before or after fixing, the difference is but very slight in the final result; as far as it goes it may be stated as follows:—If the contrasts are likely to be a little too great, or tend that way, redevelope before fixing; if the contrasts are scarcely sufficient, fix first and redevelope afterwards. Not much, however, in the way of a curative agency can be expected in this way, and pictures which are either too harsh or too uniform are best wiped out at once and taken over.

"The operator will always bear in mind, in deciding when his development or redevelopment is carried far enough, that the apparent strength of the picture, as he then sees it, will be considerably reduced in the operation of fixing, and for this he must make due allowance.

"Negatives that come out of the right strength by the first development are the best. If under-exposed, they are apt to become hard and crude in the process of redevelopment; and if over-exposed, the evil is incurable. A brilliant print can only be got from a brilliant negative.

"Redevelopment may be effected in various ways. The most usual is with pyrogallic acid, and that is the plan which I shall here describe.

"To redevelope with pyrogallic acid, the operator keeps in a stoppered vial the following solution:—

Nitrate of silver	60 grains.
Citric acid	120 ,,
Water	6 ounces.

"This mixture keeps for months. When the iron development has done what it can, and before any disposition to fog sets in, the plate is to be washed off. In a convenient developing vessel the operator puts water, about an ounce or a little less for a $6\frac{1}{2} \times 8\frac{1}{2}$ plate, and proportionately for other sizes. He next adds a little pyro., about two grains for the ounce of water, in which it immediately dissolves. He then adds a few drops, say fifteen or twenty, of the silver and citric acid solution to the ounce of water, and pours the mixture over the plate. The image immediately begins to grow in strength, and, by keeping the silver and pyro. on, any desired degree of strength can be obtained. There developer soon darkens to a wine colour, and in that condition its action is still powerful. But if it becomes in the least muddy it must be rapidly washed off the plate. So long as the solution remains transparent and bright, even if port-wine colour, it is not easy to fog the picture. Still, even the pyrogallic developer is not to be trusted too far, or fog may set in in brown spots.

"A pyrogallic development may be used in the first place instead of the iron. In this case the pyrogallic acid is simply dissolved in water, about a grain to the ounce, a little acetic acid is added, and the mixture is poured over the plate as it leaves the frame. This is a very easy development, and gives bright, strong pictures. But the preliminary development with iron is preferable, because softer pictures are got, and more full of detail.

"Pyrogallic acid cannot be advantageously left in solution in water, as it spoils. If preferred, it may be kept dissolved in alcohol, sixty grains to the ounce, when ten or twelve drops will be equal to one grain of the crystallised acid.

"The vessels used for developing must be kept scrupulously clean. If the remains of the developer be left in them a few minutes, it becomes turbid, and a grey-black precipitate of metallic silver collects round the sides and bottom. Any of this left in will tend to render the next lot of developer muddy, and therefore must be completely removed.

"I am in the habit of keeping beside me the following solution in a beaker or wide-mouthed bottle:—

Concent. solution bichromate of potash...	1	fluid ounce.
Sulphuric, or better, hydrochloric acid ...	$\frac{1}{4}$	,,
Water	3	fluid ounces.

"It is only necessary to pour this solution into the dirtiest developing vessel, and then immediately out again, when it will be found perfectly bright and clean. It is scarcely necessary to say that it must be well rinsed.

"The same solution is very useful for removing silver stains from the fingers. If got into cuts or abrasions of the skin, it is to some violently irritating, to others quite indifferent, except a momentary smarting. It is much preferable to the use of cyanide of potassium, a most dangerous chemical, and the indiscreet use of which is injurious to health and may become destructive to life. *Perchloride of iron* may also be used for cleaning the fingers. Or they may be rubbed with strong tincture of iodine (alcohol 1 oz., iodine 40 grains.); and when the stain has become yellow (not before), it will dissolve in a strong solution of hyposulphite of soda.

Of these methods, the first will generally prove the most efficacious. All silver stains, however, should be attacked before they are *set* by exposure to light, otherwise the difficulty of getting rid of them is greatly increased.

The chapters devoted to the optic department of our art-science are well written and easy to be understood by any attentive reader. They indicate to us that Mr. Lea has studied this branch of his subject much more thoroughly than we previously were aware of. His observations strongly contrast with those of a certain countryman of his, whose recently-issued work on optics (since called in by the publishers, in consequence of our exposure, we believe), consisted merely of a series of ill-digested and ill-arranged quotations from Brewster, Monckhoven, and other writers. Mr. Lea, on the other hand, not only understands what he writes about, but writes so that others may also understand. After referring in detail to several lenses, Mr. Lea expresses his opinion that the triplet, although possessing great merits, has been somewhat overpraised. However, he considers it the best lens for groups that we yet possess, notwithstanding its shortcomings in other respects. He says:—

"The triplet may, thererefore, be considered as a servant of all work, but (except in the case of groups) scarcely doing any of it as well as lens especially made for that specific work. For such amateurs as wish to do a variety of work, but feel that they can allow themselves but one lens, it will be an appropriate acquisition. It should be distinctly understood that a good triplet is capable of doing almost any photographic work well; that it is, in fact, the only approach we have to a universal lens. Some beautiful landscapes, by G. W. Wilson and other distinguished photographers, have been taken with it, and exquisite copying work. Perhaps my meaning will be more clear if I say that some landscapes can be taken fully as artistically with the triplet as with the view lens, but others again cannot. Some engravings can be copied very well by the triplet, but in other cases of copying, particularly where extreme exactness is needed, it is surpassed by other lenses.

"The triplet possesses one advantage which must not be passed over. An extension of the size of the diaphragm, whilst it greatly impairs marginal definition, does not at the same time destroy that of the centre. Consequently, where rapid work is wanted, as in taking photographs of animals, instantaneous views, &c., it may advantageously be employed. Of course, the size of the plate to be covered must be proportionately diminished, or else want of definition at the margin must be submitted to.

"It is evident, however, that if we can cover a half-plate by using a whole-plate lens with large diaphragm, and so greatly shorten the exposure, we have what, in many cases, is a very material advautage. And this we gain with the triplet.

"The many surfaces of glass in the lenses composing the triplet is an objection to it, as tending to the introduction of diffuse light into the camera. Triplets made by different makers vary very much in their performances, especially in the size of stop with which they will work, and their value is always in proportion to the size of stop with which they can be satisfactorily used."

Mr. Lea's work is by far too comprehensive to be duly noticed in the present number; we therefore take leave of it for the present, with the intention of returning to it next week.

Arrangements have been made for publishing it in this country. It may be procured at our publishing office. We bespeak for this work the attention of our readers, for it is assuredly one of great value and importance.

Photographic Mosaics. Philadelphia: Benerman and Wilson.

It is with much pleasure we again recive this annual volume, got up in such a nice, readable form, being in size and thickness somewhat akin to our own Almanac. It is edited by Messrs. M. Carey Lea and Edward L. Wilson, editor of the *Philadelphia Photographer*.

Although mainly consisting of articles extracted from our own and contemporary pages, there are several original articles which have been written expressly for the work by the editors. We always enjoy Mr. Wilson's article, *Many Mites from Many Minds*, which he never fails to contribute to this annual. In order that our readers may share in our pleasure, we direct their attention to an extract from the article in question which will be found in another page.

This, however, is not the only contribution by Mr. Wilson. We find others devoted to *Troubles in the Dark Room, Troubles in the Studio, Troubles in the Toning and Printing Room*, with some others, to which we shall direct our readers' attention by-and-by. Mr. Carey Lea contributes a *Retrospect*, in which he rapidly sums up the chief events of the past year. The selections of articles in this year's *Mosaics* are made with care and judgment, and the work cannot fail of being very useful indeed, especially to those who do not take the various journals from which the extracts are made.

MANY MITES FROM MANY MINDS.*

By Edward L. Wilson.

Be exact in mixing your solutions, and never use unclean vessels to put them in.

Mind what you are about, carefully; then if you fail you will the better understand why.

If you meet failure after success, you may be assured that it is because you have done differently from what you did when you succeeded.

If you can, let your dark closet be roomy, and be sure to have nothing in it not actually needed there. No admittance for dirt or trash.

Ventilate your dark closet and save your health. Don't be afraid to have it light enough, so no white or actinic light is admitted.

Have patience. If you fail, endeavour to understand *why* you fail, and try again. Light your sitter skilfully; pose him tastefully; focus sharply; expose with judgment; develope carefully, and good work will reward you.

If you stop your plate before fully immersed there will be a line across it; putting it in before the collodion is set causes lines, and, if you do not immerse it soon enough, the part of the plate that has become too dry will be insensitive and show a transparent mark.

The plate should remain in the bath at least twice as long in winter as in summer.

Clean your dark slides frequently, and keep them well greased with lard. Handle the plate very carefully when it is in the dark slide.

If the image starts out at once when the developer is applied it has been over-exposed; if the image appears slowly, and the deep shades reluctantly, the plate is under-exposed. First the high lights; then the light shades, and finally the deep shades in the proper way.

Remember, good negatives are the keystone of the grand arch of photography. Do not expect to get good prints and rich tones unless your negatives are good and rich, for it is impossible.

* *Photographic Mosaics.*

In printing portraits let the head be your guide; get all the half-tones clearly and nicely, so the likeness will be good. Print and tone deep for a purple-black tone; tone less for purple-brown, and still less if you wish a rich chesnut-brown.

The majority of prints are cold, grey, weak and flat, because they are over-toned. In winter your solution will tone more rapidly if you warm it. The best way to warm it is to set the vessel holding your solution in another vessel of hot water. Do not tone in too much light. A weak shaded white (not yellow) light is best. If your toning solution is fresh and strong, be careful not to put more prints in at a time than you can manage. Keep the prints moving, and guard against their overlapping each other and the formation of air-bubbles between them; if you do not they will tone unequally. Prints always dry up less brilliant and rich than they look to be in the solution. By looking through them you can tell what colour to get.

Some persons forget to put salt in the intermediate water in which the prints are put between toning and fixing; the consequence is they continue to tone, and become over-toned and spoiled. Salt arrests the toning. Do not forget this.

Correspondence.

Foreign.

Philadelphia, December 3, 1868.

THE singular beauty of some of the work done on collodio-chloride paper makes one regret that this process should involve such large manipulation with collodion—work that must be very unhealthy to those engaged in it. The amateur who makes a few plates a day, perhaps even with several days' interval, does not often suffer (at least with ordinary care) from the ether fumes; but to work all day over sheets of collodio-chloride paper is so obviously destructive to health that one is inclined to regret that this process, otherwise so valuable, should ever have been devised.

In this connection I desire today to call attention to a fact that I have reason to believe is very little known. It is that a reliable collodion can be made *containing seventy-five per cent. of alcohol* with the pyroxylines now produced. Formerly this was not possible, but now the manufacture of soluble cotton has so greatly advanced that products of almost any desired quality can be obtained with certainty and ease; and there is now no difficulty found whatever in making a cotton which dissolves in three parts of alcohol and one of ether, quite without residue. The larger proportion of bromide now used makes collodion of this sort work well for the negative process, and, conversely, the abundant quantity of alcohol facilitates the use of alkaline bromides. Some persons have a very decided liking for bromide of potassium, and the solution of that salt is very much more easily effected in a collodion containing seventy-five per cent. of alcohol than in one containing only fifty.

But my object is now more especially to call attention to the advantage of applying this fact to the manufacture of collodio-chloride paper. An abundant quantity of alcohol in such collodion has advantages in every direction—reduced cost, less rapid evaporation, and, most of all, a diminution by one-half of the injurious ether vapour inhaled by the operator.

It may be questioned whether anyone would knowingly expose his health to the serious deterioration it must experience from regular occupation of this sort; and, therefore, I cannot see that employers are justified in setting hands at such work—work that must, I think, end by seriously undermining the constitutions of those set at it. Certainly nothing but the presence of dire necessity could induce any man to engage at such work who was aware of the risk he ran. The same would seem to hold good of the commercial manufacture of dry plates—of any occupation indeed which keeps the operator in the constant inhalation of collodion fumes.

Professor Gibbs lately proposed the substitution of glass for paper filters. A funnel had its neck choked up with large fragments of glass; then smaller pieces were added, finally glass powder. This, he remarked, was sufficient to completely detain a precipitate, which could be thoroughly washed out, and then (in analysis) could be dried and weighed. It occurred to me that this principle might perhaps be turned to account in photography for filtering silver baths and collodions. I tried it, and with the following results:—

When a certain quantity of finely-powdered glass was used the rate of filtration became extremely slow. Some nitrate bath ran through only drop by drop, and at intervals of some moments; in fact, it seemed almost incredible that the descent of the water should be so much checked. This, of course, was a great disadvantage.

The quantity of fine glass powder was now somewhat lessened, so that the rate of passage became about that of a paper filter. It was found that in this manner the filtrate was tolerably, but not completely, clear. Some fresh solution of nitrate of silver, which was clouded by reason of the presence of chlorides in the water, still retained a faint opalescence after running through, nor was this removed by passing it through the filter three times. Filtration through paper removed it without difficulty; and this took place even with paper so openi n its texture as to allow the liquid to pass as rapidly as the glass, when the latter did not remove the opalescence.

I therefore conclude that glass is decidedly inferior as a filter to paper. I much regret this conclusion, as glass would have had some advantages. Paper is acted upon, as we all know, by nitrate of silver, and by exposure to light turns dark brown. In this condition it is not so pleasant to use, though I have never been able to recognise any injury resulting from using one filter again and again for negative baths, provided always, of course, that there was no iodide of silver to be separated as a precipitate, and, generally, no insoluble matter in any bath is able to injure the next by filtration through it. I am here speaking only of filtering negative baths from bits of collodion and such other matters as require filtration of baths continuing in good working order.

Glass would have been free from this difficulty of presenting organic matter for the nitrate of silver to darken. As, however, many kinds of glass give up alkali to water when pounded very fine, it would be necessary to guard against this by avoiding to have much fine powder, and by thoroughly washing with hot water. As the glass exhibited the inferiority here spoken of, it was not thought worth while to try it with collodion.

The French filters, stamped in circular form, seem to be getting into use all over the world, and, if they were only made of good filtering paper, would be exceedingly convenient. The French have, however, always used that sort of coarse grey-brown paper for filtering, and seem never to have recognised the great superiority of a softer paper, such as the good qualities of German filtering paper, which works so much faster. That, for example, which I have in use, and which is in no way remarkable, will filter nitrate solution in a good rapid stream, so that a half-gallon bath runs through in a few minutes perfectly bright. Nothing is more tiresome than a slow filtration when the filtrate is wanted for use, and nothing is better worth paying for than good filtering paper. Perhaps some of your readers may not be aware that a glass rod, about as thick as an ordinary black-lead pencil, laid inside the funnel between it and the paper, reaching from the neck of the funnel upwards, and above the edge of the paper, greatly expedites the passage of the liquid. It should be put under the portion at which the paper is three folds thick.—Yours very truly, M. CAREY LEA.

Paris, December 28, 1868.

I MUST refer again to the carbonate of silver paper of MM. Schæffner and Mohr, as I hope it will be one of the best things in silver printing which has been introduced for some time. I think the price of a sheet of this paper is about eightpence, size 22×18. Let us compare the cost of the use of this paper with that of albumenised paper, bearing in mind that with the carbonate of silver paper there need not be any waste from turning brown from being kept too long or the weather being too hot, &c.; every sheet can be used up. The cost of the carbonate of silver paper being eightpence per sheet, or 16s. per quire, may be considered equal to one quire of sensitised albumenised paper, the cost of which may be reckoned thus:—One quire albumenised paper, at say £5 10s. per ream = 5s. 6d.; according to the careful experiments of Herr F. Meicke, of Berlin, recorded in your pages March 25, 1867, each sheet requires 2·615 grammes, or about 40 grains of nitrate of silver to sensitise it. This equals 960 grains, or nearly 2¼ ounces avoirdupois, per quire, which at 4s. per ounce is 9s. for nitrate of silver, making a total of 14s. 6d. per quire bare cost of sensitised albumenised paper as prepared by the photographer, without reckoning anything for the value of his time, the wear and tear of utensils, apparatus, &c., and loss from various causes. But supposing we balance the wear and tear by the cost of the ammonia fumigation required with the carbonate of silver paper, I think it will be pretty evident to most that they may consider the use of the carbonate of silver paper will at any rate be as cheap, and most probably will be found more economical, than the ordinary silver albumenised paper.

I have made this comparison for two reasons, because I fancy that photographers generally have very little idea how much their sensitised paper costs them, and to encourage any who may wish to make a trial of the new paper by showing them it will not be more expensive in use than that they are accustomed to. There are many photographers who buy their nitrate of silver and albumenised paper at cheaper rates than those I have based my calculation upon, and the data I have given, from the experiments of Herr Meicke, these will enable to make a special calculation for themselves. When a new thing is introduced to the attention of photographers, it would soon be adopted or condemned if a number of experienced operators would at once try it, and report in the pages of the photographic journals. Of course the inventors of these new things are always sanguine of success, and should believe in their inventions; but buyers of new things and triers of new things are less enthusiastic, and unless they see a strong probability of an advantage they refrain from either trying or buying for the sake of these operations. Having, therefore, opened the case for the carbonate of silver paper, I leave it in the hands of the photographers themselves to pass their verdict upon it.

The question that will be interesting to scientific photographers with respect to this new paper will be the use of carbonate of silver, a salt slightly effected by light, and the employment of ammonia for producing an extra sensitive compound with the carbonate. Ammonia is, I believe, more used for this purpose in America than in this country, and I think ammoniacal fumigation of ordinary sensitised paper is much practised there for giving increased sensitiveness. It was used, and is still, in England for plain paper, under the form of ammonio-nitrate of silver, and its use is found to impart rapidity of printing power. Some time ago the Rev. J. B. Reade recommended the ammonio-iodide of cobalt as an iodiser for collodion for astronomical and instantaneous work, such was the extra sensitiveness imparted by the ammonia salt. The compound that is formed in the carbonate of silver paper is, I suppose, an ammonio-carbonate of that metal. From experiments, I do not think there is any *free* nitrate of silver on the carbonate paper, in which case there will be no ammonio-nitrate of silver formed, as upon a fumigated sheet of ordinary silvered paper, where we should expect to find an ammonio-chloride and nitrate of silver. A complete study of the *rôle* of ammonia in photography would be both useful and interesting. Why is it generally considered that collodion prepared with an ammonium salt is more sensitive than one prepared with a potassium or cadmium salt? Probably because the ammonia compounds are mostly unstable and readily decomposed; hence their value in photography, as shown by the few instances mentioned, and which I hope will lead to further communications upon the subject.

Another point of interest in this carbonate paper, and which the chemists must investigate, is the announcement that the compound formed by the action of hyposulphite of soda on the carbonate of silver is not decomposed in the same way as the solution of chloride of silver in the fixing salt, to the detriment of the stability of the prints on the latter silver compound. The chloride of silver forms a triple salt with hyposulphite of soda, which is liable to spontaneous decomposition, accompanied by a separation of sulphuret of silver. If the salt formed by carbonate of silver and hyposulphite of soda be less liable to such decomposition, the introduction of the carbonate must be considered a step in advance in silver printing. I suppose the compounds formed with chloride of silver and hyposulphite may be generally stated as hyposulphite of silver and chloride of sodium, and with carbonate of silver and the same fixing salt as hyposulphite of silver and carbonate of soda. This alkaline carbonate may prevent further decomposition in the solution of hyposulphite of silver, by neutralising any free acid that may be liberated. I believe both carbonate of soda and chalk (carbonate of lime) have been recommended as additions to the hypo. bath for this reason. Experience alone will prove the value of the new paper in respect to the qualities in which it is stated to excel.

I have been much interested in reading the valuable addition to the mass of photographic knowledge which is found in the pages of The British Journal of Photography, and in the article by Mr. George Price upon the retention and non-retention of albumen films upon paper, and given at page 613. But I have been made very uncomfortable by reading it, and, had I not plenty more matter to render me liable to unhappiness, I might make this paper a source of grief. I have not been abused in it. No; abuse hurts no one but he who dispenses it. On the contrary, the author has been most flattering in his remarks about me. No favourite theory has been crunched up, like that of Mr. F. W. Hart. I am said to be wrong in supposing that nitrate of silver weak and nitrate of soda strong are solvents of albumen; but then there are many in the same predicament, and we can bear that. But what I lament over is that, being told I am wrong, I am utterly and entirely given up to error of belief. There I am left, and no way out of the fatal path is shown to me. Methinks I hear, in the darkening gloom around me, the voices of those who have ventured to believe that albumen is *dissolved* by nitrates all asking for "light, more light;" and we are assured by him who has cast us into these dreary regions of error, that we must give up all hope of ever seeing the true light any more, for "a law which science knows nothing whatever about" is our only chance. My dear sir, may we ask you to experiment a little more, and find out this law, for till then we shall be uncomfortable, unless we find it out for ourselves? You are an indefatigable and able experimenter, and we will do all we can to encourage you in your task. We will suggest anything that gives us a chance of release. Is there nothing in *osmotic action*, or the theory and laws which govern and explain *dialysis*, and which, I think, have proved useful to sugar refiners, that will be of service to us? It is hard to think that science is so ignorant, and we, her humble votaries, are in such a "fix" in consequence. For the sake of humanity—for the sake of science herself—we pray Mr. Price to enlighten us further. Chaffing apart, photographers should feel much indebted to the clever author for his comprehensive study, which should lead to further results, and perhaps even greater than we at present imagine, with respect to the mechanical action of salts and the molecular condition of matter.

By the time these lines are before your readers the present year will have passed away, and another full of events will have just commenced. For myself I can only hope that I may long continue to meet your readers in these pages, that I may be able to find them new matter oftener than before, and that nothing may prevent my weekly appearance. I hope new readers will give in their adhesion to The British Journal of Photography, whose pages are open to all, and whose Editors I am sure are always on the *qui vive* to satisfy their many subscribers.

On Christmas Day I visited the Champ de Mars, the scene last year of an Exhibition without parallel in the history of the world, to which kings, emperors and potentates came and did reverence, and which was peopled by all nations, so that twelve millions went to and fro in it to admire its wonders. What now remains of this vast undertaking? Not a vestige! The Champs de Mars, once covered with the palaces, the gardens, the lakes, and the multitude of edifices of all countries, gay with bright banners and brighter flowers, is now a flat, dull, desolate level of dense mud! Not a stone of all that was wonderful last year serves to mark the spot! Thus it is with all sublunary things—passing away is written everywhere; but in letters, and writings, and relics, we live the past over again. And so I would draw another moral from that famous past Exhibition, and advise all the readers of this Journal to note down all they observe; to record all their experiments; to write all their thoughts respecting our art-science, and have them preserved in these pages; so that whatever changes may befall the writers, their deeds shall live when they have passed away. I must now wish all a most Happy New Year. R. J. Fowler.

Home.

PHOTOLITHOGRAPHY.

To the Editors.

Gentlemen,—In Dr. Markham's article in your last number, he describes a process invented by him, but which in reality was first introduced by M. Toovey, of Brussels. The reasoning employed by Dr. Markham is correct, and once on the track he could not fail in being landed in the process. He must not, therefore, be surprised in finding that others have arrived at the goal before him. He is without doubt an inventor, but not the first inventor of the process. But this by the way.

I have tried the process in question; but while I find that by means of a little care I get, easily enough, reproductions of subjects in line—such as the music he mentions at the close of his article—I cannot get at all a passable production of a photograph from nature. The fine and delicate gradations are quite lost, and the image is excessively hard. There are lights and shadows, but no intermediate tones. I am aware that you will tell me to try a grained stone. I have done so, but still without success.

I would take it very kind if Dr. Markham, or any other photolithographer, would inform me how to proceed in my endeavours to attain the point at which I am aiming, for at present I cannot get any encouraging measure of success. Might I also ask if your correspondent has tried other gums than gum arabic? Two or three years ago I was advised to try the photolithographic effect of tragacanth, and find that if carefully managed it is very useful.—I am, yours, &c., Litho.

December 29th, 1868.

QUERIES ON VARIOUS SUBJECTS.

To the Editors.

Gentlemen,—Will you oblige me by answering the following in this week's issue of your valuable Journal?—

1. Seeing a notice in your pages that paraffine may be used for coating baths made of wood, and advisin it should be poured in molten, I have inquired here, and no one knows any other sort than that burnt in lamps. Please advise me.

2. Will a mahogany bath made of wood and coated with shellac keep water-tight? If so, can you give me a formula for the varnish?

3. Is there any mode of taking transparencies at night by gaslight with the lens and camera by wet plates? (I am aware of the dry-plate process, by which to slightly enlarge or reduce.)

4. There is a splendid stream of water some little distance from my house—how can I wash prints in it to save labour? Would a box with holes drilled in and left in for the night answer the purpose? I fancy the prints would all stick together in the box on the side where the water went out.

5. Why will not gas do for the light of a magic lantern? Would it not give a much greater light than oil?—I am, yours, &c., J. P. Curtis.

Sleaford, December 29, 1868.

[In reply:—1. You are thinking of paraffine oil; what is meant is solid paraffine, which can now be obtained readily and cheaply. Paraffine candles can be purchased in London at a penny each. They are known generally by the name of gas candles.—2. Employ a thin lac varnish, and apply several coatings.—3. Place a strong light behind the negative, but previously interpose a piece of ground glass between the light and the negative, and at a sufficient distance from the latter to be out of focus. Do not use a stop in the lens if you can possibly do without it.—4. Make rough partitions of wire work or netting of any sort. By placing these in a suitable frame or box the prints will not get matted together when the box is sunk in the stream.—5. Gas *will* do for the magic lantern, but it gives a poor light compared with an argand oil lamp. We now speak of London gas; that supplied in other places has every chance of being better, as by no possibility can it be worse than that supplied to the metropolis.—Eds.]

OUR ALMANAC.

The British Journal Photographic Almanac is now ready, and may be had through our Agents, the Booksellers, Newsvendors, or direct from our Publishing Office. The book forms a comprehensive volume of 156 pages. Among the contributors will be found the names of the most able writers and practitioners connected with photography. We shall next week draw attention to the contents of the volume, and shall now merely add that the work contains a portrait of the eminent French artist, M. Adam-Salomon, from a photograph taken by himself, and kindly presented to us by him for publication in the Almanac. The portrait has been produced by Mr. Duncan C. Dallas's photelectric process. For other particulars relating to the work, see the advertisement on page v.

EXCHANGE COLUMN.

A large and powerful rolling press for pictures 15 × 9 on table stand, with drawer, &c., complete, quite new, will be given in exchange for a thorough good lock-stitch sewing machine.—Address, Curtis, Jermyn-st., Sleaford, Lincolnshire.

R. Jones, Broad-street, Leamington, will exchange a dark tent on wheels, nearly new; there is a large box to contain the whole of apparatus, chemicals, &c., with tent at top, which closes into a shallow box; and artistic backgrounds, copying camera, or universal, also stereo. camera without lenses, in good condition, for anything useful.

A good dark tent, also box, several first-class magic lantern slides 3½ in. (most with moving subjects), and a 1-1 plate triplet lens—all or part of the above will be given in exchange for a camera, size about 10 × 12; also a good outdoor lens to cover 10 × 12.—Address, Operator, West of England Photographic Studio, The Hoe, Plymouth.

Wanted to exchange, twenty-four parts of the work, *Working Drawings and Designs of Mechanical and Engineering Subjects*, published by Fullarton and Co., clean and in good condition (cost the advertiser 2s. 6d. per number), for a *carte-de-visite* rolling press, or half-plate tripod stand, or any photographic requisite of similar value.—Address, A. H. K., 1, Torquay-terrace, Headingley Leeds.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

Charles Mitchell, Bristol.—*Portrait of William Canynges, Esq., Bristol.*

W. D. Sanderson, Deansgate, Manchester.—*Views of Cat Bells, from Derwentwater; Shepherd's Crag, Derwentwater; the Lady Chapel, Fountains Abbey; Wattenalath; the Terrace, Haddon Hall.*

W. Stephens.—Your question was duly answered in the Journal.

Index.—With this number of the Journal is given the Index to Vol. XV.

W. D. Saunders.—The exact spelling or even phraseology in the title or name is quite immaterial. The boards have been returned.

T. (Sheffield).—If you obtain the written sanction of the original it will, in effect, secure you against all consequences.

C. W.—We have a lens of the kind about which you inquire, and we have never seen any that can surpass it, while but few equal it. It answers well for landscapes.

T. C. A. (Birmingham).—We regret the loss. The portrait is wonderfully sharp considering the great length of the exposure. The facial shadows are not, in our estimation, too dark. The other matter you refer to is being arranged, and will, we expect, be soon announced.

Mercurius.—If you have no gas in your house, you must use a spirit lamp, which will serve your purpose equally as well, and, if you use methylated spirits, be nearly as economical; at any rate, the cost of the heat will be trifling in comparison with the advantages gained by it.

X. B. Z.—When we first tried your collodion it behaved very badly, giving dirty, feeble pictures. Eventually, by adding tincture of iodine until it was of a deep colour, it worked cleaner, but it is still very slow. Try this yourself, and let us know how you succeed.

B. B. (Preston).—The method you propose for enlarging is quite good and cannot fail to answer. You can ascertain the exact length your camera should be by a single trial, or by consulting the table of enlargements given in our Almanac.

D. Scott.—Write again and say which "little girls" you mean—what size, where or when published, or where alluded to. By means of any of these items of information we shall be enabled to do as you desire. Respecting the work of the French artist, we can arrange that for you and your friends. Newman's manual of colouring is one of the best. No American work of the kind wished for has been published.

Cornish Photo.—We cannot tell the constituents of the powder enclosed, but we can give you a good formula for the preparation of a red light, and this, we presume, is all you wish:—Mix together sulphur, sulphuret of antimony, and nitre, of each one part; dried nitrate of strontia, five parts. An orange-red fire may be obtained from the following:—Sulphur, fourteen parts; chalk, thirty-four parts; chlorate of potash, fifty-two parts.

F. F. B.—A linen screen may be rendered transparent to an extent sufficient for producing evening transparencies by coating it on both sides with the following transparent varnish:—Add three pounds of finely-powdered white resin to two pounds of good nut oil rendered highly drying; put into a jar, and set the mixture in a sand bath, stirring until the resin becomes dissolved; then add two pounds of Venice turpentine, and stir the whole well together.

Constant Reader.—1. Although *legally* you would be liable to be pounced upon by the photographer, in a court of equity you would be set free. Practically, we do not think you run much risk, for a reason that we shall give when we come to write an article on the subject—which we intend doing as soon as our information is a little more complete. Your second query will then be answered also.—3. The simpler lens of the two mentioned will prove much the better for your purpose.

Carbon.—The hydrometer, or in the present case the argentometer, is constructed on the principle that the same body sinks to a greater or less depth in different liquids according to their density. In a very dense one it will not sink. If a very delicate degree of measurement were wanted by such an instrument the temperature of the liquid would have to be carefully noted. For this purpose some hydrometers have the mercury usually placed at the bottom of the cistern, so arranged as to act similarly to that in the bulb of a thermometer, the capillary tube rising up in the stem of the hydrometer.

"Braes of Carse."—1. You *must* have a condenser in order that the solar rays may be so converged as to pass through the object-glass, passing through the negative in their course. With this exception your plan, as detailed under the first head appears very good.—2. You acted wisely in throwing away the protosulphate of iron. The paint had evidently affected them.—3. Your third query explains why you have not attached your own name to your letter. You were afraid we would inform the exciseman. To deodorise methylated spirits of wine the following is said to be a good way:—Mix with it about an equal bulk of water, allow to stand for a day or two, then filter it through eight or ten changes of fresh charcoal pulverised in granular bits like split peas. At the end of this operation it is said to be deprived of smell. By placing it in the still it can then be brought up to any degree of strength. Those who use it for drinking do not put themselves to so much trouble; they merely sweeten it with a little sugar, and add a few drops of sweet spirits of nitre, which masks the offensive odour,

Received.—D. Winstanley, J. Tulley, J. Drummond, John Fox, Dr. M——, J. Stuart. These and other correspondents in our next.

The Photographer's Pocket Almanac.—A miniature almanac, under the above name, has been published by Mr. Cussons, of Southport. Being distributed gratis, we must not be hypercritical in connection with its contents, which are of a trade character, and which will, doubtless, serve the purpose of its enterprising publisher.

The Photo-Relief Printing Co., Limited.—Invitations were issued to upwards of a hundred representatives of the metropolitan press for Wednesday last, to view the works of this Company, and to see the whole operation of printing by means of Mr. Woodbury's process. We are glad to find that there is at last a reasonable chance of this important method of photographic printing being properly utilised in this country.

A Valuable Aid to Photographers and the Travelling Public.—A fortnight since we drew attention to an excellent travelling lamp, an advertisement connected with which will be found elsewhere. The manufacturers are Messrs. T. Hetherington and Co., of Broad-street, Birmingham. We again direct attention to the lamp, in consequence of receiving an exceedingly favourable report as to its convenience, portability, and good service on a long railway journey, from a gentleman connected with this Journal. For several hours he was enabled to read the smallest type with ease and pleasure, while the clear, soft, yet brilliant light added to the comfort and cheerfulness of the compartment during the night journey. We, therefore, direct the attention of that large portion of the public who form the travelling community to this new and excellent reading lamp. To the photographic public we also again commend this lamp for use in the dark room. It is the intention of the manufacturers to substitute yellow or orange glass for the clear glass now used. The new lamp will then prove exceedingly useful to photographers for the purpose indicated.

METEOROLOGICAL REPORT.

For the Week ending December 30th, 1868.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 10 a.m.

Dec. 1868.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
24	28·77	—	40	46	47	SW	—	Dull
25	Xmas.	54	33	—	—	—	0·59	Dull
27	—	54	33	—	—	—	0·59	Dull
28	29.36	51	—	40	42	WSW	0·16	Dull
29	29.29	48	38	42	42	SE	0·37	Rain
30	29.40	45	34	39	40	SSW	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 453. Vol. XVI.—JANUARY 8, 1869.

REMARKS ABOUT THE NEW CARBONATE OF SILVER PAPER.

We have little doubt that our readers have perused with deep interest the recent letter of our able Paris correspondent in which the the new carbonate of silver paper is specially referred to. The subject is one which deserves the earnest attention of all practical men, as affording a field for experiment and the exercise of ingenuity which gives promise of a rich harvest in process of time. Our own experiments on the process have been as yet confined to a few crude trials; but, in the absence of the fuller information on the subject which we expect shortly to obtain, we will now touch on one or two of the points which appear to us to be most noteworthy.

A few experiments with carbonate of silver itself will serve to clear the way to the comprehension of the principles upon which the new process is based; and, since we know that some of our readers are not acquainted with the properties of carbonate of silver under any circumstances, we would suggest to them to make a few trials which will clear away any difficulty they might otherwise encounter. Of course, in doing this we merely refer to tyros in the art, whose stock of chemical knowledge is of the most limited extent. To such the following experiments will convey more information than pages of description:—

Place in a test tube a solution of nitrate of silver of moderate strength; now add, drop by drop, a solution of pure carbonate of soda; a yellowish-white precipitate falls at once. This is carbonate of silver. We continue adding the solution of carbonate of soda until no additional quantity of the white silver salt is thrown down by each succeeding drop of the test. We now throw the contents of the test tube on a filter, and, when the liquid has run through the paper, we pour over the white precipitate some distilled water two or three times, allowing the wash water to run through the filter and carry away any impurities from the carbonate of silver. We now spread the latter on some fine paper with a piece of glass rod, and cut the coated paper in half. One portion is now placed aside for comparison, but the second half is held over the fumes of ammonia evolved from a little of the liquid ammonia of the shops placed in a saucer. The fumed and unfumed portions are now exposed to the light, when the following changes will be observed:—The plain carbonate of silver slowly darkens under the influence of the light, but requires long exposure before a full brown tint is reached. On the contrary, the portion of precipitate which has been fumed with ammonia quickly assumes a reddish-brown colour, and ultimately becomes of a good bistre tint. In ordinary diffused light on a moderately-bright day, a few minutes are sufficient to effect this change; whereas the plain carbonate, under similar conditions, is not much affected after an hour's exposure.

It will be remembered, in exposing the fumed portions to the light, that the action of the ammonia requires to be kept up, since, if the paper be simply fumed and then an interval allowed to elapse before exposure to the light, the change of colour takes place very slowly. We thus see that, in order to obtain the maximum of sensibility to the luminous impression, we have to keep up the supply of ammonia to the surface. The volatility of the alkali we all know to be so great as to admit of its speedy dissipation by even a very moderate degree of heat, or exposure of a surface carrying it to the air.

We now come to another point which can best be illustrated by an experiment. Some of the white carbonate of silver is placed in a test tube, and solution of hyposulphite of soda poured over the substance; it immediately dissolves, just as would chloride of silver under similar circumstances, but the properties of the two solutions are essentially different. When we compare them we obtain the following important results:—When the cold solution of chloride of silver is treated with acetic acid speedy decomposition takes place, sulphide of silver being deposited; when the solution of carbonate of silver in hyposulphite is similarly treated, hours elapse before the same decomposition occurs. Again: if we boil a solution of chloride of silver in hyposulphite of silver, the solution quickly becomes clouded if the liquid be neutral; but, on adding acetic acid to the hot liquid, decomposition at once takes place, sulphide of silver resulting from the treatment. When the solution of the carbonate of silver in the fixing agent is treated in the same way, boiling is not found to alter the liquid unless the temperature be kept up for a long time, and on subsequent treatment with acetic acid decomposition proceeds very slowly.

The significance of these facts is now obvious. MM. Schæffner and Mohr prepare their paper, whether plain or albumenised, with carbonate of silver. Owing to the slight tendency of the carbonate to decompose, the paper may be kept for a very long time without discolouration; but, on exposure to the fumes of ammonia, the previously sluggish carbonate is changed into a compound much more readily acted upon by light than our ordinary silver printing material. Then we find that a print produced on such a surface, after toning, is readily fixed by hyposulphite of soda without the slightest risk of rendering the prints yellow, or otherwise degrading the purity of the high lights, and this as the result of the peculiar properties of the solution of the carbonate in the fixing agent, which we have described above.

Lying before us as we write is a print produced by this process, and we can only say that it speaks loudly in favour of its mode of production. It is not quite up to the standard of an ordinary good albumenised paper print, but perfection is not immediately obtainable in any new process, however good; and there appears to be no reason why this one should prove an exception to the rule. It is but fair to add, however, that the *carte* we refer to possesses much delicate gradation of tone, and illustrates remarkably the capabilities of the process for affording whites of extraordinary purity; in fact, the print before us has evidently been produced chiefly for the purpose of proving the value of the process in this respect.

The toning bath recommended by the discoverers of this paper is the sulphocyanide and gold solution lately so highly commended. We long since pointed out that this is but another mode of effecting sulphur toning, and several excellent professional photographers have recently assured us that the same conclusion has been forced upon them by prolonged experience with the sulphocyanide bath, notwithstanding their opposition to our opinions in the first instance. We should, therefore, regret that the success of the new paper should be

hazarded by the use of an objectionable toning process, when the authors state that equally good results can be obtained with the acetate of soda or other well-known toning baths.

The new process admits of great variation, and, no doubt, of considerable improvement also; but the principle stands, however the details may be altered. The discoverers well deserve the thanks of all photographers for giving a new impulse to inquiry in a branch of our art which has undergone but little improvement of late years. We may now fairly look forward to the time when costly silver printing baths will disappear from the photographic *atelier*, and their place be supplied by the economical fuming box, and well-prepared paper suited for every variety of work.

BLURRING.

The proposition to use iodine dissolved in collodion, made by your correspondent Mr. Plymly, is a very ingenious suggestion, and seems to be much more advantageous than the annatto plan; for there is a far greater chance of getting a thorough optical contact, and the whole operation is much cleaner. But I think the use of iodine is very objectionable. Iodine volatilises very easily, and, if the plates are long kept, they must lose some, perhaps a large, portion of their protection; and, then, the air of the dark slide must become gradually charged with iodine vapour, which would tend to act, I think, injuriously upon the other plates. We all know the influence of free iodine in collodion—it tends to diminish sensitiveness very considerably; and I have endeavoured frequently to point out how very susceptible dry plates are to vapours contained in the atmosphere. A single plate coated in this way and presently exposed—as in the experiment recorded was probably done—may not be injuriously affected; but a number of plates placed together in a drying box, or in strong boxes, or even a single plate shut up for a time in a dark slide—in all these cases the vapour of iodine would be very apt to be injurious.

I therefore suggest the substitution of other colouring matter in the collodion in the place of iodine.* *Aniline red* dissolves very easily in collodion, which, when extended over glass, gives a splendid red film that may be rendered as dark as desired by increasing the proportion of the colouring matter. It would be needful to make it rather dark, as the crimson shade of aniline red is less impervious to the actinic rays than some other shades of red; for which reason I should advise to make it a very pale, deep red, by using an abundance of the colouring matter.

The test mentioned by Mr. Plymly is not, I think, always a decisive one. I have paid a good deal of attention to the matter of blurring, and have tried to find why at some times it will show itself with a comparatively short exposure, and at others be absent with a long one. As far as I have been able to make it out, the conditions are as follow:—

If the dark object have behind it a clear, deep, blue sky, there is little danger of blurring; the light from the sky is not intense enough. But if behind the dark object there be bright clouds, or even if, in the absence of clouds, the sky be hazy and the sun tolerably powerful, there will be danger. The position of the sun has also much to do with it. With the sun behind one there is less danger; precisely as the sun is more nearly in front of the camera the danger increases. If with a hazy sky the sun be so nearly in front that it just escapes shining into the lens, then there will be great danger of blurring, and the test for protection will be a better one. Still this is not decisive, for I have observed (as doubtless have many others) that in the same negative some branches, for example, of a tree projected against the sky will be blurred, whilst others, apparently equally exposed to the danger, will not be. M. Carey Lea.

SCENIC BACKGROUNDS.

Natural, printed-in backgrounds for *carte* or other photographic portraits give, in the writer's estimation, by far the most pleasing effects of anything that has thus far been introduced in this line. It does not follow, however, that "scenic backgrounds" will, therefore, go out of date; indeed, such a contingency is decidedly improbable, as such backgrounds are much more convenient to use than any process of double printing. They are, moreover, so much open to improvements that a comparison between printed-in and painted-scenic backgrounds is scarcely fair, seeing that almost all the printed-in backgrounds with which we are familiar are the work of first-class men, who have taken every pains to make the results all that can be desired.

In such outdoor backgrounds as we are already furnished with, the horizon line is frequently, if not generally, so placed as to appear about the height of the knees in the picture of a standing figure.

Those of us who indulge in reading verses as a pastime, soon become acquainted with what is called the "poet's license," which, as I take it, is simply the popular sanction to a custom of "murdering" language, rendered necessary to those who indulge in it by their having undertaken a task which they have not the ability or the patience to perform properly. No skill or talent would be required in the construction of verses if the "poet's license" were used *ad libitum*, and *no* limit were placed to the custom of giving other than the right meaning to proper words or mangling or coining words simply for rhythmical purposes. The art worthy of admiration is that of expressing beautiful thoughts in legitimate language, which, as it were, *falls* into "numbers" and *turns out* to be rhyme. Simple "word torturing," whether used in bad "poetry" or bad punning, is a contemptible practice unworthy of imitation.

What has the "poet's license" to do with backgrounds? Why nothing, of course, but it is parallel with another license, viz., the "artistic" one, which has a *great deal* to do with backgrounds, although it is very questionable if it *ought* to have.

Surely our art—the *truthful* art—ought not to be used for the purpose of perpetrating a glaring falsehood, and of writing down an outrageous impossibility. And yet, is it not so? Do not "artists," with their confounded license, draw for us impossible backgrounds? Do they not make fields, roads, and footpaths intended as continuations of our gallery floors, which under no circumstances at our command can possibly be made to "combine" with them? Do they not give us the horizon line in places where the horizon line can never be? And, when we photograph backgrounds of this kind, do we not perpetrate an enormity?

It is true we have no definite distance at which to place our cameras, and no definite height at which we make them stand; but those who paint us backgrounds ought to know that *there is but one point from which their pictures can be viewed* with such accuracy as they are capable of giving, and they might (if they are capable of determining that point), at all events, write legibly behind the background at what distance and at what elevation the said point was to be situated. Then at least we might buy backgrounds which would suit our premises and our lenses, and give us an effect in our pictures which, if not absolutely truthful, would, at all events, not be a glaring falsehood.

The writer has rather an extensive acquaintance amongst "photographic artists" (the brush men), and if these are a fair sample of their class, even a superficial knowledge of perspective is too much to expect from them.

Before being too hard upon the faults of others, however, let us bestow some little attention upon our own. Let us determine two things at least, viz., from what point a photograph of a person should be taken, and where it is best our horizon line should be.

The object of a portrait, as I take it, is to afford either a vivid resemblance of an absent friend, or to give a good idea of one whom we have not seen. For either of these purposes the preservation of the "likeness" is indispensable.

Filling wrinkles, converting a pug nose into an aquiline, or "carroty hair" into "curls of glossy blackness," are arts more becoming the notorious Rachel than a portrait painter. They may obscure ugliness, satisfy vanity, abbreviate life, or fill the "artist's" pockets; but *they also destroy identity*, which is exactly what a portrait painter ought not to do above all things. No artist does convert a "pug" into a "Roman!" Of course not; but he frequently makes the pug a little less puggy! the hair a little less of the Rufus style, and other unpleasant features a little less so, until the "likeness" is lost, and often the picture is merely a caricature of the original, or the original a caricature of the picture.

This work of destruction, so far as "likeness" is concerned, may be accomplished in more ways than one, and by photographers as well as by artists. Look at a man from some point whence you never saw him before (as, for instance, from the pavement in front of a high building, the man being on the top), and you would not know him. Point the camera up to a man so situated and photograph him, and you will get a result which no one will recognise. And why? Not that the man presented to this point any aspect other than the one given, but that we are not familiar with that aspect of the man, and fail to recognise him in a picture taken from such a point of view.

* Mr. Lea will have seen, since writing the above, that another correspondent, "H. E. W.," has, in our number for December 11th, suggested a modification similar in principle to that now described.—Eds.

To be sure this is an extreme case, but it serves to illustrate the fact that, a picture taken from a point whence we never saw the subject, will present an aspect differing from the one with which that subject is associated in our mind, and as much as the one position differs from the other. In short, to make a "likeness" of a person, the camera should see him *as he is generally seen.*

Men have peculiarities of *expression* by which we know them. These expressions may be either natural or affected. Some people try to look grave, others jaunty, others knowing, others dignified, some careless, and so on. Again: there are peculiarities of *position.* Some stand *à la* Napoleon, some *à la* Garibaldi, and others *à la* somebody else less known. To make a likeness as it *should* be, *both these* things should be taken into consideration; but this requires an acquaintance with our sitter of a longer duration than half-a-sovereign justifies us in cultivating or will pay for our using to advantage. One thing, however, we *can* do—we can avoid taking our portrait from a point whence it is very unlikely the subject is seen, except upon comparatively rare occasions.

When friends meet each other, or enjoy one another's society, they stand or sit together in most instances, and each sees the other's head on about a level with his own. Very tall men habitually look down upon their shorter brethren. Men of the opposite characteristic, on the other hand, are given to looking above them, but the *majority* of men, of course, will *see* the majority of men on a level with themselves; and hence the writer contends that, in the *majority* of instances—that is, as a rule—men are known to each other by one of the aspects they present when looked at from a point on a *level* with their own heads, and ought, therefore, to be photographed from such a point.

There is, however, another thing to be considered in portrait taking, and that is, as there are *several* aspects which exhibit the characteristic expression or attitude of the subject, to select one which is as pleasing to the eye as possible; and here, it seems to the writer, is one of the chief points for the display of artistic ability.

During a sojourn in Scotland, in the spring of 1868, the writer observed that Mr. Rodger, of St. Andrews, and Mr. Valentine, of Dundee—both men of renown as photographic portraitists—were in the habit of posing their subjects in a kneeling position on a chair without legs, using the back of it towards the camera as a support for the arms. By this means a more erect and manly aspect was given to the shoulders than in a sitting figure, and the head was brought to about the same level as the lens of the camera, which, to the writer's thinking, assisted greatly in the production of *likenesses* as well as pictures. Supposing it to be a fact that "dignity" is given to the appearance which a head presents by lowering the point of sight beneath the level of the head, is it not a questionable "improvement" to make, and a step in the wrong direction, inasmuch as it contributes to the destruction of individual identity?

Granting, however, that a portrait should be taken from a point on a level with the head of the subject, how about the horizon line in an outdoor background? The horizon is invariably on a level with the observer's eyes, indeed the word "horizontal," which signifies "dead level," is derived from the knowledge of this fact. If, therefore, we are going to represent this line at all, and represent it as the writer contends we should, viz., in a *possible* place, we have no alternative but to give it on a level with the *head* and not on a level with the *knees*, as frequently given.

A decided line in such a position would certainly, from an artistic point of view, be very objectionable; but surely no glaring impossibility ought to be represented in order to avoid this, for then the remedy is as bad as the disease. Suggestive rather than well-determined backgrounds—as in the pictures of Mr. Edge, for example—are most pleasing; and in these there is but little difficulty in giving the horizon line in what has, in the present article, been indicated as the proper place, without being offensive. Where this line is shown about the knees of a standing figure our camera must be supposed to be at the same elevation; and if the top of a table be also visible in our picture above the horizon line, the whole thing becomes ridiculous because incongruous, inasmuch as we are then supposed to be looking at our object both from above and below at the same time.

The subject is one not only worthy of, but positively demanding, serious consideration. To the writer's thinking such consideration will result in our making it a special rule to photograph our subjects from a point on about a level with the head in the case of persons of an ordinary height, and of raising in elevation and depressing in boldness our horizon lines in outdoor backgrounds.

D. Winstanley.

OUR ALMANAC.*

In the course of a few years the Almanac issued annually in connection with this Journal has grown from the dimensions of a tiny book for the waistcoat pocket to the large and plethoric volume now before us, the magnitude of which may be inferred when we state that, between matter and advertisements, it contains no fewer than 220 pages, being in this respect the largest annual of the kind that has ever been published, at least in our own country.

Sixty-four pages of advertisements attest the value attached to the Almanac by manufacturers and dealers in connection with photography; and from the very large circulation the work enjoys they would seem to have selected the proper means for securing publicity of a permanent character.

A feature in the present volume, as compared with its predecessors, is the introduction of illustrations, notably one which makes us acquainted with the *physique* of M. Adam-Salomon, the famous Parisian photographer. This has been engraved by Mr. Dallas by his photelectric process. It is said to be a fine and characteristic likeness. In order to secure the necessary large supply of prints in time, *two* plates were engraved, both of which have been used in supplying the requisite number.

The various articles which this year form the reading matter are very varied in subject and treatment. Of these the Editor himself contributes upwards of twenty, besides a variety of hints, suggestions, and formulæ.

Among the original articles written expressly for this Almanac by the Editor's friends are:—*Remarks on the Coffee Process*, by Mr. England; *On the Production of Instantaneous Photographs*, by Mr. Valentine Blanchard; *Remarks on the Honey Glycerine Process*, by Dr. Kemp; *How to Treat a Broken Negative*, by Mr. Chawner; an article on *Achromatism*, by Mr. George Shadbolt (our predecessor), whom we rejoice to see again "in type;" *Carbonate of Silver Paper*, by Mr. R. J. Fowler, of Paris; *A New Salt of Gold for Photographic Purposes*, by Mr. A. L. Henderson; *On Printing and Toning*, by Mr. Foxlee; *How to Print a Hard Negative and Preserve Detail in the Shadows*, by Mr. Werge; *On Focussing*, by Mr. Bockett; *On the Preparation of Albumenised Paper*, by Mr. Pumphrey; *How to Remedy Over-exposed and Over-developed Negatives*, by Mr. Homersham; *On the Glycerine Process for Transparencies*, by Mr. Harrison; *On Photographing on Canvas*, by Mr. George C. Warren; *On Celestial Photography*, by Mr. Grubb, C.E.; *On Mounting and Framing Pictures*, by Mr. Frank Howard; *On Swan's Carbon Process*, by Mr. J. R. Johnson; *On the Ratio of Exposures*, by Mr. Samuel Fry; *Comparison of French and English Weights, Measures, and Money*, by Mr. R. J. Fowler; *On Exposure, Developing, and Lighting*, by Mr. E. Dunmore; *How to Cure Pinholes and Fog*, by Signor Vervega; *On Photographing Children*, by Messrs. Charles E. Pearce and Edwin Cocking; *On the Invisible Image*, by Mr. W. H. Harrison; *On the Law of Charges, or Value*, by Mr. John Beattie; *On Photo-Enamelling*, by Mr. F. W. Hart; *On the Velocipede Applied to Photography*, by Mr. Swan; *On Small Cameras and Enlargements*, by Mr. Ernest Edwards; *On the Law of Copyright in Photographs*, by Mr. Le Neve Foster, M.A.; *On Landscape Composition*, by Mr. W. H. Davies; *On Natural Backgrounds in the Studio*, by Mr. S. Parry.

These, however, only comprise some of the subjects, for we find, in addition, valuable and interesting articles by Dr. Reynolds, Dr. Markham, Dr. Vogel, Mr. R. W. Thomas, "Aliquis," Messrs. M. Carey Lea, William Griggs, O. G. Rejlander, Walter Woodbury, and others.

Among the articles by the Editor are *A Chapter for Beginners—A Brief Treatise on the Magic Lantern—On Collodion for Dry Processes—How to Exhibit the Development of a Plate in Public—On Photographic Poisons and their Antidotes—On the Ammonio-Iodides—On View Meters—On the Derangement of the Silver Bath—On Defects in Landscape Lenses—On Lenses for Distant Objects—On the Various Dry Collodion Processes most Successfully Practised*, with a detailed account of each—*On Cracking of the Collodion Film*, &c., &c.

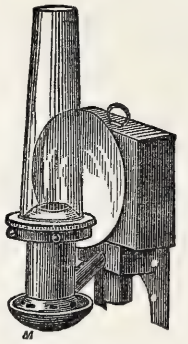
It must be confessed that the foregoing list of subjects presents a most varied bill of fare. By way of giving an extract we shall select from one of the editorial articles, that on the lantern, some observations on lighting up this instrument by means of the Argand lamp, in the belief that it may prove of some use at the present festive season, when the lantern is, more than at any other time, in popular demand:—

"*Lighting.*—The subject of lighting next claims consideration. Theoretically, the most perfect light is that which is very small and intense;

* The British Journal Photographic Almanac and Photographer's Daily Companion, for 1869. Edited by J. T. Taylor. London: 2, York Street, Covent Garden.

but in practice a flame of somewhat large size answers very well—indeed rather better than when the size is small, for the condensers are seldom, if ever, perfectly corrected for spherical aberration, and still seldomer are they made of homogeneous glass; for which reasons a very small and intense flame is not projected evenly over the disc, and the slightest defect in the condensers is shown with painful amplification on the screen. The lime light, when produced with the mixed gas burner, is the smallest-sized flame usually employed; and, although it is not by any means small, yet it sometimes proves a severe test for the optical qualities of the lantern.

"The best light for ordinary private lantern exhibitions is the Argand oil or paraffine lamp; and the best for public exhibitions, or those on a large scale, is the lime light. It is not sufficient that a lantern have an Argand or *solar* lamp (as they are now frequently called), for many of these give indifferent light, owing to imperfection in construction or diminutive size. The writer has in his possession six Argand lamps of various constructions, all of them intended for the magic lantern. One of these belonged to a lantern recently purchased at a high price; but when its power was tested by a photometer, it was found to yield a light of only two-thirds the intensity of another of similar size. If oil is to be burnt, the best and most convenient lamp is that which is here engraved, which is known as the 'Fountain Argand Oil Lamp.' Its advantage over those in which there is a narrow contraction in the chimney (the original form) consists in there being less liability to have the chimney broken through haste or inadvertence in lighting the lamp, the functions of the contraction in the chimney being here performed by a brass stop or 'solar cap,' as it is technically called. That portion of the frame situated below this stop is quite cut off from observation, and to this extent there is a loss of light, or rather it is scarcely so economical as the other; but considerations of parsimonious economy must be ignored in a case of this kind, especially as the amount saved in a two hours' entertainment would not exceed a penny or two.



FOUNTAIN ARGAND OIL LAMP.

"To prepare the oil for this lamp place in a bottle a pint of sperm oil, set it on the hob until it is warm, and then introduce about two ounces of camphor previously crushed into small fragments. Shake the bottle repeatedly and the camphor will be found to dissolve. Much of the perfection of the flame depends upon the evenness with which the top of the wick has been cut. I have never yet seen it cut or trimmed by means of scissors with the regularity by which it can be prepared in the following manner:—When the wick has become burnt or charred, and the lamp has quite cooled down, remove the cruder portions of the charred wick by means of the scissors or knife, and then rub the finger firmly round the wick in a circular direction. The wick at the commencement of this operation should be slightly *above* the level of the brass burner, and should be rubbed down to its level. If those who experience difficulty in getting a flame of perfect uniformity will adopt this method, they will never again have cause to complain of a want of success.

"It will tend to expedite the lighting of the lamp, and thus indirectly to evenness in the top of the wick, if a camel's-hair brush, or even a feather, be dipped in paraffine oil or turpentine, and then applied to the surface of the wick. In the management of a lamp of this kind the great point is to secure evenness of the wick, for on this depends the uniformity of the cylinder of flame.

"This applies equally to the Argand paraffine lamp, concerning which a few words may now be said. The burner of this lamp is similar to that already described, but the reservoir for the oil must be placed below the burner and not on a level with or above it, as in the case of the fountain lamp. While the reservoir of the fountain lamp may be advantageously retained inside of the lantern, that of the paraffine lamp would be much safer were it placed outside, for some kinds of paraffine oil will not stand exposure to a high degree of temperature with impunity. I find, however, that the simple expedient of placing a sheet of tin between the burner and the reservoir prevents the oil from getting heated to any great degree, especially if the holes for the ingress of air be in the immediate vicinity of the reservoir. The sheet of tin alluded to acts as a sort of false bottom, and thus keeps the oil comparatively cool. Of the various Argand paraffine burners that I have seen, the best, in my estimation, are those bearing the stamp 'Young's patent.' They are well made, strong, and not liable to get out of order. There are other kinds of lamps, but those here described are the only ones that should be employed in a good lantern.

"Common gas is frequently applied to the lantern, but, although it is very convenient in houses in which there is gas, yet the light is much inferior to that from an oil or paraffine lamp. Gas for this purpose should be enriched by being passed through a box or small metallic chamber loosely filled with fibrous or spongy material saturated with a hydrocarbon, such as benzole. The improvement thus effected in the light is greater than will be generally credited. If two fish-tail burners are placed so that one shall be nearly an inch behind the other, and if they be so inclined as to permit the flames to touch each other at the top, a great intensity in their luminousness will accrue. When separated, the intensity of the light is much diminished. If the gas be so saturated with the vapour of the hydrocarbon as just to be on the eve of emitting a smoky flame, it is then in its best condition for giving a luminous flame, one which will be both brilliant and dense; and, in this state, a pair of fish-tail burners, one placed before the other, will yield a light at once steady and powerful. I have seen a very good carburetter made out of a four-ounce bottle, although it should be formed of metal so as to stand a slight degree of heat sufficient to slowly volatise the turpentine, benzole, naphtha, or whatever other fluid may be employed. The gas must be admitted by means of one pipe, and, after coming into contact with the cotton which has been saturated with the liquid, should pass out by means of another pipe."

On the vexed question of *prices*, and the laws which regulate them, Mr. Beattie offers some admirable and philosophical remarks, which every professional photographer will do well to ponder; in like manner Mr. Le Neve Foster, the respected Secretary of the Society of Arts, in his article, *Copyright in Photographs*, gives a careful digest of the law of this country. Scarcely a week elapses in which we do not receive letters from photographers making inquiries concerning this matter. Mr. Foster (who is a barrister-at-law) presents the subject in a manner quite devoid of legal technicalities. The question as to *who* is the owner of a portrait negative, and the legality of photographers doing what they like with such a negative, are ably discussed. It is, we venture to say, one of the best expositions on the law of photographic copyright extant, and, as such, photographers cannot *afford* to be without the volume in which it is contained.

Mr. England, in his *Remarks on the Coffee Process*, institutes a comparison between it and his own collodio-albumen process (both of which are given in detail among the editorial articles), and, after some observations which cannot fail to interest every landscape photographer, he thus sums up:—

"I cannot but acknowledge that the coffee process possesses two important advantages over the modified albumen, namely, it has greater sensitiveness, and is exceedingly simple—the latter a great recommendation, as it can hardly fail in the hands of a careful manipulator to produce good results. Still, on the other hand, the modified albumen process possesses great certainty and freedom from solarisation in the most brilliant sunlight and under the most violent contrast of light and shade—a quality the coffee process does not always possess. The film also perfectly adheres to the glass, thereby saving much trouble to the inexperienced.

"However, I cannot but regard the process of Colonel Barrati as a valuable addition to those that already exist, and destined to become a favourite with many photographers."

From the thoughtfully-written article on *Instantaneous Photography*, by Mr. Blanchard, we give just a single paragraph to show the practical nature of his remarks:—

"One point we must be particular about: it is to see that there be perfect harmony between all the solutions. For instance: with a forty-grain bath we must have a highly-bromised collodion and a strong iron developer. A collodion with a small proportion of iodiser, and giving in consequence a thin, pale, blue film, will not yield the best results in such a strong bath, but will work much better in one not so rich in silver. The collodion I have described must not be confounded with one containing a very large quantity of bromide; indeed, it will be found that, as bromide of silver is slowly formed in the bath, such a collodion will also give a thin, blue film. The colour is, however, deficient, and if the plate be left longer in the bath it will acquire more colour. The difference in results will mark the two sorts. With the collodion weakly salted the picture will possess considerable contrast; but with the other the image will be thin, and will show in the high lights points of white on the surface, which will be visible even before fixing."

To specify the titles of the numerous brief articles comprehended under the headings "General Formulæ" and "Recipes and Hints," would be extremely difficult. It is enough here to remark that in this department will be found the best toning, developing, and general working formulæ at present in use in the first studios in the world.

We may state that there are also eleven pages of the most useful tables for photographers, such as tables showing the times of enlargement or reduction when lenses of certain foci are used; tables of chemical symbols and atomic weights; of specific gravities; of the solubility of iodides and bromides; of French and English weights and measures; and others of similar utility.

ELECTROTYPING AND ELECTROPLATING.

No. IV.

COPPERPLATING.

BEFORE the amateur in electroplating commences his experiments, it will be necessary for him to obtain a stock of copper wire for making

his connections with the battery and depositing vessels—that known as No. 14 or 16 Birmingham gauge will be found the most suitable. Why copper wire is recommended is because that metal is the best conductor of electricity next to silver, which latter metal would be found too expensive. Brass comes next in conducting order, but is too brittle to admit of being generally used.

A depositing vessel will be required; one of metal glazed inside is recommended, as it will allow the various fluids to be warmed to the temperature which most facilitates the quick deposition. It may be here mentioned that of the three metals, copper, gold, and silver, copper requires the least heat, silver rather more, and gold more than either, to ensure the quick, even, and reguline deposit of each metal.

If a metal depositing vessel is used, metallic rods must not be employed for supporting the article and the plate in their perpendicular position, because they would cause the circuit to be completed between the two poles by means of the metallic connection afforded by the metal of the vessel, and no deposit would occur on the article. Glass or any other insulator must be used when metal vessels are employed.

Having decided as to which of the previously-mentioned batteries you will use (I should recommend the sulphate of copper battery for copperplating), put it in working order, and let it work for two or three minutes, so as to imbue the plates with the solution. That is one step. Now make the copperplating solution, which is made as follows:—Take two ounces sulphate of copper—the same as used for the battery—and dissolve it in sixteen ounces of distilled water and filter it; when quite clear, add one ounce of sulphuric acid (oil of vitriol), and, when the heat which is generated by the union of the acid with the water is dissipated, it is fit for use.

It is highly important that the solution should be bright and clear, or it will not deposit so good a colour, nor in a reguline condition. What I mean by "reguline condition" is, that the metal is deposited on the article being plated in the same condition as we see the metal in everyday use—a regular deposit, no roughness, and quite coherent. That is the second step.

You will now require a small sheet of copper, as mentioned before, about five inches by three, soldering to the wire proceeding from the copper of the battery. This you must immerse in the copperplating solution for a few minutes, and, whilst it is in the solution (the battery of course in action), you must attach by soldering, or any other method, the article you wish to plate to the wire proceeding from the zinc. When satisfied as to the perfect connection of the poles with the battery, then lower the article into the solution and fix it, as described before, in a perpendicular position facing the copperplate, and about two inches from it.

It is recommended by some operators to place the article to be plated and the copperplate horizontally and parallel to each other, instead of perpendicularly. In my private practice I have found the latter method best, for this simple reason—that the continued action on the dissolving plate which is uppermost detaches from time to time a black deposit, which, under the most favourable conditions, will form on the copper; and this deposit falls down and deposits itself on the article being plated, and if not discovered and removed in time will eventually spoil it. When, however, the plates are perpendicular the deposit falls to the bottom, and will allow of the fluid being decanted, and thus save the operator much trouble and annoyance.

Sometimes you will find that the deposit will either not commence at all, or will deposit in patches in various parts of the article. If the former be the case, then you have not a good conductor of electricity, and the copper will refuse to deposit. It must then be prepared with a good coating of common black lead, which must be polished in the usual manner. You have now a coating of metal in a finely-divided state, which will enable the copper to spread itself over it. Now place it in the depositing vessel, and the process will go on satisfactorily again.

You may have an article you wish to coat which you are assured is a good conductor of electricity, but refuses to allow the metal to deposit in a clean, reguline condition, and causes it to be thrown down in the shape of a black, non-adhesive powder. In this case you have a metal which decomposes the sulphate of copper; and you must obtain, in order to produce a satisfactory result, a basic or primary coating of copper by a different process.

In these cases the cyanide of copper is principally used, which is prepared thus:—Procure some scraps of copper or clippings of copper wire, and dissolve them in nitric acid to saturation; then decant the clear liquid, and evaporate it until crystals are formed; then pour on the crystals four ounces of water, and stir until they are dissolved. Now take a sufficient quantity—say a fourth of the above solution—and further dilute it with six times its volume of water; then add to the resulting solution of nitrate of copper a piece of cyanide of potassium—about one ounce. You will find it produce a thick, curdy precipitate—cyanide of copper. Stir it well with a glass rod; the precipitate still increases; stir on, and when the cyanide can precipitate no more it commences to redissolve the precipitate, and sufficient cyanide must be added until the precipitate is all dissolved, and the solution is bright and clear.

You have now a solution of cyanide of copper; a little more cyanide must now be added to produce free cyanide, which acts in making the liquid conduct better. This is a very useful condition of the metal, and must be used exactly in the same way as the sulphate solution, with the article and plate in the same position, when, if the article be not composed of iron, you will find, on putting your battery to work, that a thin coating of copper will be precipitated on the article. The copper, however, which is deposited by this process neither answers nor can be used for general depositing purposes; its only use is to deposit a thin film of copper on refractory articles, and when you have got that thin film you must take the article and plate out of the cyanide bath, and well wash them and replace them in the before-mentioned sulphate bath, when the process will be found to go on satisfactorily, and the copper will be deposited quite easily, cleanly, and regularly. That is the way to overcome one of the greatest difficulties that presents itself in copperplating.

Now to treat and remedy the other peculiarity of electro-deposition—that of the deposit occurring in patches in various parts of the article. This is a peculiarity which is to be met with in every phase of electro-deposition, whether silver, gold, or copper solution be employed, and arises simply from the fact that the article being coated does not possess a chemically clean surface—a condition as essential to an even deposit as a clean glass is to a clear negative.

In cases of this description the article must be removed from the wire and be either boiled in, or well rubbed with, a solution of pearl ash or common soda in boiling water, taken out, well washed and rubbed, and replaced in the plating solution without drying, when, if the surface be clean, the process will go on satisfactorily; if it do not do so it is obvious the process must be repeated as often as necessary.

Now for a few words on the different results of the different battery powers used in the decomposition of copper. It must not be taken for granted that every remedy suggested for the alleviation of the ills incident to copperplating is applicable to the deposition of other metals. Copper is a metal which is eminently suited, both by reason of its preservative power and its quick and easy deposition, for the various uses to which it is applied; and none the less is it prized for its preservative power and its quick deposition than for the facility with which it can be deposited in various conditions.

By noticing the following powers employed, and their consequent results, the operator will be enabled from time to time to correct his solutions and batteries, when the faults correspond to the following results:—If a small Smee's battery and large sheet of copper is being used, so that the waste from the solution may be readily made good, the copper will be deposited on the article coating in so soft a state that it may be cut with a knife as readily as a piece of lead, and this condition of the metal is admirably suited for the taking of casts of moulds by the electro process, as it is deposited in a reguline condition, with the particles in a state of perfect cohesion. With two pairs of Smee's improved battery, or the sulphate of copper battery, arranged for quantity, the metal is deposited quite as cohesive and compact, but harder; so that, by employing a stronger or weaker battery, different condition may be obtained.

Now arrange the batteries for intensity, and the metal will lose its soft, cohesive, reguline condition; and, as more power is put on, still arranging for intensity, the metal will be gradually deposited in various qualities, deteriorating from the reguline to the crystalline, from the crystalline to the brittle, from the brittle to the rough (and when the battery power is increased greatly in excess), from the rough to the pulverulent, and from that to the condition of an useless, non-adhesive, black powder.

The foregoing conditions must be carefully attended to. I am afraid theory must be set aside and practice alone be depended upon to enable the operator to regulate the power so as to produce the desired quality of metal.

I shall not yet dismiss the subject of copperplating, as it offers so many instances of refractory deposition which are readily overcome, the surmounting of which is calculated to improve the amateur's acquaintance with the art, and better fit him for experimenting on the salts of the nobler metals. My next shall be devoted to a few general remarks on copperplating, and directions for depositing that metal on the ordinarily repulsive bases of iron and steel.

NON SAPIENS.

A FEW GENERAL RULES FOR BEGINNERS.*

1. Invariably wash the fingers under the tap immediately after they have been in *any* solution, but most particularly after hyposulphite. By neglecting this you will transfer portions of one solution to another, and lay the foundation of long series of failures, which may prove utterly distressing and perplexing.

2. Do not have the ambition to commence with difficult work. Point the camera out of the window, and take the view, such as it is, until you can do it with certainty and success. After that will be time enough to try portraiture—last of all, copying.

3. Begin with small plates, and do not try large ones until you have mastered the smaller. Half-size will be the largest proper to begin with.

4. Do not undertake to make collodion before you have learned how to use it. Be satisfied to purchase that which some experienced friend recommends.

5. Do not tend towards intensifying thin pictures by after treatments. When photography was less understood this was oftener necessary. It is better to wash off and begin again, and generally less trouble to get a better result.

6. The quickest way to learn is this: take any simple object as above, a brick house for example, and try it again and again, varying the length of exposure and the length of development, until you get a negative that prints exactly right. This will teach more in a few mornings than as many weeks of random work.

7. Successes that come by chance are worthless, and prove nothing as to ability. Try to know exactly why you succeed and why you fail.

8. You may often succeed in getting the right exposure the first time, but you cannot be sure of it; yet a careful examination of the first trial ought to enable you to make sure of the second.

9. If the camera needs to be placed in the sunshine, throw the focussing cloth over it before the shutter is drawn out to make the exposure. The direct light of the sun may find its way through rents too small to admit diffused.

10. Once in a while wipe out the camera with a damp cloth to remove dust, which by settling on the plate may cause pinholes or comets.

11. Treat the lenses with *the utmost* care. Never leave them about; never wipe them with anything but the softest old linen cambric, perfectly clean, or, still better, with soft chamois leather, and not even so except when needed.

12. Do not unscrew the tubes unnecessarily to wipe the inside surfaces of the lenses, or for any other purpose, and always do this in dry weather, or you will let in damp air, which will be apt later to leave a dew on the lenses. If any of the lenses are set loosely in the tube, be sure they are replaced with the same side front as before.

13. Do not let either the lenses or the camera stand in the sun, or you may expect warping and splitting of the wood and discolouration of the lens.

14. Be sure that the camera stand is free from vibration. Uncover the lens very gently so as not to skake the camera in the least, or the definition will be impaired.

15. Unless the ground glass is of the best you cannot focus with accuracy. Much of the ground glass in the cameras made for sale is very poor. The glass should, in fact, not be ground at all, but only "greyed," that is, have its surface removed by rubbing with fine emery powder. Focus a brick house 200 feet off with a short-focus lens, and if you cannot see the white lines of the mortar either with the naked eye or the magnifier, the glass is too coarsely ground, and it is to be expected that all the work done with it will be inferior.

16. Focussing with a microscope is less trying to the eyes, and gives sharper work. The larger the lens of the microscope used the less the eye is strained. An engraver's glass set in horn is good, but a similar one, an inch and a-half or two inches in diameter, tires the eyes still less.

17. Learn exactly how to make a negative bath, and then avoid doctoring. For the most part you will only injure it. Add a very little carbonate of soda, and sun it, if out of order, for some hours in direct sunlight, then filter and acidulate as directed for a new bath. Filter first, then acidulate.

18. Decaying organic matter, foul smells, sulphuretted hydrogen, and fumes of ammonia may be expected to produce fog.

19. Do not think it necessary to have the dark room too dark. There may be light enough to work with perfect comfort, and the strain on the eyes in going backwards and forwards will be so much the less—an important consideration.

* *Manual of Photography.*

20. Have nothing to do with cyanide of potassium. It is a substance of which the photographer has no real need. If used at all, it should be left to those who have learned their experience on less dangerous materials.

21. Remember that most chemicals are poisons, and that if the fingers are not washed immediately after being plunged in them, or if, even with this precaution, they are kept long in the solutions, mischief may ensue. What this mischief may be is of so gradual and insiduous a nature as to be ascribed to any other cause than the right one.

22. Remember, also, that most fumes are injurious. Vapours of ammonia disorganise and paralyse the blood corpuscles. Vapour of ether is very injurious to the nervous system, and depresses the whole tone of the body. Nitric acid is highly poisonous; its fumes, when inhaled, in even a moderately strong form, may cause death in a few hours.

23. Therefore make every provision for thorough and complete ventilation. And do not fancy (as many most unwisely do) that because your senses become habituated to such fumes, and cease to be inconvenienced by them, that the system is, therefore, not suffering.

24. Adopt invariably the maxim, that whatever is worth doing is worth doing well. Practice never makes perfect without care and thoughtful and intelligent observation. Some will do a thing all their lives, and always badly.

25. Acquire the habit of rinsing out all the vessels as soon as emptied, and of not leaving the adhering portion to dry on the bottom and sides, when it will take five times the trouble to get it out.

26. Make it a rule to wash every vessel before you put it away, and again before you use it. Never trust to *anything* being clean, but make it so. If there is any one thing that is essential in photography, it is care of this sort. The delicate reactions on which photographic processes depend are sufficiently exacting, without further embarrassing the processes by introducing foreign matter of unknown nature.

27. Never forget that no vessel is rendered clean (even if what it has contained has been merely an aqueous solution) by simply pouring water in and throwing it out.

Hold, therefore, the vessel, whether beaker, bowl, bottle, or whatever it may be, under the tap, so that the water may run over *every* part, inside and out—outside, because you can never be certain that a glass vessel is clean *inside* unless you have also made it so outside. Remember that if you hastily rinse out a vessel, you may leave drops of the old solution adhering to the sides above where you have washed, and that a single drop so left may spoil the following operation. This direction may be thought so much a matter of course as to be superfluous, but it *is not so*.

In all cases, except where the old contents are very easily removable by water, employ the bichromate cleaning solution, which for this purpose may be made of double or treble strength, so as to work more energetically.

28. Finally, the beginner in landscape photography is earnestly recommended to act upon a definite system. For example: let him not run from one lens to another, but rather, having provided himself with one thoroughly good one, let him study out its capabilities and learn exactly how to use it. Different lenses work so differently that, to the beginner, they are very confusing, and tend to conceal from him the sources of the mistakes and faults that he must necessarily make. Only in one way can he usefully employ himself with several lenses, and that is by using them in succession to take the same view, and observing and studying closely the differences in the results.

It has justly been observed by Mr. H. P. Robinson that there is no more effective way of learning than by selecting some one particular view, and working at it until a thoroughly good picture is obtained, regardless as to how numerous the attempts may need to be. One such piece of negative-making worked thoroughly out will teach as much as thrice the time spent in random view-taking. The student should bear steadily in mind that whilst a thoroughly good negative is very valuable, there is nothing more worthless than a tolerable one. A tolerable negative is not worth the trouble of printing, and is consequently worth nothing at all.

M. Carey Lea.

SCIOGRAPHY.

So far as we are aware, the attention of photographers has not been so peculiarly directed to the subject of *sciography*, or the projection of shadows, as the subject warrants. We have pleasure in directing atten-

tion to the following article on the subject, for which we are indebted to our next door neighbour, the *Builder*:—

A HUNDRED-AND-FIFTY years ago the learned few who knew there was such a word as sciography in the world of words, attached a different meaning to it from that it represents in the present day. It was explained at that time as a profile or platform, or the first rude draught of a thing. It also represented the art of dialling, or of showing the time of the day by shadows; and astronomers used it to express the art by which they found out the hour of the day or night by the shadow of the sun, moon, or stars. As far as it concerned architecture, it simply meant the profile mentioned above, now called an outline or a section, then described as "the draught of a building cut in its length or breadth, to show the inside of it, as the conveyance of every room, with the thicknesses of the walls, timber works, floors, vaults, &c." So lately as the period of the compilation of Rees's *Cyclopedia*, sciagraphy and sciography are both explained as "the profile, or section, of a building to show the inside of it." As with many scores of English words, however, we have sifted and shifted the meaning of these kindred terms, and they are not now by any means so interchangeable. Profile, in the architectural world, is extinct, though it still flourishes in the portrait painter's studio; platforms, too, have vanished from the modern draughtsman's vocabulary, enticed, perhaps, by the high office held out to them at public meetings; and sciography no longer means the outline of a building, but the outline of the shadows that are cast from that building. As precision of terms is one means of progress as well as one sign of it, we may congratulate ourselves upon being on the right road.

We have before us a work on this science of the projection of shadows by Dr. Puckett.* He tells us most of his text and many of his diagrams were prepared as blackboard lessons for the students of the Bath School of Art, who are under his instruction. No progressive text-book being at hand, he called upon his own resources; and, aided by hints derived from the lectures on perspective at the Royal Academy by the late Professor of Perspective, J. P. Knight, R.A., and by thoughts suggested by Dr. Brooks Taylor's more advanced work upon the same subject, he has endeavoured to fill up this void for other teachers and pupils by placing his lessons in their hands. Before a student is in a position to be benefited by our author's labours he must be familiar with linear perspective; sciography, from its very nature, cannot be more than a supplement to perspective. But to architectural students his work is likely to be of great use, as errors in shadows, their spendthrift profusion, and the idle withholding of them altogether, are as pitfalls in their paths, into which they must certainly fall without a sound knowledge of the principles that govern them.

Dr. Puckett lays down the primary laws of shadows in these plain terms:—

"The direct shining of the sun, or other luminous body, is in the form of rays, or thin ethereal lines, each acting independently of the other; no such separation of parts is observable in common circumstances, in consequence of the diffusive properties of the atmosphere.

"When the medium in which the rays of light move be of uniform density, they will always spread in straight lines from the luminous body which produces them.

"In consequence of this directness, a shadow or darkened spot is observable behind any opaque object presented to the light. During night we are in the earth's shadow; and this shadow reaches so far beyond us into space, that when the moon plunges into it in her course she undergoes an eclipse.

"In proportion as light advances from its seat of production it diminishes in intensity. The ratio of diminution is agreeable to that which governs physical forces—*i.e.*, the intensity of the light will diminish as the square of the distance increases, or at the rate of 1, 4, 16, &c. But in proportion as we lose in intensity we gain in volume; the light is the weaker the further it is from the candle, but it is filling a wider space. This continual receding of the rays of light from each other, as the word implies, forms radii, proceeding from a centre."

Notwithstanding this radiation, the sun's rays, owing to the immensity of space they traverse, are conventionally divested of their almost imperceptible divergence, and considered to be parallel to each other. In accordance with this accepted fiction, the first lesson to be worked out by the student is proof of the fact that "when the direction of the sun's rays to the plane of delineation is parallel to that plane, lines that represent rays of light must be drawn parallel to one another." Two corollaries are deduced from the problem in which this statement is proved:—First, the shadow on a plane of any point must lie on the intersection with that plane of one containing the ray of light that casts the shadow; and, secondly, shadows thrown by lines upon planes parallel to such lines vanish to the vanishing point of the plane on which the lines lie. From this elementary platform, if we may use the expression, the pupil steps upwards to the consideration of more intricate shadows. Sometimes he is placed with his back to the sun, sometimes with his face to the great luminary, sometimes he is placed immediately under it, so that its rays pour down upon his devoted head; and in all these varied circumstances he is instructed to take due note of the immutable mystery and certainty of the projection of shadows. There are twenty lessons in all, leading from shadows from planes, oblique and otherwise, and upon them, to shadows upon and from curvilinear and spherical surfaces. This is the mode in which shadows are thrown upon and form oblique planes. A truncated pyramid placed in perspective, making angles of 45° with the plane of delineation, casts a shadow upon an oblong figure with a gabled apex that is placed at a more acute angle with the plane of delineation, which, in its turn, casts a shadow upon the ground. It is necessary, to delineate the proper projection of these shadows, after determining the azimuth and the altitude of the sun, to find the axis of the pyramid. The student is then directed to draw a line by the vanishing point of the sun's rays upon the ground until it is intersected by the ray of light from the luminary containing the apex. At its intersection with the vertical plane he is to draw a perpendicular line meeting the ray of light that tips the apex of the pyramid; and then lines drawn by the vanishing point of the sun's rays upon the horizontal plane through the corners of the base of the pyramid, and cutting the vertical face of the block, and carried to that just mentioned, will give the form of the shadow. Without the author's diagrams, and his references to them, the process is more difficult to follow than with those aids. We must add, however, the vanishing point for the shadow thrown by the axis of the pyramid upon the oblique plane is obtained by the intersection of a line joining the accidental vanishing point of the oblique plane with V. P. 3, with the vertical trace of the sun's rays upon the plane of delineation. The shadow upon the ground is obtained by lines drawn by the vanishing point of the sun's rays upon the ground, and cut by rays through certain points not to be indicated without the diagram.

By the time he has arrived at the seventeenth lesson the pupil is assumed to be proficient enough to understand the mode of finding shadows thrown by artificial light in the interior of rooms. Here we have a diagram showing a chamber, with a bookcase and a box in it, and a square plane suspended from the ceiling, with strong lights and shadows playing upon the whole. Dr. Puckett explains that the shadows cast by an artificial light are governed by the same principle as those that are cast by the sun, viz., "the union of the luminary, the vanishing point of the plane receiving the shadow, with the trace of plane throwing the shadow." The luminous point, however, is always represented before the spectator. After going through all the shadow lines, and the means by which their exact position is ascertained, the author sums up with a remark to the effect that "the vanishing point for a shadow must be found upon the trace of the plane receiving the shadow; and the intersection upon this trace, obtained by the ray of light passing from the luminary to the vanishing point of line throwing the shadow, will be the shadow's vanishing point." The eighteenth lesson brings us to the subject of reflections.

Whilst we are looking through the chapter on reflections, our author permits us to imagine ourselves seated in a boat on a lake, with the glorious hills and sky reflected in the water around us—a delicious privilege for weary students, for which they will gratefully thank him. Leaving them to contrast the brown rippled shadow of the boat with the radiant reflections of the light-clouded sky, we will make our more sombre way after Dr. Puckett. This is a sample of the way he treats his subject:—

"While the painter can scarcely be expected always to work out every appearance of nature with mathematical precision, the laws that govern such appearance should at least be thoroughly apprehended by him, that he may more closely imitate nature in all her diversities, and by the application of her laws be able to test the correctness of his work.

"Light is diffused around us by the refractive power of the atmosphere, and therefore objects are quite visible, though the rays of the sun do not strike directly upon them. The atmosphere being thus a vehicle of light, the rays of the sun must be regarded as travelling through immense regions of darkness before they reach our atmosphere, where they become diffused into that universal soft light which we observe around us. But besides being diffused by a pure atmospheric medium, light is greatly enhanced in brilliancy by reflection. If all the objects on the surface of our planet were to be black, which is the negation of all colour, the sun's light would be absorbed, or at least return no part of the rays which fell upon them, and we should, even while the sun shone, possess much less light than we now enjoy. Nature has avoided this calamity, and, by producing all varieties of colours in objects, the sun's rays which fall upon them are less or more reflected or thrown back into the general mass of light. We, then, understand that any object we see reflects rays of light, and that these rays travel from the object to our eye as soon as we bend our vision upon it. Inasmuch, however, as a thousand or more individuals may see the same object at the same instant of time, it is evident that the rays proceed at all points, and fall upon eyes at every variety of angle."

Thus it will be seen that though it is impossible to say anything entirely new of facts that are, if not as old as time, at least as old as our terrestrial globe, though only known to man after ages of self-culture, it is possible to state those facts in a plain manner, easy to remember and understand, and that the author has done so. The students left in the boat are further told that a ray of light darting downwards in an exactly perpendicular direction to the surface of the lake will be thrown back in the exact path which it traversed in its descent, while another descending in an oblique manner will not return to the place whence it came, but will be reflected at an angle exactly equal to that at which it descended upon it. The first-mentioned ray, or that striking the reflecting surface, is called the incidental ray; the last-mentioned, or that which is returned from the reflecting surface, is called the re-

* *Sciography; or Radial Projection of Shadows.* By R. Campbell Puckett, Ph.D., Head Master of the Bath School of Art. London: Chapman & Hall, 193, Piccadilly. 1868.

flected ray. Further: the angle made by the incidental ray with a perpendicular to the reflecting surface, called the angle of incidence, is equal to the angle made by the reflected ray, with the same perpendicular line, called the angle of reflection; and this fact affords a method of universal application by which, when the angle of incidence is found, that of reflection is obtained.

The nineteenth lesson shows the method adopted of finding reflections upon a vertical surface, as a looking-glass. The pupil is required to understand that reflections upon plane surfaces always lie in planes at right angles to such surfaces, and contain the object throwing the reflection. To this end a mirror is drawn, and a vase and frame placed sufficiently near it to be reflected upon it. Then follows the lineation which determines the position and extent of the reflections. The twentieth lesson illustrates the principles of reflection upon oblique planes. A lighted candle in a candlestick standing on a couple of books is placed before a swing looking-glass, the mirror of which is in an oblique direction forming an angle with the horizontal plane. The figures are placed at angles of 60° and 30° with the plane of delineation. As reflections always lie in planes perpendicular to the reflecting surface, it is necessary to find a vanishing point at right angles to the oblique plane. Our author then draws a line representing the trace of a plane upon the oblique surface of the mirror, which he continues until it cuts the produced axis of the candlestick. Then, he says, as the apparent distance of reflection behind the plane reflecting surface is always equal to the distance of the object from the reflecting surface, an angle must be constructed equal to that produced by the trace and the axis on the other side of the trace, the outermost line of which will give the axis of the object in the reflection. Four corollaries are deducted from the examples illustrating reflections:—1. Reflections on horizontal surfaces will have the same vanishing points as the objects reflected. 2. The angle of incidence is always equal to the angle of reflection. 3. Reflections upon plane surfaces always lie in planes at right angles to such surfaces, and contain the object throwing the reflection. And, lastly, reflections upon plane surfaces will always appear to be at every point equidistant with the objects casting the reflections to the reflecting surfaces.

The author has treated an intricate subject without entanglement, and the progressive manner in which he has arranged his lessons helps to facilitate an exact comprehension of them. Shadows are the inseparable adjuncts of realities; and we endorse his suggestion that sciography, as a means of expression of form, should be comprised in the programme of the studies of art-students.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 12th.......	Society of London	No. 9, Conduit-street.
,, 14th.......	South London	City of London College.
,, 14th.......	Manchester	Memorial Hall, Albert-square.
,, 14th.......	Pho. Sec. Lit. & Ph. Soc. of Man.	No. 36, George-street.

OLDHAM PHOTOGRAPHIC SOCIETY.

The annual meeting of the above Society was held at the Hare and Hounds Inn, Yorkshire-street, on Thursday, the 24th ult.,—the President, Mr. J. Green, in the chair.

After the minutes of the previous meeting had been read and confirmed, the Secretary read the

ANNUAL REPORT.

The Council, on presenting their report for the past year, can congratulate the Society on its prosperity, though they cannot but regret that the number of papers read has not been so large as could have been desired.

The position of the Society, in a financial point of view, is sound, the art-union having contributed to this result. An outdoor meeting has been held at Lymm. The weather for the most part was unfavourable; the attendance of members of the "black art" was rather meagre, but that of the fair sex was large.

Through the kindness of some of the leading photographers, the Society now possesses some of the finest *carte* photographs of the day. This year the Society has been able to have a presentation print, which has given great satisfaction to the members.

The Council deeply regret the loss of two of their members within a very short time of each other, who had, ever since the formation of the Society, taken an active part in its consolidation and progress.

In conclusion: your Council would again urge upon the members the great importance of reading papers, and introducing novelties and subjects for discussion at the monthly meeting.

On Thursday, the 31st ult., the members held their annual dinner and *soirée* at the Cemetery Inn, Middleton-road, when thirty gentlemen sat down to dinner, after which about a hundred ladies and gentlemen, friends of the members, assembled to enjoy an evening's entertainment of a varied character. An extravaganza, entitled "Blue Beard," was performed by some of the members, and gave general satisfaction, both as to the performance itself and the good taste displayed in the dresses and accessories. The room was tastefully decorated for the occasion. The remainder of the evening was happily spent in dancing, &c., and the company departed bearing away pleasant remembrances of the annual *soirée* of the Oldham Photographic Society. Before separating, however, a hearty vote of thanks was passed to the Chairman by the company present.

Correspondence.

Foreign.

Philadelphia, December 16, 1868.

It occurred to me recently to try whether the *alkaline development* could be applied to wet-plate photography. It was evidently necessary, in the first place, that the application of the alkaline developer should not cause a precipitate, and this was attained in the following manner:—

A portion of bath solution was divided into two parts. One was treated with ammonia, and the brown precipitate redissolved with nitric acid; the other half was then added, and care was taken to have the whole solution faintly alkaline. In this bath (which is evidently the ammonio-nitrate bath of the printing process) alkaline carbonates and bicarbonates gave a white precipitate of carbonate of silver, but dilute liquid ammonia caused no precipitate. This form of alkali was, therefore, selected for the developer.

Ordinary bromo-iodised collodion was extended on a glass plate, and sensitised in the above-described bath. After exposure it was covered with a weak solution of dilute ammonia, which, even in prolonged action, failed to bring out anything. No disposition to fog showed itself; there was simply no action at all.

The plate was now thoroughly washed under the tap to get rid of the soluble silver salt, and a solution of pyrogallic acid was applied. Traces of an image showed themselves, but veiled in thick fog. Longer washing was then tried without improvement. The action of the pyrogallic developer was then powerfully restrained by solution of bromide of potassium, and the mixture was applied to a fresh part of the plate, but still the fogging showed itself and could not be held in check.

Generally I do not think unsuccessful trials worth recording in print; but the curious result of the foregoing is evidently that the plate should have been insensitive. If it had fogged under the action of alkali it would have been less surprising. Even when through the agency of pyrogallic acid and ammonia an image was forced out, it proved to be an altogether feeble one, not comparable in vigour with what an iron developer would have produced on an ordinary wet plate to which a similar exposure had been given.

I should have stated, in the first place, that one principal motive that led me to make the experiment was that I had been forcibly struck with a fact that I believe has not been generally recognised, viz., that the alkaline developer is much more powerful than the ordinary iron developer. I have constantly noticed this fact in working with dry plates. Not unfrequently in descriptions of dry processes it has been stated as an advantage that the plates could be developed with iron. I hold this, on the contrary, to be a disadvantage if iron be needed. I have always found that it is by reason of great under-exposure iron is incapable of bringing out an image on a dry plate; still, by washing off the iron and applying an alkaline pyrogallic developer, the image appears.

I am led from this to speak of an allied matter. I referred just now to the use of bromide of potassium in the developer for preventing fog. I have for a long time considered that the application of bromide of potassium to the developer, and the leaving of undecomposed bromide in the film (which depends upon one and the same principle), were discoveries of the greatest importance in photography, and have ascribed them to Major Russell. I have lately, however, seen them ascribed to the late Mr. Glover. I should be glad to be referred to the origina mention of this property of bromides, in order to know to which of these gentlemen the honour belongs, if any of your correspondents well posted in the matter will point out the place of publication.

Connected with the subject of alkalinity of the bath is a matter that presents itself in the management of disordered baths, which is not very easy to explain. If an ordinary negative bath be found to have a tendency to give pinholes, and be evaporated down and fused in order to get rid of them, the fused cake will by solution in water give a bath which sometimes will work perfectly at once, and in other instances will give a plate that instantly fogs all over on application of the developer, and will consequently require to be acidulated, without there being any assignable reason why the same treatment of different baths should produce such opposite results.

In view of the enormous consumption of silver by photography, it is fortunate that the number and productiveness of the silver mines should increase also continually. The mines now being opened in Nevada—a district lying immediately east of California—are of wonderful richness. The ore appears to exist in inexhaustible quantity, and to contain a heavy proportion of the metal. A gentleman engaged in the

business of mining informs me that the picked ore in heaps at the "Pine Hill District" Mines is worth $1,000 per ton. As there are at present no facilities for transportation, this ore had to be carried two hundred miles. A mill which he had erected was burned down. There being no means for constructing another on the spot, he purchased a mill two hundred miles away, and brought it to the mines in pieces by waggons, and set it up there, including a sixty-horse engine.

Various ores of silver are found. Native chloride, or "horned silver," is quite abundant. Sulphide is also found in large quantities, but the miners find it unmanageable, and greatly prefer other forms of ore. The Pacific Railroad, which will be in running order to San Francisco next July, will greatly facilitate the development of this mineral region. Not so much, however, as the Southern Pacific Railroad, which will pass more directly through the mining region of Nevada, but which, though now finished from Kansas City to Fort Hays, cannot be expected to reach the Pacific till several years later than the more northern road.

I am glad to learn that Mr. Schnitzer, whose mind has been affected for several years, has entirely recovered his health, and is actively at work again at the problem of photographic objectives. It is to him that we owe the globe lens, an invention that opened an entirely new field to photography, much more by leading to further improvements than its own merits. All the doublets that are now the favourites of the photographer, except the lenses of Petzval, are sprung from Schnitzer's idea, and, had his health permitted him to improve on his own original conception, he would doubtless have remained in the van. He is now, however, at work again, and I may before long have occasion to write to you of some of the results of his later labours. M. Carey Lea.

P.S. — In speaking in a recent communication on the subject of collodio-bromide gum plates, I omitted to mention that when the plates are first plunged into the developing bath, the bath should be washed rapidly over the plate by alternately raising each end of the pan for a few seconds. This removes a sort of cloudiness which at first forms on the bath.

Paris, January 4, 1869.

It is not often that the incidents of one day will furnish matter for a letter to The British Journal of Photography, so that I am pleased to record new year's day as one of these exceptional cases, having found, in the mode I spent it, many things which I noted down for your readers. About 11 a.m. we started in search of *dejeuner*, but, having some time to pass beforehand, we wandered along the boulevards, examining the infinite variety of toys, gimcracks, sweetmeats, &c., that are at this time of the year exposed for sale in the little wooden huts or *barraques* which line the footpaths on both sides of these great thoroughfares. Here is an optical toy selling for thirty-nine sous, and called the "chamelion top." It is after the principle of Gorham's colour top, but less elaborate. The top is spun, and a series of coloured circles are seen as it revolves, the colours and shades of which can be changed by touching a black paper disc which is placed upon them. The effect is very pretty, and the toy is optically interesting. At another stall are to be purchased some marvellous oranges, which are to be looked through, when you will see pictures of all sorts of subjects. The orange is then to be eaten, and the picture kept for other uses. The way these marvellous oranges are made is by making a hole through the centre, and inserting a little microscopic photograph at one end. Of course, upon looking through the magnified picture is seen. These oranges are half-a-franc each.

At a well-known publisher's I saw some specimens of phototypes by the process of M. Tessie du Motay, and upon inquiry I found that several works are being published which are illustrated with plates of this kind. An important work upon the *Friezes of the Parthenon* has been out some time, and another upon the *History of the Ceramic Art* has just appeared. The plates are well executed, and, being photographs in printing ink, their accuracy and permanency cannot be called in question. As the prospectus truly sets forth—

> "It has been deemed best to illustrate this work by photography, as it affords the best means for reproducing objects of the ceramic art *just as they are*—neither more ugly nor more beautiful—with all the defects of baking and the specks in the enamelling—with all the suavity and artistic irregularity of contour, modelling, and decoration as seen in the originals, and of which the amateur will find the smallest details by examination with a magnifying glass."

Being now time for *dejeuner*, we ordered our breakfast suitable for the day, and whilst waiting for it I took up a newspaper and found an interesting law case reported, an abstract of which I resolved to transfer to your columns, as showing the legal decision here upon a question of the ownership of a negative. It appears that in 1860 M. Yvon, an artist celebrated for his historical pictures, was commissioned to execute a painting to represent the battle of Solferino. The principal figure in this was to be the Emperor of the French. Now, to give value to such a picture, the likenesses of the personages represented should be guaranteed, and in the ordinary way these persons would have had to have given the painter long and painful sittings. M. Yvon wished to do away with this by the use of photography, but being no photographer himself he engaged MM. Bisson Frères to take the photographic portrait of the Emperor under his own special directions. It was not the first time that M. Yvon had transactions with these gentlemen, as he entrusted his paintings to them to copy and publish, in the same way that Meissonier places his in the hands of our countryman, Mr. Bingham.

Well, the artist and his photographer went to the Tuilleries. The artist directed the pose, lighting, &c., of his august sitter, told M. Bisson where to place his camera, and the portrait was taken. Some time later M. Yvon authorised MM. Bisson Frères to print and publish the portrait, but, as MM. Bisson Frères expressly declare, *without ceding any of his rights in the negative.* The law report goes on to say that "fortune did not smile upon MM. Bisson Frères," and explains this poetical figure of speech into which it was betrayed by adding that their house became bankrupt. Everything was sold, negatives, prints, &c., *but* it was stipulated that the purchaser should respect the rights of property of twelve hundred negatives, which belonged to artists and manufacturers, &c., and which should be given up to them at the first demand. M. Placet, a gentleman whose name is well known to the readers of this Journal as eminent in the history of photo-engraving, &c., became the purchaser of MM. Bisson's business, negatives, &c., and was thus constituted their successor. The negative in question of the Emperor was amongst the twelve hundred whose claims were to be respected. During the Exhibition M. Placet seized a painting on porcelain representing the portrait of the Emperor, from the photograph of MM. Bisson Frères. The owner contended before the tribunal that M. Placet had no right to indict him for copying that in which he (M. Placet) had no property. M. Placet then made a demand before the civil tribunal to have his right of property in this portrait recognised. M. Yvon contended that *he only* was the proprietor of this negative obtained under the circumstances before described, MM. Bisson having only let themselves out to execute it for him. He offered also to pay any supplementary price that might be deemed right, and demanded the restitution of the negative. M. Placet opposed this pretension of M. Yvon. Last week the following judgment was delivered in the case:—

The portrait in question was executed by Bisson, from the instructions and with the assistance of Yvon, and M. Placet is successor to the Bissons, with all their rights. The negative, destined exclusively at the first to serve for the execution of the portrait of the Emperor in a battle scene, was ordered by the painter in the interest of his work. That the painter alone regulated the conditions of pose, costume, size of negative, and general disposition of the picture. That the aid of the Bissons was limited to the use of the instruments and operations of their profession. That in a work of this nature it is important to distinguish between the artistic part of the invention and the material part of the industry. That Bisson Frères, set to work by Yvon, had lent him their industry for a determinate object, for his account and by his order. That a remuneration is due to them, but the work executed belongs solely to Yvon, who ordered it and composed it. That Yvon has a right to demand the restitution of his negative. That the right of Yvon was never contested by the Bissons; that, on the contrary, they had expressly acknowledged it before the tribunal. That when the Bissons' business was sold, a special reservation was made relative to the property of artists in certain negatives. That before this an engraving from this negative had been made and published, with the knowledge of the Bissons, without their making any claim, as it was authorised by Yvon. It was understood that the Bissons were to be remunerated for taking this negative by allowing him to use the negative for the profit of their house. But as soon as Yvon heard that Placet was prosecuting a painter on porcelain for reproducing this work, he protested against the right of Placet to do this, and prohibited *all further* reproduction of the portrait. The tribunal has, therefore, all the points necessary to form a judgment, and must examine also what extra price must be paid Bisson Frères or their successors for the negative, now that all further reproduction is prohibited by Yvon. Therefore, the painter on porcelain who used the portrait in question cannot be proceeded against by Placet. That Placet has not substantiated his claims. That in the case between Placet and Yvon, Placet is condemned within eight days to give up to Yvon the negative in question, on payment of 300 francs (£12) the extra value, and to pay 10 francs (8s.) per day for any delay in doing this for the space of two months. Placet is prohibited from reproducing this portrait in any way for the future, and shall pay Yvon 20 francs (16s.) for every time he can be proved to transgress in this respect. Placet to pay all expenses.

The *dejeuner* ended, we go out again, and, passing a stall full of photographs (celebrities, twopence each, and others in proportion), hire a cab to enable us to call upon some friends and pay our respects. We discharged the cab at some distance from the city, and, upon trying to get another vehicle to come back, found it next to impossible—everything was engaged. After walking a couple of miles, and evening coming on, and being weary, we would hire a carriage to go the remaining mile, but could not, being asked £1 for the job! A *fiacre* was, however, obtained at a high price, though lower than £1, and we arrived home. Part of the boulevards have been lighted by the electric light, burning in a globe of white ground glass. The effect is very good; the light is well diffused, and is not unsupportable at its greatest intensity. With an account from an evening paper I conclude the narrative of new year's day. A lady presented herself to one of the

best photographers on the boulevards, and requested to have her portrait taken. The artist hastened to comply with her request, and proceeded to focus his sitter, when, to his horror and dismay, he saw her hand direct a cocked pistol to her fair forehead! Coming from under the dark cloth, he begged Madame would not spoil such a beautiful face in such a manner—it would be such a pity; and then, if she carried out her intention, it would do such harm to his house. Madame told him to be reassured, and not to disquiet himself; she had no such intentions at present as he was pleased to attribute to her. She desired him to go on with the operations, for she wished her portrait to be taken in that condition, so that she could send it to an admirer who was not yet ardent enough! And with it she would send word that *she*, too, would go on with the operation she had commenced if he did not become more devoted! The portrait was taken and sent, and history declareth that, in a few days, the still loaded pistol was also sent to the recreant young man, whether to discharge it into space or against himself is not recorded.

The zirconia light does not seem to have commenced to be shown in the court of the Tuilleries. I went down the other evening to see, and there was nothing but gas lamps. Perhaps the experiments are all over. R. J. FOWLER.

Home.

DALLAS'S PHOTELECTRIC PROCESS.

To the EDITORS.

GENTLEMEN,—I am obliged by your notice of my process of photographic engraving. There is, however, a manifest printer's error in the latter part of the article, which it may be as well to correct. The article states—"The surface *requires* an extra tint, a dirty one, in the process of electrotyping." It should be "*acquires.*" This tint was formerly of great trouble to me, as it not only necessitated extra work in cleaning, but it injured the more delicate bitings, and especially my basic tint. This difficulty I have now reduced to a minimum, the plate being cleaned in about a third of the time, and without risk of removing delicate gradations of tint.

I have not worked the process commercially, as I wished to perfect it as much as possible. I think I may now say that it is capable of doing great things. My friends have laughed when I have said that it was a giant asleep. I have sacrificed much for it—time, money, and position; but I have felt all along that I have been pursuing no unworthy object. I have loved the work, and have determined, God helping me, to succeed. I have felt that the recompense in money, and, what I value more, the power to do something for art that will live, would not be scanty. Had money been my chief aim I could not have advanced to my present point, but should have sought out some other "diggings."

I am no believer in patents, unless backed by "the sinews of war." To patent means to fight, if you really wish to protect your labours of brain and hands. A patent is too often a *damnosa heritas*, and he who would enjoy "quietness and assurance" had better, especially if not wealthy, be content with keeping his methods as close as possible. The genius of photography is, I confess, opposed to secrecy; but photographic engraving is not a thing for amateurs or the general photographer.

I could, no doubt, obtain a valid patent. The principle on which my process is based has never yet, to my knowledge, been recognised in photography. I have had to encounter many guessers and guesses, but no one has as yet hit the secret. I do not say it may not be discovered independently; but it was only by observing a certain peculiarity of a well-known material that I hit upon the *germ merely* of my process. I have had to exercise no little thought and labour to utilise the principle. Like Columbus' egg, it is now very simple when I know it, albeit requiring an amount of knowledge and skill which have not "come by nature."

My aquatinting ground, as far as I have tested, keeps indefinitely, and could be sold ready to be used at a moment's notice. The normal strength can be diluted to any degree with the suitable solvent easily procurable at any chemist's or oil shop. The etching liquid is of great importance, and is also easily procured. The metal surface on which the ground is laid and the subject bitten would admit of printing direct from it, without cleaning; but, as this would divulge the kind of metal I use, and as this is of no little importance to me, I prefer electrotyping, even although it has its disadvantages—first, in regard to time, and, next, the inducing of the extra tint. Still, electrotyping has its advantages, which more than counterbalance the points I have named.

The process is capable of yielding, from an inferior photograph, a result considerably better than the photograph itself. But give me a perfect photograph—an original, not a copy—and I will guarantee to produce a result which will be, I will not say equal to a carbon or silver print, but with a character of its own which would lead many good judges to prefer it to either of the former; for there is one undoubted fact, that a good print or proof from a steel or copperplate has a charm about it which will always render it acceptable.

I eschewed the attempt to produce by printing ink a *facsimile* of a photograph. My object has been to produce an engraving from a photograph—an engraving which, though possessing features *sui generis*, shall still be an engraving in appearance and fact, and not something which is neither the one nor the other. If I may judge from the opinions of good critics, I have succeeded; but I am still desirous to climb higher.

Thanking you for the space you have accorded me,—I am, yours, &c.,
108, *Fleet-street, London, Jan.* 4, 1869. DUNCAN C. DALLAS.

THE LIME LIGHT.

To the EDITORS.

GENTLEMEN,—In the course of a few trials with the lime light I have arrived at the conclusion that the nicely-turned cylinders sold in bottles are by no means necessary for the production of the best light.

The other evening I allowed the gas to fall upon the side of an unshapely lump of lime, and found that the light was quite equal to that obtained from the most beautifully-turned cylinder. The question, therefore, arises—Why use such cylinders if the ordinary lumps answer as well?

I find that if the flame be so directed as to impinge on a sharp projecting corner of the lime the light is improved. Here arises the further questions—What is the *best* surface for emitting light? and at what angle should the flame fall on the lime? It was at one time considered necessary that the angle of impact should be a right angle; but, from the fact of the burner obstructing some of the light, this was considered to be an objection, and the flame was directed in such a way as to cause no loss from this source. Apart from this, some advantage in respect of power appears to be gained by an obliquity of incidence of about forty-five degrees or thereabouts. When the impact is direct, the lime "pits" more rapidly than when the above angle is used.

I am not sure if some important advantages would not be gained by adopting perfectly flat plates of lime instead of the cylinders in common use; and if zirconia come to be introduced as a substitute for lime I believe the best form for it will prove to be that which I have now indicated.

I am interested in this subject, as I am about to fit up an apparatus for producing enlargements of rather more than the usual size, and it is of some importance that I get the best possible light. Can you give me a few hints on this subject? If you can, please do so. It will greatly oblige,—Yours, &c., HENRY PARK.
January 5, 1869.

[We are well acquainted with the subject introduced in our correspondent's communication; for we have often used the lime in the rough lump—more frequently, indeed, than in the form of cylinders. It is only a very hard lime which can be thus employed, for a soft sample would pit so rapidly that it would require to have a fresh surface exposed every minute. It is for this reason that the lime is made cylindrical in shape; and it is also for a similar reason that it is made to revolve by clockwork. With hard lime it is immaterial what the shape is. Concerning a flat surface: Mr. Bryson, of Edinburgh, was in the habit at one time (and possibly is so still) of using flat discs of lime in preference to balls or cylinders. Respecting the angle of impact, the lime, some time ago, was placed on a support which stood nearly at a right angle to the blowpipe; but although we still occasionally meet with this kind of arrangement, it is not generally adopted.—EDS.]

"LIGHT! MORE LIGHT!"

To the EDITORS.

GENTLEMEN,—In his letter for January 1st, your talented Paris correspondent, in his commendatory remarks on my article upon the retention and non-retention of albumen films upon paper, which appeared in the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for December 24th, says he has "not been abused in it." I sincerely trust he does not think I have ever abused anyone in whatever I may have written at any time.

Mr. Fowler says he has been made very uncomfortable by reading my article. I am truly sorry to hear it, for, though an entire stranger to me, I esteem and think so highly of him, that his Paris letter is invariably the first thing I read in your Journal. I scarcely know whether to take his "chaffing" as sarcasm or joke, for most assuredly he is too conversant with science not to be aware of many things—even in photography—that were long maintained and believed to be facts, which are now known to be fallacies; and yet science cannot tell us anything about the matter. For instance: up to the last four or five years, scientific men asserted that the base of the salting chloride did not affect the colouration of the print, but it is now universally acknowledged that it does; nevertheless, Science cannot, at present, tell us in what manner it acts, but surely that is no reason why she should always remain in this state of ignorance.

Mr. Fowler says:—"Methinks I hear, in the darkening gloom around me, the voices of those who have ventured to believe that albumen is *dissolved* by nitrates, all asking for light, more light." Now, what is

meant by "dissolved?" The dictionary does not give us a satisfactory philosophical definition. I understand it to mean that the substance dissolved and its solvent have become what is called a solution. Thus, nitrate of soda "dissolved" in water is a solution of nitrate of soda.

When the albumen is removed from the paper by a solution of a salt, be it nitrate or not, with whose base it enters into chemical combination—let us say a solution of sulphate of copper—the chemical compound which is formed sinks in the solution when left at rest, and we thus have an albumenate of copper suspended in a solution of sulphate of copper, and not a solution of albumen. The albumen is, therefore, most assuredly not "dissolved." Does Mr. Fowler maintain that it is?

Why does the albumen quit the paper and form an albumenate in the bath instead of on the paper? Can Science give us a satisfactory answer? I believe she is entirely ignorant of the matter, and therefore say, the albumen is removed in obedience to a law which science knows nothing about. I should, perhaps, have been more correct, strictly speaking, had I said science cannot tell us what that law is.

Well! I myself want "light, more light," and, therefore, I invite the talented writers of THE BRITISH JOURNAL OF PHOTOGRAPHY to discuss this and cognate subjects; because, as discussion brings forth the opinions and thoughts of many minds, there is a probability that it may lead to our knowledge of many important facts of which we are now ignorant. It should ever be borne in mind that any fact added to our store of knowledge, however isolated and insignificant it may appear at first sight, invariably leads to important results. But it unfortunately happens that photographers, as a body, cannot be induced to discuss theoretical subjects.

I would fain ask Mr. Fowler where he finds, in anything I have ever written, any warranty for the following assertion:—"We are assured by him who has cast us into these dreary regions of error, that we must give up all hope of ever seeing the true light any more." In the first place, if he and others have hitherto believed a fallacy to be a fact, they have not been cast in the "dreary regions of error" by me; however, if they think I am wrong in saying they *are* there, I have invited them to prove it. In the second place, instead of saying "they must give up all hope of ever seeing the true light any more," which is implying that it *has* been seen, I say they have not seen it at all. In the third place, because they are not at present enlightened by truth that is no reason why they should "give up all hopes" of ever being so; and, methinks, it plainly proves that I do not think they need despair, for I have invited discussion in order to obtain "light, more light."

I need scarcely tell Mr. Fowler that it is very easy to "suggest" this or that thing as being possibly the cause of a particular phenomenon; but a suggestion is not always a fact, and it is facts that Science wants, as her very existence depends upon them. I am very sure that the mechanical action of an admixture of salts—aye, and their chemical action—upon albumenised paper is but little understood, and that its discussion would lead to "results" much "greater" than is imagined; but who will discuss them? Much, very much, might be written respecting nitrate of soda in the printing bath, but who would care to read what might be written?

Wishing my "chaffing" friend—if he will allow me to call him so—a speedy exit from the "dreary realms of error," and wishing, also, that he may soon receive "light, more light,"—I am, yours, &c.,

Peckham, London, Jan. 6, 1869. GEORGE PRICE.

[With reference to that portion of Mr. Price's letter in which he says that scientific men have, up to the last four or five years, asserted that the base of the salting chloride did not affect the colouration of the print, we ask Mr. Price to turn to Hunt's treatise *On Photography*, published many years ago, where he will find that he is wrong in this assumption; for that author gives a list of the colours or tones obtained from the employment of different salts. Dr. Hermann Halleur, also, in an excellent treatise written in 1853, but now long out of print, says:—

"The great variety of tints produced by the combination of silver with different chlorides is very remarkable. However, it is only during the first stages of exposure to light that this variety exists; after a time all the different compounds acquire the olive tint. With chloride of ammonium (sal-ammoniac NH_4, Cl), and chloride of sodium (common salt, NaCl), the tint produced is red; with chloride of strontium ($SrCl+6HO$), brown; with chloride of barium ($BaCl+2HO$), brownish purple; with chloride of calcium ($CaCl+6HO$), brick-coloured; with chloride of potassium (KCl), the tint varies from a fine brown to a bluish steel colour; with sesquichloride of iron (Fe_2Cl_3+6HO), from deep brown to black. With hydrocholoric acid ($ClH+\times$ aq.), the colour is red, changing to black; with chlorwater ($Cl+\times$ aq.), red; with chloric ether (C_4H_5Cl), dissolved in alcohol, black. Other combinations will be mentioned in the sequel. As far as my own experience enables me to judge, these differences in the tints obtained seem to proceed from the presence of the alkalies, earths, or metals, and not from that of organic substances; though the latter, in combination with nitrate of silver, produces similar variations."

Hence, Mr. Price will see that *before* "the last four or five years," scientific men recognised the fact of the colouration being dependent pon the base of the salting chloride.—EDS.]

Miscellanea.

PHOTOGRAPHIC PATENTS.—It may be interesting to notice the relative number of patents connected with photography applied for during the last three years. During the past year the number was fifteen; in 1867 there were eighteen; while in 1866 there were no fewer than thirty-three.

MR. M. CARY LEA'S NEW WORK.—We last week drew attention to the new and elaborate *Manual of Photography*, just issued from the press by our esteemed friend. We have received numerous inquiries as to where the volume is to be purchased in this country. By an advertisement elsewhere it will be seen that the work is on sale at our publishing office, 2, York-street, Covent Garden, W.C. For further particulars we refer to the advertisement at page iv. of our advertisement sheet.

OXYHYDROGEN EXPLOSION.—On Monday evening week two explosions of a rather alarming character occurred at the Surrey Theatre, in consequence of the alleged mismanagement of those who had charge of the lime lights. The first took place during the performance of the ballet, when the stage was crowded with dancers; the second during the transformation scene. The various fairies, angels, ballet girls, and children, who were suspended by wires in mid air, were much alarmed, but fortunately no serious damage ensued.

A NEW SCHOOL OF ART.—"'Ave yer portrait taken, sir? Honly a bob, sir, including a guinea-gold gilt frame!" Thus was one of our leading metropolitan photographic artists once accosted by the doorsman of a "hartist" in Westminster Bridge Road. Being informed by the gentleman that he was an artist himself, and therefore must decline the offered privilege, the touter thus delivered his sentiments:—"*You* a hartist! You be —— ! There's lots o' duffers as *thinks* theirselves hartists who knows as much about hart as Muggie Brown does about the ten commandments, and comes a spongin' over *here* in order to learn what true hart really means; and I suppose you are one on 'em—reg'lar duffers, say I!"

EXCELSIOR VARNISH.—By this title is designated a new kind of varnish recently *invented* (shall we say?) by Mr. Ackland. Although the resin present is said to consist to a great extent of shellac, yet it is so modified that, when applied to a perfectly cold plate, it dries quite brilliant; nay more, the negative to which it is to be applied need not even be dry! This quality indicates that it will prove a boon to those landscape photographers who work in tents, and whose convenience for drying and warming the plate preparatory to its being protected by varnish in the orthodox fashion is often of the most meagre kind. Although (as might have been anticipated from its miscibility with water) the film of varnish will not resist water if accompanied with friction, still there are so many uses to which it may be applied that we cannot but welcome a varnish of this description. The peculiar surface it possesses enables it to "bite" the pencil when it is applied for the purpose of improving the artistic effect.

FIRE AT A PHOTOGRAPHIC ESTABLISHMENT.—On Tuesday evening, the 29th ult., about eight o'clock, a fire broke out in the premises of Mr. John Urie, photographer, situated at 33, Buchanan-street, Glasgow. Within five minutes after the fire was discovered the fire brigade, under Mr. Bryson, was on the spot. The fire spread with great rapidity, and in few minutes the photographic studio, constructed of wood and glass, was one mass of fire—the flames ascending several yards above the roofs of the adjacent buildings. Immediately before the arrival of the brigade the front of the wooden structure fell to the ground with a great crash, the roof falling inside, and thereby increasing the volume of flame. The firemen got speedily to work, and in a brief space of time it was evident they had got the fire under control. The origin of the fire is unknown, but there is no doubt that it broke out in the photographer's premises. The damage, the greater part of which, we understand, is covered by insurance, will probably amount to £3000.

WERGE'S DRY-PLATE BACKING.—Mr. Werge has introduced under this name the best and most convenient backing for dry plates that we have ever tried. It consists of collodion holding in suspension a very fine red pigment. When applied to the back of a dry plate it forms an effectual preventative of that evil known as "halation," which in the case of transparent films proves such an annoyance when light and dark subjects are in immediate juxtaposition—such as the window of an interior, a dark tree against a bright sky, &c. Photographers are much indebted to Messrs. Plymley and "H. E. W." (of Preston), who, in our Journals of the 4th and 11th of last month, directed attention to adiactinic collodion as an advantageous remedy for the defect in question. Mr. Werge's preparation for this purpose, while the same in principle, differs from those of the two gentlemen referred to, inasmuch as the film is an opaque red. We are much pleased to see such an excellent backing for dry plates thus commercially introduced, and we predict for it a large sale; for the trouble of applying it is so trifling, while the advantages it confers are so very great, that no one who in dry-plate work values the qualities alike of delicacy and vigour will desire to be without it. We may now consider that the days of annatto painting of the backs of dry-plates are at an end.

CARRIER'S SENSITIVE ALBUMENISED PAPER.—What a very useful paper this is! and what a boon it confers upon the amateur! Some time

ago Mr. Solomon, the agent for its sale in this country, handed to us a sheet, with a request that we would give it a fair trial and report upon it accordingly. This paper, which was stated to have been prepared many weeks before we received it, was as white and pure as if newly made, and the small portion of the sheet that remains is as white as it was when we first received it. Exposed under a negative, we obtained two capital prints, which we toned, not by the formula which accompanied the paper, but by one which has since been published in our ALMANAC, in an article by Mr. A. L. Henderson, entitled, *A New Salt of Gold for Photographic Purposes*, and which is a compound salt of chloride of gold and chloride of tin. Under the action of this valuable toning agent, the prints rapidly assumed a rich colour, which became a little deeper after fixing and drying them. We do not here speculate upon the probable preparation of Carrier's paper; we simply take it as we find it. A small supply of it should, and doubtless will, form a part of the landscape photographic tourist's outfit, for by its means he can prove the quality of each negative as soon as finished, and without trouble. Other advantages will suggest themselves to the reader.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—
W. Harrison, Bowdon.—*Two Portraits of the Hon. J. Leicester Warren.*

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

☞ *Correspondents should never write on both sides of the paper.*

PHOTO.-ENGRAVER.—We have published the details of one of Mr. Dallas's processes of engraving, but not that to which you refer, which is at present a secret process.

R. FOX.—We have now several drawings of velocipedes proposed with special reference to the use of photographers, and some of these days we shall be able to give you the information required.

M. D.—We are pleased to hear that you profited by our advice in the matter of the telescope. Respecting your microscope query, we give you precisely the same reply as we did on the former occasion; you cannot do wrong in securing it.

GLASS HOUSE.—The owner of the property must be consulted before you make the proposed erection in your garden; and, after you obtain his sanction, you must then get the permission of the local board of works or health before you commence to build.

ORION.—To protect the face of your Nichol's prism, cut a piece of microscopic glass to the exact size and cement it on by means of Canada balsam. This is a most valuable method of protecting the soft surface of the prism, and ought to be well known among microscopists.

T. S. REEVES.—The important London firm you name adopted that size through inadvertence; but the equilateral size is now being extensively sold by them, and is also almost exclusively so by other dealers. Please let us have particulars about the explosion—its cause and preventive.

ZIRCONIA CYLINDERS.—In answer to the queries of numerous friends, we beg to say that we are not in a position to report on the application of these cylinders to the oxyhydrogen light. Within a week after we receive them our readers shall be made acquainted with our views as to their merits.

PHANTOM (Chipping Norton).—The black tone you so much admire in lantern transparencies may very easily be obtained thus:—Make a saturated solution of bichloride of mercury in hydrochloric acid, and dilute this with eight or ten times its bulk of water. Apply this to the picture while it is still wet. After a minute or two wash off thoroughly, and apply a solution of hyposulphite of soda. When dry, varnish. That is the whole secret.

A COUNTRY M.D.—You will, on reflection, perceive that it would be inexpedient to devote an article to the subject in question, although we consider it one of much importance and requiring strict and close research. We believe that it is being thoroughly investigated by some gentlemen of standing in the world of law and electrical science. You will obtain all the information you require from a monthly serial, *Human Nature*, published by Burns, Camberwell.

CORA MACBETH.—1. To avoid stains on your hands you should use thin and flexible India-rubber gloves. They are sold at five or six shillings. Finger stalls might probably answer your purpose as well as the gloves. If you try the stalls, will you kindly communicate your experience with them?—not necessarily for publication, unless you wish it. We have had several inquiries from lady readers concerning these finger protectors, but we know of no person who can give us information respecting the comparative merits of the two kinds of protectors—the gloves and the stalls.—2. It is probable that a solution of wax in turpentine will answer better than anything else for conferring the desired quality of brilliance upon the prints. Add a little oil of lavender to the turpentine.

C. H. B. (Liverpool).—See our reply to R. Fox. See also an article in our ALMANAC (just published), entitled *The French Velocipede Applied to Photography*. In that article you will find your first query answered. We do not think that there is any patent restriction on its manufacture. On the subject generally: the two-wheeled velocipede is undoubtedly the most rapid; but it is doubtful if, unless in the hands of a thoroughly skilful person, it would prove so convenient as a "three-wheeler." We have tried the latter, and can vouch for the ease and comfort with which it may be propelled; but as yet we have not been able to muster up sufficient courage to try the "two-wheeler." In two or three weeks more, however, we trust to be able to tell you all about it, and its application to photography.

W. F. S.—There is no better way of treating your old silver solution than by throwing it down as a chloride. To do this, make a strong solution of common salt and pour it into the silver solution, stirring or otherwise agitating it. Rather pour in too much than too little. The chloride of silver will soon settle at the bottom, and the supernatant liquid must be poured off, afterwards adding two or three changes of water. When dried mix it with carbonate of soda, place it in a crucible, and fuse it.

EXCELSIOR.—You can, you say, obtain an image on the ground glass of the same size as the original when you employ your quarter-plate camera, but cannot do so with your half-plate apparatus. The lens is not in fault, as you appear to imagine; it is only your camera that is too short. If you extemporise an extension of the camera by lifting out the ground glass and holding it a few inches behind the camera, throwing the focussing cloth over it to prevent the admission of light, you will soon find the correct distance of which you are in search. The initial inquired about is probably that of "Slater." The object of placing a supplementary concave lens in a portrait combination is to lengthen the focus, and thus make it cover a larger plate. In the table of enlargements in our ALMANAC you will find the precise distance both the card and the ground glass must be from the lens to enable you to copy the former up to whole-plate size.

"QUATIENS" writes:—"I have some negatives which have been varnished without being fixed enough. Can I remove the varnish by any means and complete the operation of fixing? Also, could you tell me what is the cause of the peculiar evil odour of the sample of albumenised paper enclosed, and whether it will effect its printing qualities? The varnish I use is that of Sœhnée Frères."——The subject of the removal of varnish is very ably treated by Mr. Homersham in our ALMANAC for this year. It is effected by means of alcohol. In Mr. Pumphrey's excellent article on albumenised paper, in the the same work, we do not see any allusion to the "evil odour" of some samples of paper; it arises, however, from the albumen having been stale. We know of some first-class pictures which have been obtained on a worse-smelling sample than that enclosed.

"A YOUNG MAN FROM THE COUNTRY."—You may be so; but you are evidently one of the class who imagine they can truthfully sing the last line of the refrain, "You don't get over me." We regret that you have been victimised by London dealers, or, rather, by *a* London dealer; but it is entirely your own fault—you were too clever. Deal with respectable men, and you will be treated in a proper manner. We never heard mentioned before the name of the person by whom you have been taught your fallibility in matters requiring shrewdness, and we do not care to know about such a person. Your own common sense should have suggested to you the impossibility of any person being able honestly to sell nitrate of silver at three shillings an ounce. Your past loss will, we trust, prove a great future gain to you. Do not think of seeking redress through the County Court, for it will result in your being laughed at by your brethren, even though you gained your case.

RECEIVED.—M. Carey Lea; John Bradley; "Subaltern" (Deesa). In our next.

⁂ Some reviews, and other articles in type, are unavoidably left over till next week.

APPLICATIONS FOR NEW PATENTS.

December 4, 1868.—"Improvements in Apparatus for Toning and Washing Photographic Prints. No. 3,695."—H. DELABENE MARSDEN.

December 7, 1868.—"Rooms and Apparatus for Photographing by Artificial Light. No. 3,722."—GEO. KENDALL PROCTOR.

December 17, 1868.—"Improvements in the Production of Plain or Coloured Photographs. No. 3,849."—JOHN POUNCY.

LONDON GAZETTE, *Friday, December* 25.

NOTICE OF SITTINGS FOR LAST EXAMINATION.

C. COLLIS, Torquay, photographer.—Jan. 9.
J. MAHEW, Great Titchfield-street, photographic artist.—Jan. 13.

Tuesday, January 5.

BANKRUPTS.

CHARLES ABBOTT BOOTY, photographer.—Feb. 1, at Bankrupt's Court, London, at 1.
WILLIAM DAYNES, Rugby, photographer.—Jan. 19, at Rugby.

METEOROLOGICAL REPORT.

For the Week ending January 6st, 1869.
Observations taken at 406, Strand, by J. H. STEWARD, Optician.
THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Dec. 1868.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
31	29·75	43	34	37	39	WSW	—	Dull
1869. Jan.								
1	30·13	47	28	30	32	W	0·08	Frost
2	29·98	53	30	40	42	WSW	—	Dull
4	29·95	48	38	39	41	SW	0·14	Dull
5	29·70	54	39	48	48	SW	0·03	Rain
6	30·26	—	37	38	39	WSW	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 454. Vol. XVI.—JANUARY 15, 1869.

AN EASY MODE OF PREPARING BROMIDES.

A German chemist, Herr Boedecker, has recently arranged a new, or rather an improved, process for preparing alkaline bromides, which is of very considerable interest to us as photographers. We, therefore, now give an epitome of the method so proposed, since bromides promise to play the most important part of any other compounds in future photographic processes; moreover, since the process is a very simple one, and capable of yielding a bromide which is an easy source of other similar salts, it will interest our readers to know some of the details.

Herr Boedecker commences by preparing a very curious compound in the following way:—Twenty parts of ordinary flowers of sulphur are placed in a flask of sufficient size, and over the powder two hundred and forty parts of bromine by weight are poured; the two bodies easily combine without any perceptible evolution of heat and without the least danger, forming a dark brown, fuming, and very oily-looking liquid, possessing a remarkably pungent, disagreeable odour. When this curious fuming bromide of sulphur is poured into slightly warm water it is decomposed at once with a slight noise, the products of its action on water being sulphuric and hydrobromic acids and sulphuretted hydrogen. If, however, instead of pouring our oily liquid into water we pour the above quantity into a good milk of lime—prepared by first slacking one hundred and forty parts of good fresh quicklime, and then stirring up with five times its weight of water—we obtain sulphate of lime, *bromide of calcium*, and oxysulphide of calcium. The bromide is a very soluble salt, but the other two bodies are very slightly soluble in water. It is, therefore, only necessary to filter in order to remove the two latter from the liquid.

We now have a solution containing bromide of calcium and small quantities of the other two compounds. The liquid is treated with a few drops of dilute sulphuric acid and boiled for a few minutes; a little more milk of lime is now added to a slight alkaline reaction, and the liquid evaporated to a small bulk. On allowing the solution to stand for a day the remaining sulphate of lime almost wholly separates, and, after filtration, the liquid may be evaporated to dryness and preserved in a well-closed bottle, owing to the great tendency of the bromide to absorb moisture from the air. The trace of sulphate of lime remaining in the salt does not in any way interfere with the use of the dried salt for bromising collodion, since the sulphate remains behind on dissolving with alcohol.

Bromide of barium may be prepared in a precisely similar manner if we substitute baryta water for milk of lime, and take especial care to get rid of the sulphide of barium formed in the process.

We have already said that the above mode of preparing the calcium salt is very simple, more especially useful since the bromide of calcium is a most convenient source of other bromides. If we take some of the bromide of calcium, dissolve in the smallest possible quantity of water, and pour this into a nearly saturated solution of the sulphate of the base whose bromide we wish to prepare, a precipitate of sulphate of lime takes place, and the water retains the metallic bromide in solution; the latter can be then filtered off, and on evaporation to dryness yields the salt required.

In order to enable our readers to make use of these facts, if they have the bromide of calcium, we have calculated the following table, which gives the proper proportion of each sulphate to be used in precipitating ten parts by weight of the bromide of calcium:—

10 parts of bromide of calcium require	6·6	of sulphate of	ammonia.
,, ,, ,, ,,	14·0	,,	cadmium.
,, ,, ,, ,,	14·0	,,	cobalt.
,, ,, ,, ,,	12·3	,,	magnesia.
,, ,, ,, ,,	8·7	,,	potash.
,, ,, ,, ,,	16·1	,,	soda.
,, ,, ,, ,,	14·3	,,	zinc.

If the process be conducted carefully we can obtain the following quantities of the various bromides from ten parts of bromide of calcium, when the latter is treated with the equivalent quantities above given of the respective sulphates:—

Of bromide of	ammonium	9·8	parts.
,,	cadmium	13·6	,,
,,	cobalt	10·9	,,
,,	magnesium	9·2	,,
,,	potassium	11·9	,,
,,	sodium	10·3	,,
,,	zinc	11·2	,,

We need not say more, since the convenience of the above table is evident, and the advantage of being able to prepare any desired bromide at a moment's notice must be likewise apparent.

EXPERIMENT WITH AN AMMONIO-NITRATE OF SILVER BATH.

In the last letter which we published from our able Philadelphia correspondent, attention was drawn to the results of a very interesting experiment made by Mr. M. Carey Lea. Instead of employing the ordinary bath in sensitising a plate coated with bromo-iodised collodion, Mr. Lea used an ammonio-nitrate bath possessing a decidedly alkaline reaction. The plate, when exposed in the usual way, and treated with a solution of ammonia, gave no image; but, on treating it with pyrogallic acid, a faint picture could be distinguished veiled in fog. Our correspondent was led to expect that, instead of such a result, increased sensitiveness might be looked for, and appears to have been surprised that the opposite condition should have been obtained.

The anticipation of increased sensitiveness under the circumstances is, of course, perfectly reasonable; but there does not appear to us to be much real difficulty in explaining the cause of this insensitiveness. Among other explanations we might offer the following as by no means improbable, since it is based upon analogy:—When corrosive sublimate is added to ammonia water a white precipitate is thrown down; this compound, on analysis, proves to be a chloride of an ammonium base, in which four atoms of hydrogen are replaced by their chemical equivalent, or two atoms of mercury. When the reverse order is observed in mixing the two solutions—when the ammonia is added to the corrosive sublimate—a white precipitate is also produced; but its composition is quite dif-

ferent, since we now find the compound to be made up of three atoms of corrosive sublimate with one of *amide of mercury*.

Applying the information which these facts afford to the case of Mr. Lea's silver bath, we should be disposed to think that, when ammonia is added to nitrate of silver, a compound of the latter salt and amide of silver, or some analagous body, is produced which is little affected by light. If, on the contrary, nitrate of silver be subjected to the action of a large excess of ammonia—as in fuming—an altogether new silver compound is probably formed, analogous to the mercurial compound already referred to, and which is much more sensitive to the action of light. Many other considerations, which we need not detail here, lead to the belief that, when nitrate of silver is treated with excess of ammonia, nitrate of ammonia, water, and *argentamine* are produced—it being understood that the last-mentioned body is simply ammonia in which part of the hydrogen is replaced by silver.

If it be recollected that there is great probability that the body produced by adding ammonia to nitrate of silver is different from that obtained by adding nitrate of silver to ammonia, it is easy to see that an apparently slight variation in the mode of conducting the experiment might lead to very opposite results. We would, therefore, suggest to our valued correspondent that it would be a matter of much interest to continue his experiments in this interesting direction, under other and defined conditions similar to those we have referred to above.

COLLODIO-BROMIDE DRY PLATES.

It is interesting to see that this excellent dry process is steadily making its way. The case is very different now from what it was a year ago, when I first commenced writing to you relating to it. *Then*, scarce anyone but Messrs. Sayce and Bolton had reported favourably upon it; and one thing that probably kept it back was that some who wrote on the subject published formulæ that were quite impracticable. One of these, I remember, caused me a great deal of trouble, and disposed me at the outset to reject the process. I could get none but very insensitive plates. I found after a time that the writer had mistaken his equivalents, and whilst supposing that his formula gave an excess of nitrate of silver, it in reality involved a deficiency.

Since my last communication I have continued to make long series of trials with a view to find improvements. It does not seem worth while to recite these experiments *seriatim;* even in the briefest way I should take up too much of your space. I shall in this note confine myself to stating one or two points:—

1. In my communication lately sent to you on the use of gum and sugar with collodio-bromide plates, I should have mentioned that this preservative requires more bromide to the developer than any other that I am acquainted with—a peculiarity which evidently connects itself with its extreme sensitiveness. The proportion of bromide advised in my directions for the lead bath process must be at least doubled, and the developer must never be put on the plate without the bromide in it. It is not admissible to begin the development (as in some other cases) with pyrogallic acid and ammonia, leaving the bromide to be added later in case of need; this is on no account to be attempted. Nor will the liberal use of bromide be found to lead to insensitiveness or tardy development.

On the contrary, unless the plate has received a very insufficient exposure, the development is rapid. In my own experience, if the plate has had an exposure sufficient for a wet plate under identical circumstances, the development takes no more time than that of a wet plate developed with iron. This is extremely agreeable, and a great superiority over many other dry processes. In fact, the collodio-bromide dry process is so agreeable that, when once fully mastered, I doubt if any one would consent to use any other, especially as the negatives print better than those of any other dry process that I am acquainted with.

2. I observe that many are experimenting with different sensitisers (often improperly called preservatives). This is very desirable, and is the only way in which the best possible treatment can be made out. It may be of interest to experimenters, however, to be informed that there can be no absolutely *best* sensitiser, inasmuch as *one that gives the best result with one pyroxyline does not necessarily do so with another.*

Thus it has happened to me to prepare four plates together, using two sensitisers and two pyroxylines, so that all four plates were different. These plates were exposed in rapid succession and developed together, when it appeared that the one sensitiser gave the best result with the one specimen of cotton, the other the best with the other.

This curious fact—which, I believe, has not been before stated—explains the extreme divergence of the results obtained by different experimenters, and, moreover, tends to show that these differences of result will always continue.

There are, for example, some preservatives that give strong contrasts. These will do with almost any intense cotton. Others, like gum, tend to thinness and flatness, unless used with a cotton that exactly suits, but, when such cotton is obtained, give by far the best results.

And I may here remark that the gum process, with the collodio-bromide, is not the easiest to succeed in. I suppose that beginners would do best to try tannin and honey, or something of that kind, requiring a threefold exposure of the wet, and succeeding with varieties of cotton more easily found. But when this is mastered they will want the rapid work. I shall, before long, send you some further details in respect to this. I can now, with certainty, work as fast with the dry as the wet, and it is my intention to spare no pains to work and publish even the smallest detail essential to success. I do not think any greater service can be done to photography than aiding in enabling all who will make the effort to get clean, delicate, soft plates by a dry process with no longer exposure than that of a wet plate; and it can most undoubtedly be done, and that with means as simple as those of any other photographic process. This is to be done with gum and sugar in the proportion I have already indicated; but I have found other conditions greatly aiding the quality of the work. It will take two or three weeks' work to fix these with precision, and then I shall at once lay them before your readers.

M. Carey Lea.

P.S.—As *gallic acid* has been highly recommended for use with gum dry plates prepared with bromo-iodised collodion and a nitrate bath, both by Mr. Russell Manners Gordon and M. Constant-Delessert, a few words on its action in connection with gum to the collodio-bromide dry process may not be unacceptable.

If gallic acid be added to the solution of gum and sugar (gum twenty, sugar twelve, to the ounce) in the proportion of two to three grains to the ounce, it will be found to exercise a very well-marked influence. The picture will be brighter and cleaner, but also, unfortunately, the plate will show a greatly diminished sensibility and a tendency to harsh contrasts, unless the exposure has been very considerably prolonged.

The brightening effect spoken of is, with gum plates, a decided advantage—so decided that I do not wonder that it should have attracted favourable notice. But, then, if the benefit be great, the evil is very serious—so much so, that, in my opinion, the use of gallic acid with gum in collodio-bromide plates destroys a great part of the advantages to be gained by the employment of that substance.

The great point is to have a treatment with gum which will retain all its advantages and cure its defects. This, I believe, I have obtained, and purpose to publish as soon as I have it perfectly in shape.

Independently of this new method, some additional brightness may be gained by *washing the plate* after the collodion has set. Most operators do this. I introduced the method of omitting this washing and plunging the plate into the sensitiser (or "preservative") as soon as set. As yet but few have adopted this method of mine; eventually I think it will supersede the other, because washing the plate, though it increases brightness, detracts largely from sensibility, which is a great evil. It also seemingly increases the amount of work, and introduces a new question, the *quality of water.* My method makes the operator independent of the nature of his wash water, and removes the trouble of providing distilled water for the first washings by suppressing *all* washing.

The modification which I am now perfecting will constitute important improvements in the rapid dry process which I sent you a fortnight ago. As soon as I get them into the best shape I shall send them.—M. C. L.

COPYRIGHT IN PORTRAITS—IMPORTANT TO PROFESSIONAL PHOTOGRAPHERS.

Professional photographers do not appear to have adequately realised the effect of the copyright act. The excellent article by Mr. Le Neve Foster, published in our Almanac, seems to have attracted much attention, for we have already received several communications on the subject. One of these touches on a phase of the

Copyright Act which has not received much attention, and as such we publish it here, and attach our reply:—

"May I be allowed to ask your opinion concerning the following circumstance? A number of persons go to a photographer (No. 1) to be taken in a group, and to be supplied with a copy each of them for a certain price (no mention of copyright). Some time afterward several of the group, desirous of giving their friends small copies of the picture, commission another photographer (No. 2) to copy one of the originals in *carte-de-visite* size—two of the party objecting.

"No. 1 photographer, hearing of the circumstance, goes to No. 2 photographer and threatens him with penalties if he (No. 2) execute the order, as he had registered the original copyright.

"Now, do I understand rightly Mr. P. Le Neve Foster in your ALMANAC (page 110, second and third paragraphs), that the copyright is the property of the persons photographed in the group, and that No. 1 photographer has no right to the claim? Can the majority, or *any*, of the group get the original copied where they please? And can one or two of the group secure the copyright of the original without the knowledge or consent of the others?

"Your kind notice of my queries will greatly oblige,—Yours, &c.,
"P. M."

We proceed to reply to the above:—Photographer No. 1, in the absence of any agreement with the person or persons giving the commission for the group, *has no copyright whatever* in it; his registration is valueless. The group, or those of its members who gave the commission, are entitled to the copyright.

If more than one person owns the copyright it is like all other joint property in an indivisible thing—no one or more of the joint owners can deal with the property to the exclusion of the others. Who, in the case named, is the proprietor of the copyright will depend on which member or members of the group gave the commission for the picture and paid for it.

It may be that none of the group are entitled to it. An outsider may have given the commission for the picture, in which case he becomes the owner. One thing is very clear—the photographer has no right to it.

It may be well to add here the opinion given by an eminent member of the legal profession in Scotland, Mr. Andrew Mure, Advocate, now Sheriff of Zetland. The question put was this:—"*Suppose a photographer registers a negative without the knowledge of the employer, would he be entitled to the copyright?*" Sheriff Mure replies as follows:—"The photographer who registers a negative without the knowledge of the employer has no title to the copyright, and is not proprietor thereof under the statute; for, under the provisions of the first section of the statute, he does not retain the copyright except under a written agreement with the employer."

ON COMBINATION PRINTING.*

THE subject which I have to bring before your notice this evening is one of such magnitude and importance, that I feel the very imperfect sketch which I shall be able to give of it will by no means do justice to its varied claims. It is my purpose, however, to make the matter as clear as I am able to do, and to treat it in a manner which may be understood by all. The importance of combination printing is, I think, derived from two considerations. It affords the means of supplementing the powers placed in our hands by the opticians to a very considerable extent, and it also gives us a power far beyond that which can even be realised from the most perfect "merely mechanical" instruments. However perfect the instruments may be which the combined science and skill of the optician may place in our hands, there must always be a "something beyond," which can only be reached by supplementing our powers by some such device as combination printing. There is in photography a perfection to be gained of a far higher standard than the merely technical excellence of the most perfect of mechanical appliances.

It was doubtless at first the idea of those who introduced combination printing merely to supplement obvious defects in the processes then in use, the application of the plan to the more direct purposes of art-photography being of a later date. Even now, although the powers placed in our hands by the optician are so great, and notwithstanding the perfection at which the chemical part of the process of photography has arrived, it is often very advisable, in treating a large class of subjects, to adopt the method of combination printing in preference even to using more direct means. I more particularly refer to those subjects in which "cloud effects" form a prominent feature. In cases such as these the usual plan is to take the sky on one plate and the landscape on another, and join the two in printing. This is probably the simplest effort of combination printing, as well as the one used most frequently by the majority of photographers. I am unable to find the first mention of the plan of combining two or more pictures; but it is to Mr. Rejlander that photographers are indebted for the first application of combination printing to the direct purposes of art-photography. In his celebrated picture of the *Two Ways of Life* (first exhibited, I think, in 1857), the wonderful art power of combination printing was first called into being. The idea of taking a picture in a number of different parts, and then combining these together so as to form one harmonious whole, was indeed a great advance upon the old notion that a photograph must consist of the view presented to the camera at one time—nothing more and nothing less. Mr. Rejlander's idea was to make a picture of a scene which he had imagined, not of one which could be really placed before the camera, so as to be rendered in a merely mechanical manner.

In a work of this character it will be obvious that the perfection of each individual part will be, in a great measure, independent of the perfection of the whole, as a whole—each part is, by itself, a photograph, having its own perfections and its own faults; and each part bears as much the impress of the mind of the artist as any single subject can do. But the whole is a result entirely dependent upon the mind of the artist, and but little affected by the particular merits of each individual part. This, it appears to me, is a complete rejoinder to those who affect to state that, as the "camera has no soul, photography can never be an art." It was not the camera which produced the *Two Ways of Life*, any more than the brickmaker makes the house. It was the artist, Mr. Rejlander, who produced the picture, just as it is the *architect* who builds the house.

It is not my intention, nor is it, indeed, my business, to enter upon any detailed criticism of this, the first great combination picture. The picture will always have a great historical interest as being the first effort, or, at any rate, the first successful effort in its own particular direction; and all photographers should be duly thankful to Mr. Rejlander for having so boldly launched out on such a difficult task, and for having so successfully shown the possibility of attaining so much excellence in imaginative art by the means of photography. However great the success of Mr. Rejlander's picture, I do not think that imaginative art is the true sphere of photography, and particularly I do not think that it is possible to represent an abstract idea by photography. For instance: the central figure in the *Two Ways of Life* does not, to my mind, represent "Repentance," but it represents a "repenting woman;" but, as I say, I am not going to criticise, and so I will at once turn to the practical part of the subject.

The actual plan adopted in the production of the picture of which I am now speaking was described by Mr. Rejlander in a paper read by him at a meeting of this Society on the 6th of April, 1858. The picture having been roughly sketched on paper, the figures were taken in separate groups—or singly—on a number of different negatives. I am not aware of the exact number of negatives which were employed in the production of the picture, but I think about thirty were used. The whole of the negatives having been taken, the print was proceeded with in the following manner:—One of the negatives was placed in the printing-frame and the paper laid upon it. The exact position which the negative occupied on the paper was determined by measurement, and having been accurately adjusted, the back of the frame was put in and fastened up. During the printing of the first negative all the paper was shielded by means of a large velvet cloth, so that the light should print only through those parts of the negative which were needed to form the picture. When the first negative was sufficiently printed, a second was placed also in the position measured for it, and it in turn was printed, taking care to shield all the other parts of the paper with the velvet cloth. By a repetition of this process, using a new negative each time, the whole picture was at last printed in; and then, as far as I am at present concerned, the picture was complete. This method is not exactly the one now considered to give the best results, and, though differing nothing in principle from the plan now adopted, is, I believe, never made use of at the present day.

Before turning from the consideration of this picture, I wish to point out two things connected with it, which have to my mind an important bearing on the various criticisms which have been made for and against combination printing. The first is, that the *perspective* of the picture, wherever there are lines which can show it, is, if not absolutely correct, sufficiently good for all purposes of art. The other point is, that some parts of the picture, though they look right in size, are very much enlarged from their true proportionate sizes. The drapery of the background, for instance, was arranged in quite a small room, while you will see that the arch in the centre is of considerable size, being taken from a garden, and it is probably fifteen or twenty feet in height. I do not defend this, but I point

* Read at a meeting of the London Photographic Society, January 12, 1869.

it out, because it shows that to produce a good art result it is possible sometimes to deviate a little from the absolute facts of nature. It would probably have been impossible for Mr. Rejlander to have obtained drapery of the magnitude of that which he has represented in his picture; but an enlarged view of small drapery, if it do not give the absolute fact which it was intended to represent, gives a representation sufficiently near for the purposes required.

Next after the *Two Ways of Life* came Mr. H. P. Robinson's picture *Fading Away;* this was published about a year after the work of Mr. Rejlander, and I have the pleasure of being able to show you the first print produced of it.

I, although Mr. Robinson's partner, have no hesitation in saying that this picture has also an historical interest, as being the first picture of the long series of works of the class which have made Mr. Robinson's name famous among photographers.

The manner in which this picture was taken was almost precisely identical with that which was adopted in the *Two Ways of Life*, with this exception—the figures were taken separately, but with their appropriate background. The operation of printing was thereby rendered much more easy, and the joinings are more difficult to detect in consequence. This picture has a point of interest which I must not allow to pass unnoticed. I should mention that, at the time this picture was taken, it was made a matter of considerable discussion whether or no the subject was one fitted for an accurate and realistic display of photographic art. It was *because* Mr. Robinson considered the subject was one eminently *unsuited* to the absolute rendering of an ordinary photograph that he chose the picture for his first serious attempt at combination printing. It was because the subject would be considered so awful and so painful, if it were to be rendered simply photographically, that Mr. Robinson chose it to try to show that the amelioration of art could be introduced into even the commonly-supposed unplastic art of photography. The principal figure, the lady, who *is* "fading away," has in the picture the appearance of one in the last stage of consumption. Unless this could have been shown, the picture would have been a mere body without a soul—it might as well have been called by any other name. But was this lady really in such a state of decline as she is here represented to be in? By no means. Though the picture was taken ten years ago or more, the lady is now, and was then, in a state of robust and vigorous health. The difference between the absolute fact of nature and the apparent fact shown in the picture is here well illustrated. I think we need no other argument to show that a photograph *can* be something more than a mere soulless "copy" of an object, or person, or scene.

NELSON K. CHERRILL.

(To be concluded in our next.)

PHOTO.-ENAMELLING.*

SINCE the publication of our treatise on photographic enamels, many experimenters in the provinces and abroad have written to us on the difficulties with which they have had to combat on account of the crystallisation on the bichromated glass.

The formula we give, and which follows a regular course in seasons propitious to photography, should be modified when required, to prevent accidents. We should say, however, that without any change there would be no impediment by the crystallisation if the mixtures were prepared beforehand, and were not used until some days afterwards.

In any case, and to satisfy present requirements, the following is an easy method to remedy the evil:—The crystallisation is prevented by augmenting the dose of gum to ten, and even fifteen, per cent. If after this addition the image should not take a sufficient intensity in the blacks, which denotes a want of sensitiveness, add to the liquid a little water saturated with bichromate of ammonia.

The essential point is to keep an exact measure, and let the doses be equivalent to the light.

The maximum time of exposure being six minutes for the worst weather, it is necessary that a glass perfectly dried (above the spirit lamp), and exposed quite hot, should be used when exceeding that limit of time, so as to avoid bichromated crystallisation.

It is good in practice to prepare a litre of gummed water according to the formula, and to have, besides, at hand a vessel of very strong gummed water, and another containing a saturated solution of bichromate of ammonia. Thus, without waiting, you are provided with the means of avoiding accidents.

We have been asked if it be easy to colour enamels. In the photographic enamel there is no more difficulty in the colouring than in the case of ordinary photography; but this work must not be proceeded with until after a first dressing. The powders—which, by an art in their manufacture, offer before use the same shade they possess on leaving the enameller's hands—may be applied as water colours on tinted plates, and shades may be produced by strengthening the first tint.

We will present at the next meeting of the Society a gas stove which, under proper management, will admit of all the sizes of medallions commonly used being vitrified in one minute.

GEYMET AND ALKER.

* Read at a meeting of the Photographic Society of France, December 4, 1868.

ALCOHOL AND ETHER.

WE know not how those "enemies of mankind," the officers of Excise, may relish the article we are now commencing to write; but it will be better that we premise, at starting, that we have no desire to tamper or interfere with those rights vested in properly-qualified and duly licensed rectifiers and distillers. Our remarks are solely intended for those readers who dwell beyond the sphere of the doubtless excellent, necessary, and wholesome Excise regulations of this country.

As a text to our observations we give an extract from a letter recently received from India:—

"The article which you wrote in your number of July 10, 1868, page 325, relating to sending collodion in a portable form to India, was read by myself and friends here with an interest which those at home could not possibly appreciate; but, while you dwelt at some length in it on the means of supplying us with soluble cotton or paper by post, you probably did not consider that here we have neither alcohol nor ether. We have large supplies of brandy, rum, gin, and other potable liquors; but these will not serve to dissolve cotton when we run short of collodion, and, in consequence of the exclusiveness of the Peninsular and Oriental Company, we cannot get a supply under ever so many months. What would really be of advantage to us would be to inform us of some means by which we could extract the alcohol from the liquors above-named, and, further, to convert this alcohol into ether. The process cannot be *very* difficult, I suppose, otherwise its price would be greater than it is; and if I were to obtain only an ounce or two of the ether from a bottle of brandy, I would consider it a good bargain; for with the power of making our own collodion when we are short of it, and no prospect of a speedy supply, a pleasant era would be opened up."

In reply to the above we now purpose making some observations on alcohol and ether, and how to procure them. We assume that some trouble in the accomplishment of the object desired will prove no hindrance, and that expense is rather immaterial. Our correspondent is one of a numerous class whose claims we advocated on the occasion alluded to by him, when Mr. Solomon, of Red Lion-square, raised the question of the difficulties which existed in the transmission of collodion abroad.

The problem now to be solved is the following:—Given brandy, rum, and gin *ad libitum*, how to obtain alcohol and ether fit for photographic purposes.

A proper question to put at starting is this—What is the relative proportion of alcohol present in the liquors in common use? This is readily ascertained.

The *strongest* gin sold is 17 U.P. (under proof), and contains 40 per cent. of absolute alcohol. This is the strongest allowed by the Excise. The "best ordinary" gin is still weaker, being 22 U.P., containing 37 per cent. of alcohol. The gin usually sold in public houses is still weaker. Hollands gin contains 47 per cent. of alcohol. Good whiskey, whether Irish or Scotch, contains 50 per cent. of absolute alcohol, which is equal to 54 per cent. of alcohol of 0·825. Rum is imported from 10 O.P. to 43 O.P., but is not sold at this strength, the usual selling strength of good rum being 11 U.P., at which strength it contains 43 per cent. of absolute alcohol. French brandy is imported into this country at from 5 O.P. to 10 U.P., and at the latter strength contains 44 per cent. of absolute alcohol.

We now give the strength of a pint each of fine Jamaica rum and pale brandy, obtained from actual analyses:—

Jamaica rum—one imperial pint contained	Water ... 5 ounces. Alcohol...15 „
Pale brandy—one imperial pint contained	Water ... 9½ „ Alcohol...10½ „

From this it will be seen that rum is the more fitting liquid of the two for the purpose in question, namely, for strengthening up to the "photographic pitch;" and, as it is procurable everywhere, we shall select it for our experiments. Rum owes its peculiar flavour to butyric ether, which (from some experiments we are aware of having been tried) does not appear to exert any maleficent influence upon the collodion made from it. Our Indian friends, therefore, who have supplies of this liquor will proceed as follows:—

Place the liquor in a still and draw off as much of the alcohol as possible, leaving the water behind; or (which is an easier method)

put it into a well-washed bladder of sufficient size, that of an ox being usually employed for the purpose. It is worth while being at some pains to select a good bladder, as it will answer the same object any number of times. When filled, hang it in a warm place, and, by the process of *osmose*, which we need not here stay to explain (especially as it has been explained in the last volume of this Journal), much of the water will percolate through the bladder, leaving the spirit remaining, and of course much stronger than formerly.

If in this strong spirit some well-dried and powdered carbonate of potash be placed, and shaken up, it will dissolve in the water which is present in the liquid, and will, after a time, fall to the bottom of the vessel as a denser fluid, from which the supernatant spirit may be easily decanted. This spirit will be found sufficiently strong to answer for many purposes connected with photography.

It may, however, be strengthened to a still greater degree by adding to it some freshly-burnt quicklime, or some fused and powdered chloride of calcium. If it were allowed to stand for a few days and then distilled, it could be obtained as almost absolute alcohol.

Although we have supposed rum to be the liquid which we have subjected to these strengthening improvements, it is obvious that any of the numerous spirituous liquors may be treated in a similar manner. If the odour of the alcohol thus obtained be considered objectionable, powdered charcoal digested in the liquid forms a remedy.

So much for alcohol. But ether is also required for collodion, although if the cotton be specially prepared it will dissolve in alcohol. Alcohol *and* ether, however, are required to dissolve the pyroxyline in use at the present time.

There are two methods commonly employed for making ether—the first being that which is easiest of accomplishment; the second the most economical. In the one, the various ingredients, spirits and acid, are mixed together at once, placed in a retort, and distilled off, the product being ether. In the other, the acid is placed in the retort, and the alcohol is added in a continuous trickling stream. We now give these methods in detail.

Place in a glass retort two pounds of spirit, and add to this two pounds of sulphuric acid, and, placing the vessel on a sand bath, allow it to boil as rapidly as possible. What passes over into the receiver is sulphuric ether. When a heavier fluid passes over, lower the heat and add the remainder of the spirit, distilling it off as before. Now mix with the ether an ounce of dried and powdered carbonate of potash, and, after agitating at intervals for about an hour, finally re-distil. The ether thus obtained will be about ·750.

Another and the best method of making ether is the following:—Take of spirit two and a-half pints, and sulphuric acid ten ounces. Pour twelve ounces of the spirit gently over the acid, which must have been placed in an open vessel, and mix well. Now transfer the mixture immediately to a retort, and raise the heat rapidly to about 280° Fahr. As soon as the ether begins to distil over, supply in a constant stream fresh spirit through a tube (the retort being so constructed as to permit of this being done), and in such quantity as to equal that of the spirit which distils over. When forty-two ounces have passed over, and the whole of the spirit has been added, the process may be stopped. Very strong ether is obtained by re-distillation—chloride of calcium, recently-slaked lime, or carbonate of potash having been previously added.

Some prefer a leaden still with a pewter head, the worm of the still being formed of a piece of thin tin gas pipe; but many modifications of any special method of producing ether may be successfully introduced, so long as the general principle of manipulation be adhered to. The preliminary mixture of the acid and alcohol must be made with care. A method that has been recommended by a gentleman practically conversant with this branch of manufacture consists in placing the spirit in a circular dish, such as a bowl, and by means of a spoon giving it such a whirling motion as will cause a cavity in the centre, into which cavity the acid is slowly poured. The object of raising the heat *rapidly*, after the mixture is placed in the retort, is to prevent any of the spirit from being distilled over before it has attained the degree of temperature necessary for etherification.

We trust that the foregoing remarks will serve the purposes of those of our readers who reside at such a distance from centres of supply, and, that in the hour of need, when their stock of collodion has become exhausted and they would otherwise be thrown idle until fresh stores should have arrived, they may in the manner described be enabled to shift for themselves.

We shall next week devote a few remarks to the subject of the making of soluble cotton and paper, or of procuring it from this country through post, and of forming collodion from it sufficiently fit for photographic purposes to prove "a friend in need" in the temporary absence of that made by professed and experienced manufacturers.

In the meanwhile, we close this article by appending a few observations on the subject of the sources from which alcohol may be procured. We have spoken of rum. This spirit is obtained from treacle, which must previously have been largely diluted with warm water, and fermented. A photographic friend says he has tasted some possessing excellent qualities which was obtained in the following manner:—A quantity of molasses was put into a washing tub half filled with lukewarm water. Nearly a pint of yeast was stirred in, and a sack thrown over the tub. Next day the fermentation was found to be proceeding briskly, and it was allowed to go on until the sweetness of the liquor had quite disappeared. It having then been considered that the sugar had all become converted into alcohol, the contents of the tub were poured into a rudely-constructed still. What came over was undoubtedly rum, but weak and unsuitable for the intended purpose. It was, therefore, re-distilled, the result being a beautifully clear and colourless liquid of considerable strength. The cost of the spirit is of course less than one-fourth of what is paid for it "over the counter;" but our home readers have too much respect for the law to try the experiment of making it.

A good spirit is yielded from potatoes. The process recommended by one maker is to heat the potatoes in steam a little above 212°, then to mash, and add hot water containing a small admixture of caustic potash, the quantity of water being sufficient to form a thin paste, to which, when nearly cold, yeast is added, and the fermentation and distillation is then conducted in the usual way. It is said that from eight hundred pounds of potatoes may be obtained thirty pounds of spirit.

In a similar manner carrots may be utilised. The following is an experiment once tried by Dr. Hunter, of Edinburgh:—Thirty-six bushels of carrots, previously dried for a few days and washed, were cut down and boiled, for three hours (in seventy-two gallons of water), to a pulp. By means of a press, two hundred gallons of juice were extracted, which was boiled with one pound of hops for five hours. When cooled to 66° Fah. six quarts of yeast were added, and, when fermentation had ceased, it was distilled, the result being twelve gallons of proof spirit, which resembled the best corn spirit in flavour.

Every reader, of course, knows that whiskey is obtained from malt; but they may not be aware that the finest "poteen" whiskey said to have ever been produced in Ireland was obtained through the agency of a still the body of which cost only a sovereign, the head four shillings, the worm twenty-five shillings, and the mash-tun and flake-stand about eleven shillings—the cost of the whole plant not exceeding three pounds. The still held forty gallons, and was made of common tin, or tinned iron. Our foreign readers will, therefore, see that the manufacturing of alcohol need not be a very expensive process. It is needless to say that the results of amateur performances in this direction, either in making alcohol or collodion, cannot be compared with the excellent productions of the skilled manufacturers of which this country is so justly proud.

ART IN PHOTOGRAPHY.

Bravo! Mr. Winstanley, bravo! If any one speaks my sentiments I cannot refrain from clapping my hands. In these times of nonage, in which candlesticks and genuflexions are subjects of serious discussion throughout the land—in which "nonsense verses" are still an institution, and philosophy is taught by the Tuppers—things that would make not a future but a contemporary New Zealander smile with pity and contempt—in such times it is rare to find people with sufficient moral courage who will openly say one word against the shackling and straight-jacketing of sublime words, and dubbing the mangled corpse "poetry," which is a system unworthy of our very nurseries. But when such a voice in the wilderness *is* raised, it behoves kindred spirits to give it due applause.

A poetical idea expressed by chisel, brush, pen, or camera is poetry. Measure the idea, so to speak, constrain it, put it in an old-fashioned garment, and you have nothing but a caricature. Worse than this: commonplace ideas expressed in poetical slang—think you *that* is poetry? You will say I go far beyond your esteemed correspondent. Well, I do. Mr. Winstanley threw his ink-horn principally against the scenic background, and, in passing, skilfully hit the wrinkles and the pug nose in front.

But, though I agree with him in the main, I must say that the consideration of scenic backgrounds and horizon, important as it is, sinks into insignificance when compared with the serious consideration due to the model and foreground.

Before, however, I dismiss the former subject, I will just say that scenic backgrounds have originally been introduced, not so much to present a picture, as from necessity, to hide faulty manipulation;

just in the same way as, later on, vignettes were brought on the stage. A novelty soon becomes a fashion—a rage an outrage. Yes! the "artistic" backgrounds and slips are outrageous. I am proud to say I have never used them. There is nothing like a plain, or at most a panelled, background.

I now return to the model and accessories. Here is the place for your artists (photographic) wherein to display poetry, genius, idealism, and—bosh.

The primary object of a portrait is that it be, as the vernacular truly expresses it, a likeness. Some fanciful people may be pleased with poetry, genius, &c., superadded to the likeness, not seeing that the addition is out of character. Well and good. But are there such folk who would have poetry, &c., at the expense of the *likeness?* Oh, yes! Not, indeed, people in general, thank goodness! but pseudo-teachers of art, poetry, &c., &c. I will abstain from pronouncing a verdict upon them. We may, perhaps, soon catch a Maori alive, and hear what he will say.

Meanwhile, let us not lose sight of our object, *i.e.*, the likeness. Let us keep that fast by all means. Let us produce it in the best possible *natural* attitude, the best possible light, with an appropriate lens, the lens pointing in the right direction and not too near the model. Give directions, but on no account *touch* the model; if you do you break the charm—the pose becomes unnatural. The accessories must not intrude, nor be crowded or betray study.

These, methinks, are some of the art characteristics of photography. It is surely worse than nonsense to talk of engrafting the art characteristics of the sculptor and painter on Photography, in sheer anxiety and fear of her forfeiting the title of art. The ancients did not include photography in the fine arts, because they knew it not; but that is no reason why we should not *add* the *new* "fine art," with its own distinguishing characteristics, to the old limited number. We spurn the idea of Photography having, in common with the old fine arts, the hybrid property of being both inventive *and* imitative. She is purely copying, imitative to the highest potency, stamped with *truth*. Let us, then, when associating her with kindred arts, beware lest we throw away her birthright, and ignominiously put a stamp of falsehood upon her.

Do I, then, not approve of Adam-Salomon's photographs? No, I do not. I am a heretic who has not learnt to say "amen" to everything. I do not believe in the infallibility of fashion, nor in the immaculate conceptions of Salomon. If Dr. Diamond's is a type of those portraits he "turns out," I'll have none of them! If his poses are wire-drawn, and his accessories studiously obtruding, I'll have none of them! His distribution of light and shade is not so remarkable; his photographs (as they leave the washing-trough) have nothing particular in them; his mannerism is, to my eye, anything but pleasing. He has got a name now, and it will pass away as the Cameronian and other schools have done.

I will conclude with a conundrum:—Why are all the treatises on composition like Irish poplin?—Because half is stuff. "There is only one school of art, and that school is kept by Nature," was Hogarth's motto; and he was no contemptible artist. He composed well. To my brethren I would say—"Go and do likewise." ENNEL.

NOTES AND OBSERVATIONS IN PRACTICE.*

DRY PLATES WITH INFUSION OF NUX VOMICA.—I made a decoction of fifteen grains of nux vomica in one ounce of water. After filtration, I had five drachms of a very bitter liquid; to this I added twenty-four grains of loaf-sugar. The prepared plates were coated with this solution in the usual way, and then put away to dry.

After exposure, the plates are developed with an iron developer, which soon and easily brings out the picture of a greyish colour. As regards sensitiveness, the nux-vomica plate stands high; but, there seems to be a drawback in this plate, which is common to the plates prepared with the salts of morphia: it is difficult to push the development after a given limit has been attained.

Observations on the Philosophy of Dry Plates.—I am quite satisfied, by experiments, that the retention of sensitiveness in a dry plate is not to be attributed to what may be denominated the bitter principle of plants, nor do I believe that this bitter principle increases the sensitive character of a simply-sensitised collodion film. I am more inclined to believe that the saccharine principle is more efficacious in preserving a sensitised plate; but syrups are deliquescent, and, on this account, they are liable to produce irregularity in the development. Now, if we can compound a syrup with some bitter or some astringent substance, so as to take away from the former its deliquescence, we invariable obtain a preserver. This is the case with tannin, with coffee, chestnuts, malt, tea, and a variety of barks. In all these cases the collodion film is varnished, and the more homogeneous and perfect the varnishing the better the resulting negative. From this consideration of the matter, we are led to the conclusion that perhaps a solution of gum arabic, of plain albumen, or of gelatine, after all, is the real, the true preserver in dry plates, and that the philosophy of a dry plate consists simply *in preserving the film from the action of air.* If this be the *rationale*, the development must depend, in some measure, upon the facility or difficulty of permeating the preserving varnish by means of the developer. Hence the necessity of always dissolving off this varnish before the development commences. The subject is worthy of study.

Developer.—The following developer was an experiment; it works well, and is so far curious that it produces a deposition of metallic copper in the shades of the negative:—

FORMULA.

Double sulphate of iron and ammonia ...	3 drachms.
Sulphate of copper	1 drachm.
Water	6 ounces.
Nitro-gelatine	40 minims.
Alcohol (if needed)	40 „

The nitro-gelatine is prepared as follows:—

Gelatine	3 drachms.
Nitric acid (concentrated)	4 „
Water	12 „

Dissolve, filter, and use when required.

If the negative requires any strengthening, add four or five drops of the bath solution to a drachm of the developer, shake the mixture well together, and continue the development. We have not yet tried this developer on iron plates (ferrotypes, &c.), but we think the effect will be agreeable. The coppery hue is obtained more particularly during intensification, and probably will not be manifest to any great amount on the ferrotype. Try it.

New Collodion Filter.—It is not necessary to remind our co-labourers in photography that all our collodion must be filtered, or to insist upon the frequent repetition of this operation. They are aware of this necessity just as well as we are, and they are aware, too, that collodion filters are rather expensive articles, and not easily replaced in our small towns and villages if an accident should supervene, and the only filter in the establishment should be broken. It is our pleasure to be able to help any brother out of a difficulty, and to show him how to make a collodion filter equal to the best in the market for about a quarter of a dollar. For this purpose we require two bottles with wide necks, such as we receive our protosulphate of iron in from the stock-dealers, and capable of containing about twelve or sixteen ounces of water. The orifices may be about an inch or an inch and a-quarter in diameter, and as nearly of the same diameter as possible, for the same cork has to fit into both of them. Select a good, soft velvet cork for this operation, and see that one half fits tightly into one bottle, and the other half into the other. The next thing to be done is to bore a hole right through the middle of the cork from end to end, and large enough to admit an ordinary little finger of a man, or the delicate, tapering index finger of a lady. Such a hole is bored in a few seconds, if you are provided with what is called a cork-borer; but, should this tool not be in your possession, you can make the aperture with the blade of a penknife first, and then enlarge it with a larger blade. The surface of the aperture can easily be rendered quite smooth by running a rod of iron, made red hot, right through it. Supposing this part of the operation has been done satisfactorily and successfully, now select a glass tube of about six inches in length, and equal in diameter to a fine black-lead pencil or an ordinary goosequill. Place the cork broad end downwards on the table in front of you; now insert the glass tube into the hole in the cork, and let its end rest also on the table, and just in the middle of the hole. Holding the tube in this position by means of the left hand, you next pack round the tube some clean cotton-wool with the blade of a knife held in the right hand; this operation must be performed in a workmanlike manner, taking care to keep the tube all the time in the middle of the hole in the cork, and not to press the cotton too compactly together, otherwise the collodion will not filter through it. Introduce the collodion to be filtered into one of the two bottles so as to fill it about three-quarters full, put the cork in the mouth of this bottle, with the glass tube projecting down into the collodion; now turn the other bottle wrong side up, and bring its neck over the remaining half of the cork, and thus close it firmly and carefully. Finally, turn the combined bottles upside down, and let the collodion filter from the upper bottle into the one below. When the bottles are thus inverted, the collodion naturally must not be as high as the upper orifice of the glass tube. You can make one sooner than the description could be written.

* *Philadelphia Photographer.*

The Dark Room.—I will tell you all about my own dark room. In the first place, I prepare the colour with which to cover the panes of glass in the window, a large window containing sixteen squares. About a pint of starch is first prepared, somewhat thinner than that used by the laundress. Into this stir an ounce of saturated solution of sub-acetate of lead. In a separate vessel dissolve an ounce of bichromate of potassa in hot water, and add this solution gradually to the starch, stirring the mixture all the while over the fire, until you have a fine, bright, slightly orange, yellow-coloured thin paste. Cover all the panes of glass with this yellow colour, and repeat the operation about three times, always taking care to allow the first coating to dry before you apply the next. By taking the sashes out from the window, the thin yellow paste may be poured upon each pane like so much collodion; of course the sash must be supported horizontally. In the latter case a single coating will be sufficient. The light that passes through such a window will be yellow light; all the other colours of the spectrum will be stopped, absorbed in their passage through the coloured glass. Where I develope the negative pictures I have another window, but this is horizontal and fixed in the table, containing all the chemical preparations for developing, fixing, &c. So situated, you can hold the plate to be developed above it, and thus watch the operation of development by transmitted light.

But you say—Will not the *white* walls, ceiling, and wood-work reflect white light upon your negative?

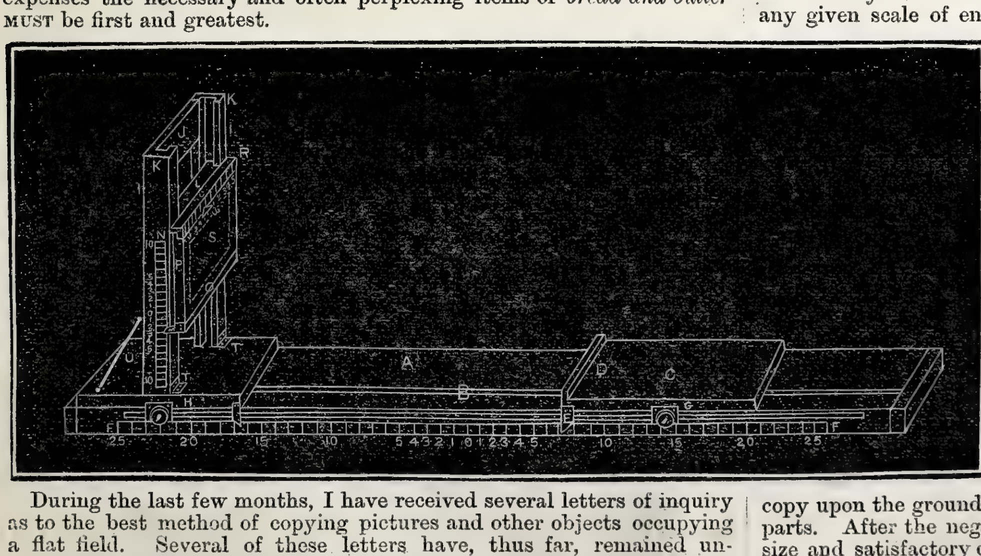
To obviate any interference of this nature, an interference that really exists—for the yellow light reflected from a bright white surface is less yellow, after such reflection, than before, just as chrome yellow is less yellow, after admixture with starch, than without this white substance—all the walls, ceiling, and wood-work are either washed over or painted with a yellow colour. Chrome yellow, mixed with a little slacked lime, is just the colour for the ceiling and walls, and a chrome-yellow oil colour is suitable for the wood-work. During development, all white light must be excluded by closing the door and other apertures and crevices through which light can pass. JOHN TOWLER, M.D.

MASON'S METHOD OF COPYING.*

ALL photographers who have occasion to copy Daguerreotypes, ambrotypes, photographs, paintings, engravings, or other objects occupying a *flat* field, are well aware that several conditions are requisite for first-class reproduction by the camera, which do not exist, or may, with apparent impunity, be disregarded in ordinary portrait or landscape work.

And yet we look through our best photographic establishments, and wade through the voluminous photographic publications of our own and foreign countries, without finding any systematic, simple, and efficient method by which uniformly good results may be obtained through inexpensive means by those possessing but ordinary capacity.

The wealthy amateur or organised company of capitalists may well afford nicely-adjusted and exquisitely-working instruments, which are *far* beyond the reach, or even the *hope*, of many, in whose catalogue of expenses the necessary and often perplexing items of *bread and butter* MUST be first and greatest.



During the last few months, I have received several letters of inquiry as to the best method of copying pictures and other objects occupying a flat field. Several of these letters have, thus far, remained unanswered, save by a simple acknowledgment of their receipt, and a promise of further attention at some future time. And I do not think that they can be better answered than *through* the Photographic Section of the Institute, and *by* a descriptive sketch of the device which I have had in use several years on ordinary work, and, in fact, upon several occasions where adjustments to the $\frac{1}{100}$th of an inch were required—a nicety far beyond which the apparatus is quite efficient, when properly constructed, as will be readily understood from the sketch and following description:—

(A) is a plain, smooth board of any desired length and breadth, having a cleat at each end to prevent warp or splitting, and having a groove (B) ploughed in its upper surface, along which the tongue-guide of the sliding-board or camera-truck (C) can easily move, and thus be kept parallel with the base (A). Upon this truck (C), which rests upon four small wheels, one under each corner (but not shown in the sketch), the camera is placed, with its front resting against the ledge (D), in which position it may be clasped by a set-screw, though I do not find it necessary to do so. The board or truck (C) may then be made to travel with its load—the camera—forward or back, to any desired point, and its position will be indicated by the index (E) moving over the scale (F), which is divided to tenths and hundredths of an inch, or a vernier may be substituted for the index when greater nicety is required. Any desired position of (C) may be retained by the set-screw (G), the head of which runs in a rebated groove in the edge of the base-board (A).

(H), the truck of the plan-board, is provided with guide, index, and set-screw, as in the case of (C).

Upon *this* truck are erected two uprights or posts (I) joined at the top, and made firm by the cross-bar (J). These posts, as shown at (K), are grooved, in which the tongues of the strong frame (L) have a free, perpendicular motion, and is held at any desired point, indicated by the index (M), on the scale (N), by a set-screw on the back side, and not shown in the sketch.

Upon the frame (L) are fastened two guides (O), in which the plan-board (P) has a free horizontal motion, its position being indicated by the index (Q) upon the scale (R).

The centre (S) of the plan-board, as shown by the dotted line, may be removed at pleasure, by turning two small buttons, so arranged as to be flush with the back, and offering no obstacle to the proper motions.

When the portion (S) is removed, the negative may be inserted in its place, and the apparatus is excellently adapted to the production of glass positives, and is so used by me in preference to a far more expensive apparatus which I constructed several years ago expressly for such work. For convenience of packing, laying away on the shelf, or hanging on a nail in the operating room, the uprights may be hinged as shown at (T), allowing the plan-board, when not in use, to fall forward, and lie flat upon the base (A), and, when in use, may be held in position by hook braces, as shown at (U). The one which I use in my own practice is so constructed.

With this simple apparatus of small cost, many perplexities may be avoided, and much time saved.

The operator is *always sure* that the plane of his original on the plan-board is at a true right angle with the axis of his copying lens. The vertical or lateral position of the original may be easily changed without interfering with the focus or removal from the plan-board.

Whenever a copy of any especial size is made, either equal, reduced, or enlarged, and the positions of the several parts of the plan-board and camera noted, no further focussing upon the ground glass is *ever* needed for reproductions upon *that* scale and by *that lens;* of course, it is necessary to observe the position occupied by the ground glass for any given scale of enlargement or reduction. A paper scale may be pasted on the base or bottom frame of the camera, and a simple index attached to the sliding portion of the camera body. Everyone will understand the necessity of having the surface of all subsequent originals occupy the same relative position as the ones used in establishing the various scales. If the plates or paper of any original is thicker or thinner, the truck of the plan-board must be moved back or forward, as the case may be, until the proper compensation is indicated by the index on scale (F).

For example: the operator has occasion to make a copy upon a scale of four times the original, which, for convenience, he places upon, as nearly as may be, the centre of his plan-board, which centre is shown by the intersection of two right-angle lines drawn through the extreme length and breadth of the plan-board, as is often done on the ground glass of the camera. Having placed his camera on the truck (C), he proceeds to adjust the focus and size for his copy upon the ground glass, by the necessary movements of the several parts. After the negative is produced, and found to be of the required size and satisfactory definition, he notes the position of the indexes on the several scales, and ever afterward he is *sure* of correct focus and size (for that scale), by referring to his note-book or sheet of scales, and fulfilling the conditions there recorded.

A list of scales for reductions, and another for enlargements, may thus be made with good subjects and light, which, by frequent use, are re-

* Read at a meeting of the Photographic Section of the American Institute, Dec., 1868.

tained in the memory, so that even reference to the recorded scales soon becomes unnecessary, and the ground glass of the camera box has but little use, except to exclude the dust from the interior. In dull weather the eyes of the operator are relieved from the perplexing and sometimes vain search for the *best* focus, and much delicate work may be entrusted to an assistant, who would most likely produce unsatisfactory results by the ordinary methods.

To those unacquainted with systematic work, the use of such apparatus may, at first sight, appear troublesome; but it is really so simple that anyone may, in practice, learn its use in much less time than is required to read this description. In fact, the whole thing can be comprehended at a glance.

Mr. Anthony has kindly offered to furnish the apparatus upon the order of any who may wish to test its utility in practice, or it may be had through any dealer.—*Phil. Phot.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 20th.......	Edinburgh.....................	No. 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

At the monthly meeting of this Society, held on Tuesday evening last, the Rev. J. B. Reade, F.R.S., Vice-President, occupied the chair.

The minutes of the previous meeting were read by the Secretary, and confirmed. Mr. Walter Woodbury was elected a member, and Messrs. Bishop and Pritchard were elected auditors for the ensuing year.

It was intimated that those members who had not yet received the print presented by Mr. H. P. Robinson would have an opportunity of obtaining their copies at the present meeting. This picture, we may observe, is entitled *Watching the Lark*, and is a "composition" picture. A child is seated on a knoll looking up with watchful eyes and listening ears to the lark who "at heaven's gate sings." The surrounding scene is Borrowdale, and is printed from a negative taken (of course) on the spot. Although of small size compared with some of Mr. Robinson's other composition pictures, we have not seen any of a more pleasing character. The attitude of the girl is natural and unaffected, while the surrounding scenery, beautiful in itself, is nicely placed in subordination to the principal object—the girl.

Mr. Spiller exhibited some specimens of oleographs, which, he said, had been sent to Mr. Crookes. He remarked that the members would doubtless be aware of the existence of those beautiful figures formed on the surface of water, and described by Professor Tomlinson under the name of "cohesion figures." They were formed by allowing a drop of oil to fall on the surface of water. Dr. Carter Moffat had been experimenting with the view of registering the figures produced in that way. The pictures exhibited showed the figures arising from sperm, seal, and castor oils, and they were obtained by first placing a drop of the oil on the water, and after three or four minutes, when the oil had assumed a certain figure, it was then taken upon a piece of glazed paper, which would thus be wet with water in some parts and with oil in others. If in this state the paper were inked, the registration of the figure would be effected. The specimens were handed round among the members.

Mr. Cherrill then read a paper *On Combination Printing*. [See page 25.] We may state that, in connection with the paper, on the walls of the room were suspended the various pictures to which reference was made in the paper, the productions of Mr. Robinson hanging on one side, and those of Mr. Rejlander at the end of the hall.

Mr. Rejlander said that he had learnt something that evening from the paper he had just listened to. One never lost by giving publicity to his ideas. He had seen many improvements in combination printing which he would have been glad to adopt had he known of them. Combination printing was really an art; and it was hard that they had to make so many apologies for composition, which was the highest of all arts. Composition was superior to drawing, painting, and everything else, and he did not see that photographers should apologise for it. Drawing the photographer was pretty sure of. The vexation in connection with composition printing was that it was unknown. A person when made aware that a picture he has been admiring is a composition, feels "humbugged," and gets a little "riled." He described the astonishment of the late Mr. Ross when he was first shown a large composition picture of thirty-two inches in size, and expressing wonder concerning the lens by which such a picture had been taken, the angle subtended being very large. The other day, in an exhibition, a lady, looking at a picture by Robinson, had asked him by what means such uniform sharpness in both the foreground and distance had been obtained, and what lens had been employed; and on his (Mr. Rejlander's) telling her that it was printed from different negatives, she significantly expressed her disgust at a picture thus produced. If composition printing were once made fashionable, it would be all right. He was glad that Mr. Robinson had persisted in this branch. Photography should be a teacher to the painter, and should not be misleading. Nothing that was untrue should ever be photographed.

Mr. Bedford observed that composition photographs had been much cavilled at by artists, but very unjustly so. They all owed a debt of gratitude to those photographers who departed from the beaten track, and ran the risk of condemnation in the hope of rendering their art attractive and useful. It was kind of Mr. Cherrill to come forward and explain the method by which those beautiful pictures were produced. He quite agreed with Mr. Rejlander in condemning anything in their art that could be called false. He remembered examining some photographs by the late Mr. Grundy, some years ago; but, afterwards ascertaining that the ships in the photographs were from models, and the rocks from bits of coal in his own garden, the charm to him was broken. It was confessed that it was done by way of a joke, and to deceive the artists. He was glad to have an opportunity of testifying his admiration of that real old master of art, Mr. Rejlander. He once overheard the late Prince Consort making some remarks on the first composition picture by Mr. Rejlander, the *Two Ways of Life*, and was delighted to find how he appreciated the high and lofty aim of the photographer. He would like to know what artist could have produced a finer picture under the same circumstances. Many much poorer pictures were hung on the walls of the Academy year after year.

The Chairman (after calling for a vote of thanks to Mr. Cherrill, which was unanimously tendered) said that they were all much indebted to Mr. Cherrill, Mr. Robinson, and also to Mr. Rejlander, who was the father of the art specially before them that evening. On the subject of composition printing he was well aware that there was a great deal of adverse criticism among artists; in their room, and at that meeting, he felt assured that there would be an unanimous feeling in its favour. Composition printing was a most legitimate branch of photography, and they might look upon the great pictures before them precisely as on the pictures in the Royal Academy—as being one and all specimens of the powerful conception of the artist. No one could go out into nature and find the ideal picture he wished to represent. To prevent that picture being barren and fruitless, and to aid his realisation of the ideal scene, the artist had in his portfolio different parts of that picture copied from nature. For example: every artist would have in that portfolio a series of trees of every kind, from the sapling to the oak; and, in like manner, studies of water, mountains, lake scenery, cattle, architecture, and the like. He selected from those a number that he was able to combine; and no more was the combination photographer to be condemned because he inserted figures from negatives in his possession into a picture and printed from different negatives, than the artist who made up his painted picture from a variety of sketches. The photographer possessed an advantage over the painter, inasmuch as his pictures were merely light and shade, which were always in true proportion. He had to congratulate them on the works which adorned the walls, and which were illustrations of combination printing.

Mr. Cherrill acknowledged in suitable terms the vote of thanks passed by the meeting, and briefly referred to the observations which had been made by the previous speakers.

A large number of fine specimens printed by Mr. Woodbury's process were exhibited. They displayed great progress in the art of photo-relief printing.

The Chairman, in thanking Mr. Woodbury for exhibiting so interesting a collection, intimated that at the March meeting that gentleman would demonstrate the working of his process.

The meeting was then adjourned to February 9, when Mr. Bing will read a paper on *Actinometry*.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A general meeting of this Society was held on the 4th ultimo,—M. Balard occupying the chair.

M. Lackerbauer presented a collection of enlarged microscopic proofs.

The following observations, addressed by M. Blanc to the Society on the manner of obtaining skies in photography, were read:—

"Generally, in photography, the views of landscapes present but a naked and cold-looking sky; some of them, and these the smaller number, are brought down in the proofs by a process known to all photographers. How much to be preferred would it not be to see in them the reproduction of those beautiful skies which are offered to us by nature!

"Occupied with this idea, and, for my own works, being desirous of filling up this void, I sought for the means of accomplishing my object, and consulted several treatises on photography; but only found the process which consists of printing immediately a second negative of the view for which clouds are required, and employing upon it the time of exposure suitable for their reproduction.

"For many reasons this process did not suit my purpose:—

"1. I make a quantity of dry collodion, and I have remarked that this process is not that best adapted for obtaining clouds.

"2. It may happen that, at the moment for operating, the sky may be perfectly clear.

"3. There is a choice to be made of clouds as well as of views, and they may not be of a sufficiently fine effect at the time of operating.

"4. A negative made under these circumstances may not suit the landscape negative for which it is intended.

"In order to obviate all these difficulties, I found it necessary to adopt some other plan, and at last I hit upon the following:—

"I commenced by making a collection of negatives of clouds, choosing, of course, those I preferred. Afterwards, in order to print them upon the proof, which was not fixed, and of which the sky had been purposely reserved by the ordinary processes, I brought this proof in contact with my negative of clouds, shut the frame, and upon the outside of the glass of the said frame I placed a proof of the same subject cut to the size, but not fixed. So that it might darken in the light, I drew my print afterwards in the shade; a few minutes sufficed for the printing, and it was impossible to discover in the proof the least appearance of retouch.

"As, in order to ascertain whether the clouds are photographed, it is necessary to open the frame, I keep the cut-out part upon the glass by simply moistening it. When it is dried it is afterwards preserved, in order to serve for other occasions.

"One of the advantages which I find in making separate negatives of clouds is that in printing the highest, the middle, or the lower clouds I obtain most frequently three different effects, which in a manner multiplies the number of negatives."

Many of the members observed that this process had been frequently employed, though it appeared not to have been published.

M. Poitevin had addressed a letter to the Society respecting the communication recently made by MM. Geymet and Alker, in which he claimed priority for the whole of the operations on enamel, with the exception of the sensitive layer which they seemed to prefer. All the rest, he said, had been taught by him in France and abroad since 1863, and to more than forty persons.

M. Amand Durand presented a collection of heliographic engravings, printed, some in typography, others in copperplate. In a letter which accompanied them, M. Durand said that in the specimens he had forwarded he had endeavoured to give the artistic character of the originals, all of which differed according to the method of engraving. He had both reduced and enlarged the originals, as would be perceived, and, thinking it would be agreeable to the Society to examine the plates which had furnished the engravings, he submitted three of them—the *Judgment of Solomon*, reduced one half; *Christ in Grave Clothes*, natural size; and *The Young Player on an Instrument*, enlarged double. These three typographs were executed according to the originals in copperplate.

M. Balard presented to the Society a series of photolithographic proofs, obtained by M. Jacques Husnik.

MM. Geymet and Alker sent a communication on *Photo-Enamelling*. [See page 26.]

The Society thanked MM. Geymet and Alker for this communication.

M. Ferrier, *apropos* to the preceding communication, announced to the Society that he had obtained excellent results by modifying one of the formulæ of MM. Geymet and Alker. The chromatised bath, such as it had been described by these experimenters, was, according to him, much too concentrated. By employing, not ten per cent., but only one and a-half per cent., of bichromate of ammonia all accidents could be avoided, and the operation was a complete certainty.

M. Soulier presented to the Society a favourable report respecting the preserved sensitive paper of M. Despaquis. This report was made in the name of a committee, composed of MM. Bertsch, Davanne, Jeanrenaud, Paul Gaillard, and Soulier.

M. Despaquis presented to the Society a series of carbon proofs mounted on cloth, for enlargements and photo. painting, to which was added the following note:—

"I have the honour to submit, for examination by the Society, proof specimens of carbon photography mounted on painters' canvas, and obtained by means of the pellicle of sensitive carbon collodion film.

"This is a new application of the carbon process of a very industrial character, and calculated, I believe, to render great services to photography for proofs destined to be painted or coloured, and, also, particularly for enlargements.

"The painters' canvas, being stretched on a frame and varnished in such a colour as may be desired, is covered with a glutinous varnish, or with white liquid paste or gelatine, and the pellicle bearing the image is applied upon it and spread by means of a soft brush. Where the paste has taken, before the adhesion is complete, the soft brush is passed over the surface of the proof, in order to efface any wrinkles that may have been formed. It may be painted afterwards in any manner, and then varnished with picture varnish."

Some members expressed their apprehension that the substratum interposed between the cloth and the painting would scale off, the objects thus obtained wanting solidity.

M. Despaquis assured them that this fear was quite groundless, and that the paintings thus obtained were as solid as those made direct upon the covering of the cloth.

The Chairman said time alone could pronounce upon this point.

M. Romain Talbot presented, in the name of M. Encausse, some prepared albumen transparent colours, all vegetable, not containing anything of aniline, and intended for colouring positives.

M. Davanne observed that, beyond the end for which they were specially intended, the colours prepared in this way, and reproducing the ordinary tone of proofs, might be of real importance for retouching. Everyone knew the difficulty of retouching an albumenised surface of any size by the aid of the ordinary water colours. The albumen colours would have the advantage of taking easily upon the albumen, and furnishing immediately a brilliant retouch.

M. Romain Talbot presented to the Society a salt for fixing, under the designation of the "*sel Encausse.*"

MM. Schæffner and Mohr presented a new paper, sensitised by the incorporation of carbonate of silver. This paper—which, after having been exposed to ammoniacal vapours, is very sensitive—keeps a long time in that state without undergoing any alteration. It was accompanied by the following communication:—

"We have the honour to submit to the Society a new sensitive albumenised paper. The importance of such a product is sufficiently appreciated, for the ordinary process presents certain inconveniences which it is desirable to avoid. The principal annoyance is the very short time which paper, once sensitised, can be preserved. A change of weather, particularly in the short winter days, sometimes causes losses to the photographer which are very prejudicial. It is also stated that efforts have been, for some time, directed towards the means of preserving sensitised albumen paper, and if, at the present time, the different processes are no longer in use, that proves that no one has yet furnished the desired result.

"By the paper which we have the honour to submit we believe that we have realised veritable progress.

"The results obtained therewith are equal, if not superior, to those produced by the ordinary process—in the variety of tones, in the greater purity of the whites, and a much greater fineness in the image. Our paper is sensitised with carbonate of silver. The mode of employment is absolutely the same as for the ordinary paper, excepting one supplementary operation. That operation consists in submitting the pads of the frames to ammoniacal vapours. These vapours act as a reducing agent. The abundance of ammoniacal vapours is the principal condition of the success, and it is for this reason that we recommend the pads of the frame presses to be treated with ammonia, as from their thickness they can absorb a sufficient quantity of ammoniacal gas.

"For this operation we place a box shut at the top by a hinge-lid; at the bottom of this box is a drawer, in which we place a mixture of carbonate of ammonia and lime. In the inside the separation is made by means of iron wire, through which the vapours mount freely and fill the box.

"We place the pads of the frame press inside the box without any other precaution than that of not heaping them one upon another.

"When the pads are strongly affected by the ammonia the impression is quickly made; it is two or three times as rapid as the ordinary process. Failure is impossible, except through an insufficiency of the ammoniacal vapours.

"In order to tone our sensitive paper, we recommend particularly the sulphocyanide of ammonium, nearly in the following proportions:—

Sulphocyanide of ammonium	80 grammes.
Acetate of soda	20 ,,
Chloride of sodium	10 ,,
,, gold	0·25 ,,
Water	1000 ,,

"We, however, obtain results as fine from other toning baths. The proof is fixed with a solution of hyposulphite of soda at fifteen per cent."

M. Romain Talbot exhibited to the Society a lantern apparatus for enlarging, by which a proof can be obtained in twenty seconds with magnesium light and by means of a special system of developing. M. Romain Talbot operated before the Society, and, with the aid of a magnesium light constructed, like the apparatus itself, by Mr. Solomon, of London, he obtained and developed at the meeting an enlarged proof. The following explanations were given with the presentation:—

"This lantern is constructed specially for the magnesium light. It serves:—1. As a magic lantern, to enlarge objects photographed, painted, or drawn on transparent materials. 2. To enlarge photographic negatives in a few seconds by the aid of a very simple and economical process of development. Thus a proof sheet 58 × 44 may be obtained in less than forty seconds of exposure, and will cost scarcely fifty centimes, including expenses of preparation and light.

"The lamp has undergone numerous improvements. The continuous light it now gives can only be compared to the electric light which is rendered proper for photographic operations. The enlargements obtained in all weathers, night as well as day, and with the greatest ease, are a result which will be appreciated by those who require it. Mr. Solomon is endeavouring to obtain other results, but these are only in regard to the pose.

"The lamp consumes one metre of magnesium ribbon in three minutes—say at a cost of thirty centimes, or ten centimes per minute."

The meeting, having followed with interest M. Talbot through the different operations, and thanked him and the other contributors, then separated.

Correspondence.

Foreign.

Philadelphia, December 20, 1868.

Some years ago, whilst engaged in some technical researches connected with photography, I purchased from a professional photographer a splendid negative of a subject connected with what I was engaged upon. In the course of two or three years, by mere standing (for it was printed from but a few times), a portion of the film detached itself from the glass, and the beauty of the negative was destroyed. When one considers how much pains, care, and time are bestowed in making negatives, and that the whole of this is entrusted to the protection of a light film of varnish, one recognises that too much care cannot be bestowed on the selection of a suitable coating; and it therefore seems to me unwise to trust to commercial varnishes, of the composition of which the operator is entirely ignorant. Experience is bought at a deplorably dear rate. Formerly I under-valued the use of oil of lavender, but since the publication of Mr. Wenderoth's experience, who lost three thousand negatives by the splitting of varnish made without lavender, I suppose all interested have profited by his communication. It is true that he used a *sandarac* varnish, and it does by no means follow that a *lac* varnish could have proved equally worthless by reason of the infusion of lavender. Still, it would not be safe to trust to this; and specially it seems doubtful whether the manufacturers of commercial photographic varnishes would be apt to use a sufficiently large proportion (about one ounce to fifteen) of so expensive an ingredient.

Some have objected very much to the use of bleached lac on the ground of the danger of its containing chlorine compounds resulting from the bleaching. In consequence of this, in making varnish for myself I have never used bleached lac without carefully examining it for these impurities, but have in no case found them. It is true that I have not tried many specimens, for I have used the very best that I could find, and as the operation is a troublesome one I have made enough at a time to last for several years. But I cannot think that chlorine compounds can be often present. I test for them as follows:—I dissolve a little nitrate of silver, about half-a-grain, in powder, in a little spirit of wine in a watch glass. In a small beaker or vial I put a little of the lac, scraped off from several different pieces, some outside and some from inside portions; set it for some hours in a warm place to dissolve, which it never does entirely, but leaves a muddy sediment. I fold up a little piece of filtering paper, and, holding it in the fingers, pour in some of the lac solution, and let a few drops filter through and fall into the silver solution in the watch glass. Now if there be present either free chlorine or hydrochloric acid, or any alkaline chloride or hypochlorite, a white cloudiness must follow. The absence of such result indicates freedom from these impurities.

I observe in a late number some remarks on the collodio-bromide process, by your ingenious correspondent, Mr. Plymly. I regret that he should have found a difficulty in getting good results, and hope that he will try again. Having myself worked the coffee process successfully, and having liked it, I feel able to say, without prejudice, that the collodio-bromide process which I published (with a lead bath) is *far* better than the coffee, over which it has the following important advantages:—

The pictures are *much softer* and more pleasing. The negatives, perhaps, are less brilliant-looking, and might seem not so good to one inexperienced in dry-plate work; but, on printing, the superiority of the collodio-bromide is very manifest in the *much* greater amount of half-tone. Then the exposure is rather less, and the plates themselves are more easily and more rapidly made.

I think I have no difficulty in saying that the cause of the troubles mentioned by Mr. Plymly lies in the *cotton.* It is perfectly useless to attempt to work the collodio-bromide process without the right sort of cotton. For example: I prepared a few days ago two specimens of cotton, both sold as "intense," under precisely similar circumstances. Both had been dissolved and salted a month previously—everything from first to last was made exactly equal. The exposures were timed with the seconds hand of a watch to be exactly alike, one following the other instantly on a day of perfectly uniform light. One gave a pale, streaky picture, which refused absolutely to intensify, and was, in every respect, a perfect failure. The other gave a perfectly satisfactory result, not even requiring the first dose of alkali to the strengthening, but coming at once up to the right strength.

In fact, the collodio-bromide process never can become popular until a suitable cotton is made expressly for it, and is attainable by all. In the interest of the art I shall endeavour that this shall be the case here, and that a perfect cotton shall be accessible to all. Perhaps such a cotton might be sent over to your side, and find a sale there. I have requested a manufacturer in this city to ascertain if he can furnish the right sort with regularity and certainty. I should be glad to see others spared the great trouble and annoyance I have found in getting the right sort, and would be willing to labour some months to aid in bringing about this result.

I am still working at the gum preservative in connection with the collodio-bromide. It certainly affords the most sensitive dry plate of anything I know, and I am making a long series of comparative trials to fix exactly the conditions under which it may be used to the greatest advantage.

It should be clearly understood by those who try the collodio-bromide in any form that a resort to redevelopment with acid pyro. and silver is *never necessary.* If the desired strength cannot be got by alkaline development alone it indicates that there is something wrong either in materials or management. I count it no small advantage in this process that those finger-staining and tiresome manipulations with silver solutions are done away with. When collodio-bromide plates are well managed they can be brought up to any strength one wants; the high lights can be brought up to absolute opacity, if such a thing were desirable. The amount of strength seems as much under command as with pyrogallic redevelopment of moist plates. If this result be not reached, it is in consequence of something being wrong—most probably the cotton; perhaps, however, the collodion is not old enough. With good cotton a month is quite sufficient, but I would prefer not using the collodion fresher. M. Carey Lea.

Paris, January 11, 1869.

Last Friday was the monthly meeting of the Photographic Society of France. The venerable M. Balard occupied the chair, and there was a good attendance of members. I was glad to see M. Poitevin once more, and to have a little chat with him. He had done nothing in photography recently, having been compelled to relinquish his favourite investigations in our science for work which brought him in something to live upon. It struck me rather painfully to think that a man to whom our science owes *much*—leaving the question of *how much* on one side—should be beaten out of the ranks of the investigators, and compelled to relinquish researches fruitful in results, in order to provide food for himself and family, whilst others, who have *more or less* benefited by his discoveries, should find in them the recompense denied to the inventor. The red riband in his button hole denoted his fellowship with the "Legion of Honour," and one could only wish it signified something more substantial.

The subject on the *ordre du Jour* which attracted me most this evening was a "presentation by M. Duchemin of transparent photographs on enamelled glass with an arsenical base, and which had been obtained and vitrified in a few minutes without transfer or collodion." There was to be an experimental demonstration of the details of this process, from the printing of the picture to the burning-in of the same. I had previously obtained a letter of introduction to M. Duchemin, and had intended calling upon him to obtain an account of his process for your readers; for some weeks ago he had presented some of his pictures to the Academy of Sciences, and his communication was referred to the chemical committee to report upon. My interest was excited, too, in this process by a letter published in *Les Mondes* on the 31st of December, in which M. Duchemin says:—

"I insist upon the importance there is in doing away with the employment of collodion and all transfer in the process. It is the realisation of an idea which has caused me sleepless nights! I can now say that it is possible with a good negative, and in less than ten minutes, to execute *directly* on enamel a portrait, and to deliver it vitrified in this space of time. I have been able in less than half-an-hour to write and fix in the fire my manuscript note addressed to the Academy; but the most curious thing is this—they refused to do the same work for me at a manufactory for seventy francs."

Your readers will pardon me for supposing I had found something that would be of use and interest to them, and excuse my natural anxiety to know something more of this wonderful process. How far I was satisfied or pleased I leave them to judge after I have given my account of what I *saw and heard* at the *séance* of our Society. First of all, it is only upon *flat* surfaces that this process is applicable; these surfaces must be composed of an arsenical enamel consisting of powdered flint glass, crown, and arsenious acid, and this enamel may be applied to metal, glass, porcelain, &c. There is some difficulty in this, however, owing to an unknown property of substances of dilating in different degrees at the same temperature, so that if this enamel be placed upon a metal or glass plate, and then exposed to the heat necessary for its vitrification, a certain amount of "cockling up" or contraction may be experienced in the cooling, which will be fatal to the beauty of the layer. In a former letter I think I quoted from M. Camarsac some remarks upon the preparation of enamel plates, in which this "cockling" tendency was overcome by enamelling both sides of the plate. The glass plates for this process should be chosen, if possible, with a dilation at a certain temperature equivalent to that which would take place in the layer of enamel upon them. However, supposing the enamel properly applied, the glass properly prepared, it is coated with a solution of bichromate of ammonia, gum, &c., the same as recommended by MM. Geymet and Alker. The plate is dried—in the case before me it was dried over a spirit lamp to hasten the process—it is placed in the pressure-frame in contact with the *cliché*, and exposed. The plate this evening was exposed from six to eight minutes in front of one of Mr. Solomon's magnesium lamps. A good deal of white fumes were evolved from the magnesium, but, as the President cheerfully observed, they would do no harm—we should only be taking our magnesia very well calcined. Exposure finished, the image is developed with a metallic

powder and a large brush, just as described by MM. Geymet and Alker. The powder which is found to answer well, and to give blacks which may be mistaken for iridium blacks, is composed of—

Oxide of cobalt	10 parts.
Black oxide of iron	50 ,,
Minium	100 ,,
Sand, very finely powdered	30 ,,

It can now be put in the furnace and the picture burnt in. *Voila tout!* The way the manuscripts are to be rendered vitrified is by writing upon these enamelled plates with an "ink" composed of the developing powder mixed with honey to the proper consistence, and then burning in the writing. It will be seen that, as far as it goes, the process is remarkably simple, and as the "author" generously throws it into the *domaine public* without any patent right, photographers can go to work upon it without fear and trembling, except that arsenical preparations are not nice to keep about one. Some may think there is not much that is new in the process, and that it has been done before; in fact, at a meeting of the Photographic Society of France, some time back, I believe some transparent pictures were exhibited which were taken by a similar process. Some may not like the idea of taking enamel pictures upon such a fragile substance as glass; others may prefer committing their deeds to parchment rather than have them vitrified even on the thickest of patent plate. All these are free to hold their own views on the subject; and we will await the report of the Chemical Section of the Academy of Sciences before saying much more about it, providing that Section ever reports upon it.

Members of the Photographic Society who had tried the carbonate of silver paper, samples of which were distributed at the last *séance* by MM. Schæffner and Mohr, were requested to report. Only two gentlemen appeared to have done anything, but they were good experimenters—MM. Davanne and A. Girard. The former had produced results which promised much, and he had great faith in the paper, the manufacture of which involved several new applications of chemical knowledge. M. Girard had produced some capital prints about three weeks ago, but had had no time to tone them; he found, however, the whites were as fresh and as good as ever. The opinions of other experimenters who had taken samples of the paper were desired for future *séances.*

M. Marion forwarded specimens of a paper he called the "mica paper." It is very like an enamel paper that was used some five or six years ago, having a bright glossy surface. The prints shown were very beautiful, as were those that were obtained with the enamel paper. I found that the mica paper would not bear twisting about much, or the surface would crack and become powdery. The paper is salted, and requires a rather strong silver bath. Its manipulations are to be performed with care, as danger of the "mica" surface rising in bubbles, &c., are inherent to it. It is recommended to dry the prints between sheets of blotting-paper; and it is said they not only preserve their flatness better, but that they need no mounting on cardboard in some cases, being stiff enough in themselves to dispense with such aid.

The *sel Encausse* is recommended for making a toning bath for prints upon this paper. *Apropos* of this "*sel,*" your readers may remember my describing it in a letter as a new toning salt, and saying that at the last meeting of the Photographic Society of France M. Davanne protested against the name of a "new salt of gold" being applied to it, as, from his experiments, he was led to believe it was not a "salt of gold." At the meeting on Friday, M. Encausse appeared in person to reply to M. Davanne. The discussion was decidedly animated, and I need only report it by saying that M. Davanne completely sustained his position, and was supported in it by the meeting. He had had the substance analysed at the mint by M. Peligot, and only one-tenth of its weight in *metallic gold* was found.

A great number of presentations to the collections of the Society were handed in, amongst them being two extremely valuable and interesting prints from the first attempts at photo-engraving by M. Nicephore Niepce, in 1824. These form part of the first series, at £20 each, to which I have referred in recent letters.

A splendid specimen of carbon printing applied to transparencies for windows was presented by M. Soulier. This gentleman remarked that unless care were taken to render the gelatine pellicle quite insoluble by means of tannin, &c., there would be a danger of these pictures becoming injured by the damp dissolving the film, and thus scattering the pigment in places.

A specimen of Liesegang's papyroxyle was presented. It was remarked that it was nothing new, having been made years ago. This is quite true, yet, if this paper pyroxyline be of the superior quality that is claimed for it, it cannot become too generally known. I think it was your able correspondent, Mr. M. Carey Lea, who mentioned that some persons were in the practice of getting their pyroxyline from St. Petersburg. I heard, during the *séance* on Friday evening, that the superiority of the St. Petersburg gun-cotton was said to be owing to the purity of the river water with which it was washed, the source of the water being the melted snows near its origin.

An International Exhibition of Photographs, to be organised by the Photographic Society of France in the Palais de l'Industrie, Champs Elysees, to be opened on the 1st May, 1869, was announced, and the regulations read. I shall give these regulations at the first opportunity. I was unable to note them all down during the *séance.* I can give a *few* particulars which may be useful. All photographs must be sent *carriage paid.* None received after the 10th of April. All *unmounted* prints to be sent between the 1st and 5th of April. No advertising to be practised. Exhibitors to pay 10 francs per *mètre* for space. Those requiring special instalments to pay extra. All exhibitors to give notice of space required by the 15th of March. A jury of admission was appointed to regulate the spaces to be accorded and the pictures to be admitted.

I must reserve my answer to Mr. G. Price till my next, not wishing to write it in a hurry, as I should do if I attempted it now. I am glad to be styled his friend. R. J. FOWLER.

Home.

SCENIC BACKGROUNDS.

To the EDITORS.

GENTLEMEN,—Having read in your Journal a paper by Mr. D. Winstanley, on *Scenic Backgrounds,* &c., I should like, if you can spare room, to offer a few remarks on the same subject.

Firstly: regarding those beautiful pictures with natural backgrounds, by Mr. Edge and others, I contend that their beauty and fitness is owing to the "confounded artist's license" employed in their use, as seen in their being lightly printed on a grey tint that *subdues both the lights and the shadows,* thus giving importance to the main thing—the figure.

Print them up to the full force of nature, and their beauty and fitness are gone; or put your sitter out of doors and photograph him in the loveliest landscape you can find, you will get your horizontal line geometrically correct to be sure, but will the result be such as will please either an artist or the public?

Touching the position of the horizontal line, no doubt Mr. Winstanley is theoretically correct; but a line, however subdued, coming behind the head would be objectionable. Better have a background (if we must be so matter-of-fact), with some near foliage or other object to hide the line altogether; and then we must use that confounded "artist's license" again, or it may take some time to discover that there is a head at all. So long as our paint and our mechanism fall short of nature, we must do the best we can with the materials we have; for, even in the truthful photograph, our blacks are not so black, nor our whites so white, as those of nature.

As regards the toning down of objectionable features, I have often experienced a feeling—no doubt common to others—that after knowing a person some time who has appeared at first very odd looking, that feeling has gradually worn off, until recalling, as it were, my first impression after a time, I have felt absolutely surprised at it—the "puggy nose" has seemed less "puggy" since then, and so with the other features. All persons thrown much together form more or less ideal pictures of each other, especially if they have grown up together. All parents, for instance, think their children good-looking, whether they are or are not; at least, that is the rule.

Besides, everyone has their *best* look. See people animated by conversation, or looking pleased or excited, and see them next day, posed in a photographic gallery! Will they not look very different? I, as an artist, am quite ready to admit the inestimable value of photography as an aid to art; but I feel I have a right, even in *cartes* (which need not necessarily be plain photographs), by touching the negative, to remove a frown or a hard line about the mouth—indeed, to remedy and make due allowance in every way for the shortcomings of the "unthinking camera."

I sometimes imagine it is a part of the "eternal fitness of things" that photography came into existence when it did, in this go-ahead age. Many people have said to me they could never spare time to sit for so many hours as under the old method. One short sitting for complexion, and the catching of that conversational expression so justly prized and so rarely seen in a photograph, is now sufficient for one accustomed to paint from the life.

I would ask the writer of the article alluded to how he would satisfy both the short and the tall friends of the sitter. They see him from different heights. I suppose a short photographer would best please his short friends, and *vice versâ.* Depend upon it, likeness, identity—call it what you will—depends upon something far more subtle than mere geometrical correctness.—I am, yours, &c.,

Manchester, January 11, 1869. J. WAKE.

INDIA-RUBBER GLOVES AND FINGER STALLS.

To the EDITORS.

GENTLEMEN,—I see in the Journal of today an answer to a correspondent concerning the use of India-rubber gloves and finger stalls.

From a long experience I find they are both objectionable. Certainly the least objectionable are the finger stalls; they fit tight to the fingers. The gloves are so clumsily made that, unless very great care be taken, the negative is very likely to be injured. I have tried to get very thin India-rubber gloves, but nothing really effective can be met with. Of course it must be remembered that it is absolutely necessary to take off the finger stalls after the development of one plate and before the preparation of another. If my experience be of any use to your correspondent, pray publish it.—I am, yours, &c., OXONIENSIS.

EXCHANGE COLUMN.

W. POUSTY, 53, Islingword Road, Brighton, has a grand piano (Broadwood and Sons), in good condition, solid mahogany, and a handsome piece of furniture—for those who have room for it. Will exchange it for bi-lens stereo. camera, rolling-press, view lenses, or anything useful.

*** No exchange notice can be repeated unless paid for as an advertisement.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

H. H. (Bristol).—Each must be registered.

J. H. S. STANLEY (Houston, Texas).—Received with thanks.

JUVENIS.—A weak solution of chloride of gold will give your transparencies a fine tone.

A. B.—You will find the required information at page xxvi. of the advertising sheet of our ALMANAC.

S. S. STARBUCK (Alford).—Communication received. Thanks for your expressions of kindly feeling.

J. BELCHER (Limerick).—No paper of the kind mentioned can be obtained ready prepared. Mr. Leighton Pine resides in America; but we are unacquainted with his address.

G. ROUSSEAU (Peckham).—The numbers will be forwarded by the Publisher, as requested. We shall be glad to receive the promised communication. We find the subject interesting to numerous readers.

A YOUNG PHOTO.—Try the following:—Bichromate of potash and water, a saturated solution. Of this mix three drachms with an ounce of water. You will find this quite strong enough for your purpose.

ACHROMATIC (Hull).—By applying to a competent optician you can have another flint lens made in the place of that which is now fractured. You should preserve the pieces, and send them to the optician when giving instructions concerning the repairs.

A TYRO (Manchester).—The chief faults in your pictures are those of lighting, which has been unskilfully managed. A strong top-light is unsuitable for a person with overhanging eyebrows and small, sunken eyes. Use less top-light and more side-light, and your pictures will be better.

LUX (Lambeth).—1. Concerning the picture you sent us: the camera by which it was taken was exactly on the level of the bottom of the arched window. It was not, as you suppose, a difficult feat to ascertain this.—2. Try the effect of rubbing the surface of the paper in the manner recently described in this Journal.

MUFFLE (Liverpool).—The second method on your list is the best for burning-in. It is clear that you have never tried it, otherwise you would not have condemned it. We frequently amuse ourselves by burning-in photographs, which is much easier of accomplishment than you seem to be aware of.—We cannot inform you how either of the gentlemen you name operate. The works of both are very similar.

S. S. B.—Your negative arrived as a fractured mass. From an examination of a small piece we are enabled to state that the pinholes are due to the cause we pointed out. Add the silver to the distilled water, filter, neutralise with carbonate of soda, add a very weak solution of permanganate of potash, and make up to the proper strength, acidifying with a trace of nitric acid. By doing this your bath will be rectified.

GEORGE.—To remove a negative from glass, after it is fixed and washed, give it a coating of a rather weak solution of gum arabic. When dry place it on a levelling stand, and pour over it a strong plain collodion in such quantity as, when dry, to form a tolerably thick and strong film. After it is thoroughly dry run a knife round the margin and place it in water, when in a short time the film will have been detached from the glass and be found floating on the water.

J. B. (Glasgow).—It is quite impossible for you to have stereoscopic effect in a single picture. You may have a wonderful appearance of relief, but you cannot see it "stereoscopically." To do this you must have two dissimilar views of the same person or place and combine them in the brain. Two pictures cannot be so superimposed as to give the stereoscopic relief. Many have considered that it could be done, and have thrown stereoscopic transparencies on a white screen by means of the lantern—not side by side, but one on the other. The result is not relief, but confusion.

"MERCURIUS" (Derby).—We cannot tell you how to re-polish the ends of your spar prism, but we can inform you how we proceed in such a case. We obtain a piece of microscopic glass of a suitable size, and by means of a drop of balsam placed on the face of the prism we attach the glass to it. Can any reader inform "Mercurius" and ourselves how to re-polish scratched Nicol's prisms? We believe the method we have pointed out to be the best, and we know that some large and valuable prisms are usually thus protected; but we shall be glad to receive information relative to this.

P. C. REMONDINI (Genoa).—Remittance received with thanks. The publication referred to will be forwarded in due course.

GEORGE BROWN.—It is probable that you could have your tent so altered as to enable you to carry it like a knapsack. In this state it would prove exceedingly convenient when you visit Iceland. There are many descriptions of the Geysers published; but at present we do not remember any of them except that published several years ago in *Chambers's Journal*, which was wrttten, we believe, by one of the proprietors of that serial. We can give you no information concerning the country in its relation to pictorial subjects. Some of our readers have, we know, travelled in that island; probably some of them may favour you with the information if you ask a few definite questions.

SUBALTERN (Deesa).—No alteration in your method of proceeding can be suggested, it being strictly correct in every particular. In your case the tone you get is owing to some speciality in the paper. Why not try some plain paper? For the range of tones which are dependent upon the salting agent, see some remarks appended to Mr. Price's letter in our issue of last week. Try also the effect of fuming with ammonia the albumenised paper you are now using. Sensitise in the usual manner, and then, when thoroughly dry, place the sheets in a close box of somewhat large size, in the bottom of which there should be an open vessel containing strong liquor ammonia. This treatment gives great sensitiveness to the paper. You will have seen that an improvement has been effected in the index.

RECEIVED.—M. Carey Lea; D. Winstanley; Patrick O'Connor; W. N. D.; B. Wyles; John Cockroft; Wells and Co.; J. W. R.; C. M'Keand, and others. Those communications requiring private replies will receive attention at our earliest convenience.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York Street, Covent Garden, London, W.C.**

DEATH OF A PHOTOGRAPHER.—A photographer, named Barfoot, has met with his death from violence near Southampton. He was attacked, kicked, and pitched into a ditch by some men whom he had accused of cheating at skittles.

SOCIETY OF ARTS.—We believe that Mr. Samuel Highley is to read a paper next week (Jan. 20th), before the Society of Arts, *On Photography and the Magic Lantern Applied to Historical Teaching*, to be illustrated by a selection from some designs made by Mr. Highley for the Russian Government.

TRANSPARENCY EXCHANGE CLUB.—The members of this Club are requested to send in all their favours *before* the end of the present month. The judges will proceed to determine the various exchanges in such time as to have them sent off on the 1st of February. Attention to the rule as to size is requested. Those desirous of joining the Club should do so at once. We have seen some most excellent lantern transparencies which have been distributed through the agency of this Exchange Club; and we can strongly recommend it to our readers as a means of enabling them to obtain a supply of these interesting pictures at the mere cost of giving away their own productions in exchange for those of their fellow-members.

LONDON GAZETTE, *Friday, January* 8.

BANKRUPT.

BLAS RANGEL, Cambridge, assistant to a photographer.—Jan. 20, at 12, at the Bankrupt's Court, London.

Tuesday, January 12.

NOTICE OF SITTING FOR LAST EXAMINATION.

M. OTTY, Liverpool, photographic apparatus maker.—Jan. 22.

METEOROLOGICAL REPORT.

For the Week ending January 13th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Jan. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
7	30·29	51	38	43	44	E	0·01	Foggy
8	30·45	55	43	50	51	WSW	—	Dull
9	30·53	52	48	48	50	WSW	—	Dull
11	30·22	41	38	39	40	SE	—	Dull
12	30·17	44	38	39	41	SE	—	Dull
13	30·05	42	38	37	39	E	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 455. Vol. XVI.—JANUARY 22, 1869.

CARBONATE OF SILVER *VERSUS* AMMONIO-NITRATE OF SILVER PAPER.

Our readers have, no doubt, thought much over the interesting and, as we believe, valuable process for positive silver printing of MM. Schæffner and Mohr. The principle involved in the action of the carbonate of silver paper is by no means easily understood, though the fact is clear enough that carbonate of silver becomes highly sensitive to the action of light when it is subjected to the influence of ammonia. In dwelling upon the details of the new printing process, and in working out some of the chief points experimentally, we have been surprised to find that but very little is really known of the action of light on ammoniacal silver compounds under varying conditions; and the facts which we have now to lay before our readers will fully confirm this.

A process for fuming sensitised paper has, we know, been long in use in America, and its employment has been attended with excellent results. Full details connected with it have repeatedly been published in previous volumes of this Journal; but we may, however, here state that the process consists simply in sensitising the paper on a solution of oxide of silver in nitrate of ammonia, or on a bath prepared by dividing a solution of nitrate of silver of the proper strength into two parts, adding ammonia to one half until the oxide of silver first thrown down is redissolved. When this point has been reached the second half of the nitrate of silver solution is added, the whole well mixed, and the paper floated for a short time on the solution. The paper so sensitised, of course, now carries an ammonio-nitrate of silver instead of the plain salt. The sheet is now fumed by exposing it to the action of ammoniacal vapour, so as to give it an excess of ammonia. This is the plan which, we understand, has been largely employed in America in positive printing, and with the best results. It will be easily seen that this process of preparing the paper is to be at once distinguished from one which involves mere fuming of the ordinary sensitised albumenised paper while moist; and it is in consequence of substituting the latter for the American plan that so many British photographers have been disappointed in the results they have obtained by the "fumigating" process.

While bearing in mind the above differences in modes of fuming, we were desirous of testing the new carbonate of silver paper against albumenised paper sensitised with plain nitrate of silver, and then printed upon while backed by pads saturated with ammoniacal vapours, according to the method of MM. Schæffner and Mohr. Such a comparison would obviously be more direct and satisfactory than one between ordinary positive paper and the carbonate of silver film. For reasons which will presently appear this comparison was not made, but we sought carefully to determine the relative sensibility of plain sensitised albumenised paper and that printed upon while backed by an ammoniacal pad.

We took a fresh sheet of sensitised paper (albumenised) and cut two similar pieces from it suitable in each case for a 5 × 4 negative; we then took two negatives as nearly alike in printing qualities as possible. One of these was placed in its frame with its slip of paper, and backed in the usual way ready for printing; the second was likewise covered with the sensitised paper, and on the back of the latter a thick pad of blotting-paper, saturated with ammoniacal gas, was placed. The two frames were now arranged side by side and exposed to a good printing light for an equal time. On opening the pressure-frames we found that the non-fumed paper had received a good impression, but that which had been backed by an ammoniacal pad was scarcely half printed. We then reversed the negative, taking a print on the padded paper from the negative which had previously been used for the plain paper, and *vice versâ*, but with the same results. We, therefore, find that ordinary sensitised albumenised paper *has its sensibility considerably diminished* when it is printed with an ammoniacal pad, contrary to the prevalent opinion.

It need now scarcely be said that, with such results before us, it would have been absurd to compare the carbonate of silver and ordinary paper under similar conditions. In these experiments of ours we obviously find good reasons for drawing the attention of photographers still more strongly to the fact which we pointed out some years ago, when investigating the relations of albumen to ammoniacal silver compounds, that the photographic reactions of silver, when in intimate union with ammonia, are essentially different from the ordinary chemical relations of the metal.

These points are now attracting more attention than they have hitherto done, since, no doubt, many will be induced to prosecute experiments with the ammoniacal silver compounds owing to the marked success of MM. Schæffner and Mohr in the same direction. To such as are engaged in working out the carbonate of silver and similar processes we suggest the careful consideration of the results of experiments on the influence of the various ammoniacal silver solutions on the ordinary sensitive silver compounds, before commencing to examine the properties of new or but little-known bodies under similar circumstances; and we may add that the ammoniacal silver solutions which require contrasting as to effects are these:—First, solution of oxide of silver in ammonia; and, secondly, oxide of silver in nitrate of ammonia, or a bath prepared as already mentioned in referring to the paper bath used in America. In addition to these we have the plan of fuming, to employ which, as we have already seen, while rendering some silver compounds highly sensitive to the action of light, reduces the sensibility of others to a very considerable extent.

PYROXYLINE AND IODISING SOLUTIONS.

Supplementary to an article on *Alcohol and Ether*, in our number of last week, we, as promised, now proceed to give some instructions concerning the preparation of soluble cotton, and the best method of iodising the collodion when made.

Gun cotton, soluble cotton, and pyroxyline each require a few words to be devoted to them before we commence. The best gun cotton, or that which is most explosive, is not the best adapted for making collodion. A cotton may be very explosive and yet very insoluble; on the other hand, good soluble cotton may not be good *gun* cotton, for solubility exists apart from explosiveness. Pyroxyline is the generic name for both, even if the cotton be (to use an Hibernianism) composed of linen.

Before proceeding further, we beg to inquire if any Liverpool friend knows how the late Mr. Berry used to prepare his pyroxyline. We once obtained from him several ounces in the form of a piece of linen, which possessed very singular and desirable properties—among others, such a degree of toughness as to permit of a stream of water to fall from a height of twenty-two feet upon an imperfectly "set" film without causing it to break, while at the same time it was admirably adapted for all the dry processes in vogue at that time. But this by the way.

How are we to make pyroxyline suitable for collodion? It is made by steeping cotton either in a solution of nitrate of potash and sulphuric acid, or in a mixture of nitric and sulphuric acids. Some have, unthinkingly, averred that xyloidine and pyroxyline are one and the same body. They are not so. The former was discovered by M. Braconnot, in 1833, the latter by M. Schönbein, thirteen years later. Without dwelling on the former substance—beyond saying that it is produced by the action of monohydrated nitric acid on starch, by which the latter substance is converted into a peculiar body which dissolves in excess of the acid, is precipitated by adding water, and is explosive when ignited or struck by a smart blow—we pass on to the discovery of Schönbein, and, in treating of gun cotton, shall only refer to those modifications of the original discovery by which a soluble cotton may be obtained with great certainty, and fit for the ordinary practice of making photographic collodion.

Owing to the strength of acids varying so much, and owing, further, to the fact that it is frequently a matter of much difficulty to obtain acid of the strength required, the formulæ we append are so varied as to suit the strengths of the acids more readily obtainable.

It will be seen that the formulæ are adapted for three different strengths of sulphuric acid, viz., those of the specific gravity of 1·840, 1·842, and 1·845; and, in a similar manner, for nitric acid of three different degrees of specific gravity, viz., 1·370, 1·400, and 1·450. From the provision thus made to suit such a variety of acids, comparatively little difficulty should be encountered in making pyroxyline in the most successful manner.

Previous to describing the method of making pyroxyline by the mixed acids, it may be desirable that we first describe how it is obtained from a mixture of nitrate of potash and sulphuric acid. The nitrate of potash which was last used by us for this purpose was obtained at a cheap rate per pound from a grocer, who knew it only as "saltpetre."

Four ounces of this salt, having been dried and powdered, must be added to seven fluid ounces of sulphuric acid 1·840, to which about half-an-ounce of water has been added. The strength of the acid is of consequence. If it be weaker than 1·840 omit the water; but if stronger the quantity of water may be increased up to double that given.

The best method of proceeding is to place the salt in a warm, well-glazed basin, first adding the water (if any is to be added), and then pour in the acid. Mix well together for a couple of minutes by means of a glass rod, and then add eighty grains of clean carded cotton by small tufts at a time. Each tuft must be thoroughly immersed by the aid of the glass rod, or by a long glass slip, before the next is added. Stir the mass well about for five minutes, and then, by means of the glass rods, lift out the cotton, which is now converted into pyroxyline, and rapidly plunge into cold water, so managing it as to bring all the cotton into contact with the water as rapidly as possible. Let the water be changed until the cotton no longer has an acid taste, and, in order to ensure its freedom from acid, let it be immersed previous to the last washing in water rendered slightly alkaline by a little ammonia.

The matted fibres must now be pulled out and dried in the sun or in a current of air, after which it is ready for being dissolved. On being weighed it will be found to have increased in weight upwards of twenty grains. The quantity thus prepared is sufficient for making a pint of collodion.

The details of washing, &c., given above apply to the preparation of pyroxyline by means of acids; hence we shall not repeat them. One point only we must note:—After mixing the acids allow the temperature to fall until a thermometer immersed in the mixture indicates about 150° Fah., after which immerse the cotton, tuft by tuft, as before directed.

A.—Sulphuric acid (1·845)	12	fluid ounces.
Nitric acid (1·450)	4	,,
Water	17	drachms.
Cotton	270	grains.
B.—Sulphuric acid (1·840)	12	fluid ounces.
Nitric acid (1·400)	6	,,
Water	6	drachms.
Cotton	270	grains.
C.—Sulphuric acid (1·842)	12	fluid ounces.
Nitric acid (1·400)	4	,,
Water	1	fluid ounce.
Cotton	255	grains.
D.—Sulphuric acid (1·840)	10	fluid ounces.
Nitric acid (1·370)	5	,,
Cotton	270	grains.

The variety of the above will, we trust, be appreciated by those who cannot readily obtain acids of a definite strength.

Pyroxyline is, fortunately, an article of commerce, and may be readily obtained from dealers in photographic materials. A very excellent form of this substance has recently been imported into this country under the name of "papyroxyline." It is manufactured on the continent by Herr E. Liesegang, of Elberfeld. It is in the form of a thin paper similar to that on which bank notes are printed, and dissolves readily in alcohol and ether, yielding a collodion of considerable toughness, and which otherwise possesses many excellent properties.

The pyroxyline, therefore, having been obtained, either by making or purchasing it, the next matter for consideration is its conversion into collodion. Into a mixture of two parts of ether and one part of alcohol dissolve pyroxyline in the proportion of five grains of the latter to an ounce of the former. This will dissolve at once and form plain collodion. For some purposes this will be too thin, and for others too thick; it will, however, be found to yield a good strength of film for ordinary negatives.

An iodising compound which we have much used consists of the following:—

Iodide of cadmium	45	grains.
,, ammonium	45	,,
Bromide of ,,	20	,,
Alcohol	5	ounces.

Add this in the proportion of one part to three parts of plain collodion. For some purposes it is desirable to considerably increase the proportion of the bromide, as, for example, in some of the dry processes; but to dwell further on this part of the subject would be foreign to the purpose which we had in view when we contemplated writing these articles.

ON THE RECOVERY OF GOLD FROM THE TONING BATH.

At the last meeting of the South London Photographic Society, the following subject was drawn from the "question box:"—"What is the best method for recovering the gold from the toning bath?" Mr. F. W. Hart was requested to open the discussion on the subject, which he did in the following remarks:—

In reply to the question from the box—"What is the best method for recovering the gold from old toning baths?"—I have to state that I generally proceed by first rendering the inert solutions of gold acid with sulphuric acid or hydrochloric acid; then I add a hot saturated solution of sulphate of iron till the solution ceases to be rendered cloudy by any further addition. I then let it stand in a warm place for subsidence before pouring off the clear waste solution, and add a few drops of iron solution to make sure that the gold has been completely deposited. This having been ascertained, I drain off as closely as possible, and wash with three or four changes of acidulated water, and finally with plain water. The precipitate will now consist of metallic gold and chloride of silver.

In order to get the gold in a separate state, I prefer to reduce the chloride and bring the metals into a button, and add about three times its weight of silver. I then pour it out into a pan of water, and collect and dissolve in nitric acid. The gold will be left as a dark brown powder. After decanting the nitrate of silver solution, it is repeatedly washed with distilled water till the washing gives no indication of silver on testing with a chloride. I now drain off the water closely and dry at a gentle heat, finally bringing the powder to a low, red heat, when the powder will take a rich golden hue.

If the mixed precipitates of gold and chloride of silver are not reduced and melted, but treated at once with hot hydrochloric acid, to which nitric acid is added at different times till effervescence ceases, then the solution must be largely diluted with water in order to counteract the property that hydrochloric acid and concentrated chlorides have of holding chloride of silver in solution; then, to get at the amount of gold, it must be reprecipitated.

I have had many samples of residues sent to me for examination which consisted, in great part, of sesquioxide of iron. This precipitate would be readily mistaken by the non-experienced for the precipitate of the noble metal. I have accounted for this fact by

supposing that the photographers had simply added the iron solution, as they have been generally informed, to an alkaline solution, carbonated, no doubt, and thus produced a carbonate of iron, which eventually passed into the state of the red oxide.

FLARE IN THE SOLAR CAMERA.

Everyone who has engaged in the production of photographic enlargements by the light of the sun, and with the aid of Woodward's solar camera, will doubtless have been annoyed by the presence of, and puzzled to account for, a small patch of sunlight which, somehow, seems to have got astray, and which wanders about over the surface of the exposing sheet of paper in a manner which unmistakably evinces on the part of the said beam of light a total disregard for such trifling matters as the high lights and deep shades of the photographic negative. Indeed, it scarcely seems too much to charge this radiant little wanderer with a positive spite against the unfortunate enlarger; for, if now and then its path is traced over some portion of the picture, which will be all the better for it in nine cases out of ten, the high lights of the face or hands are exactly the parts upon which it inflicts its presence, and when this is the case a very short time is sufficient to involve those parts in the inextricable difficulty of hopeless fog.

The erratic movements of our spectre, although quite at variance with the convenience and wishes of the enlarger, are not altogether destitute of system. There is some trace of method in its madness; there are some laws which even this perverse disturber deigns to obey; hence the torments of its visitations may be lessened by "dodging" of one variety or another. Its entrance upon the field of action may in general be anticipated some time before it actually arrives, and even when by its presence it has asserted its right to walk the ground, the path of its intended "transit" may, as a rule, be predicted with something like an approximation to the truth.

A very little experience of the solar camera will also show that our vain little phantom finds its greatest attraction on the placid surface of the mirror. If we alter the position of the mirror ever so little, by its adjusting mechanism, the phantom preserves its angularity by dancing along to another position, from which it may be again moved forwards or backwards by a progressive or retrograde movement of the mechanical appliances.

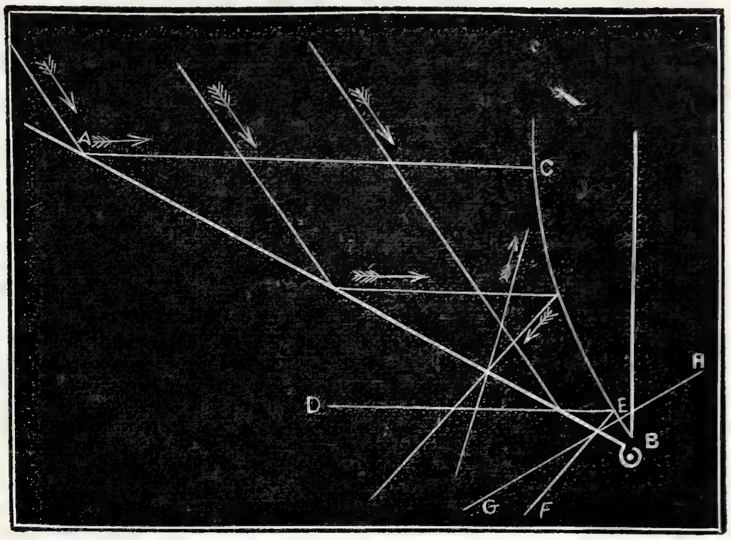
With this knowledge of the peculiarities of our little friend—or little enemy rather—we may contrive, without much difficulty, to rid ourselves of the maximum portion of the troubles which it would otherwise inflict. Making a guess at the amount of time required for the exposure of our sheet, we may often have that exposure quite completed and our paper removed before the "glimmering light" "with slow and stately march goes by." By gently moving the mirror forwards and backwards through a short distance during the exposure, the offensiveness of the spectral presence, if it cannot be mitigated, may, at least, be distributed—vignetted, so to speak—over a more or less considerable extent of space, where the diminished force of its action, occasioned by this oscillatory movement, is rendered a matter of less importance.

On other occasions, when anticipation of "the coming light" is frustrated by its appearance, and, when "dodging," the beam over the sensitive surface is inadmissible, we may often rid ourselves of the difficulty, not exactly by anticipating its departure, but by actually bringing that departure about. At other times, when the baneful effects of its "glare" may not be ameliorated, and cannot be banished, the pugilistic experimenter is apt to wish that this "fatal vision" were "palpable to feeling as to sight," in order that he might rid himself of it by an expeditious and summary process.

Under these circumstances, other experimenters might wish, and with more effect, to rid themselves of the "heated beam" by ascertaining—firstly, to what cause they are indebted for its appearance; and, secondly, how far it is possible to remove this cause without interfering with the efficiency of the solar instrument. It is to these considerations that the writer now purposes to direct the attention of the reader.

Seeing that the variety of flare now under consideration does not make its appearance during the use of the electric or lime-light enlarging camera, but is peculiar to the solar apparatus, and sensitive to the movement of its mirror, we may very reasonably conclude that the mirror itself plays no unimportant part in the production of this offending flare.

Let the line A B in the accompanying sketch represent the surface of the mirror, and the curved line B C that surface of the condenser which is placed next to it. A C then represents the direction in, or parallel with, which the solar rays should fall upon the surface of the condenser, in order to be converged by the latter to a focal point between the lenses of the portrait combination in front.



We all know that when rays of light fall upon a polished surface of glass, although the greater portion of them is transmitted through that glass, still another, although a less, portion is reflected from it. We also know that in the case of reflected rays the angles at which they impinge upon and depart from the reflecting surface are equal.

The ray A C, which falls almost perpendicularly upon the condenser, will be reflected from it in a line nearly identical in position with A C, and, after falling a second time upon the mirror, it will be cast off and lost. This, however, is not the case with all those rays which reach the condenser. For instance, the beam which impinges upon the convex surface of our lens in the direction of the line D E will have a portion reflected back again on to the mirror in the direction E F, whence it will be reflected again in the direction G H, which differs materially from the direction D E, in which all the rays should go. This latter reflected portion will, in many instances, be transmitted through the lens, and, after suffering further refraction from the portrait combination in front, will be projected upon our screen in exactly the same place as some other rays which had not passed through the same portion of the negative, and consequently the little ghost of light which it affords will be quite independent in position of those portions of the picture formed in the legitimate manner. This, it seems to the writer, is the cause of the flare to which it is the object of this article to direct attention,

As to the remedy: it is obvious that if the surface of the condenser next the mirror were plane, instead of convex, the angle of incidence would be the same in the case of all the rays reaching it, and all would glance off from the mirror after reaching it a second time in a direction whence they would not again return to trouble us. A couple of plano-convex lenses of twice the usual focal length and mounted convex sides together in a cell well blackened, ought, it seems to the writer, to form a thoroughly efficient condenser, which would enable us to use the reflecting solar camera without fear of being troubled by flare. David Winstanley.

ON "DODGES."

Is it expedient and politic to expose publicly all the little dodges in combination printing, &c.? This was the question resting on my mind after listening to the excellent remarks of Mr. Cherrill on the above subject at the last meeting of the London Photographic Society. Taking into consideration the hypercritical critiques of the present day—especially on this subject—would it not be advisable to leave them in the dark as to how such and such an effect is produced?

Surely the artist whose great aim has been to obtain a harmonious whole, and that intended to represent nature in its most truthful form, should not be the first to point out its weak parts; and, although it may afford amusement to point out how absurd a number of such criticisms are, yet it should not be done to the detriment of the work of art itself. Although photographers may use a piece of earth for rocks, or even coals from the cellar, yet it is very questionable whether it is policy to make the public acquainted with the same.

Most professions have their secrets, to which it would be unprofessional to give open expression, and there was very little or nothing gained by the exposure of the dodges alluded to, as they would suggest themselves to any ordinary intelligent printer.

Some time ago it was innocently remarked at a meeting of the same society that photographers did not tell all they knew. This is a great truth, and although I would be the last to advocate secresy in anything that would be of value to the art itself, yet I decidedly deprecate giving such public expression to what may be termed "dodges," inasmuch as it tends to lower the art in the eyes of the public at the expense of that which is really scarcely, if at all, worth having.

If photographers will communicate their experiences and the result of their labours in furthering the art-claims of photography, and keep their little dodges to themselves, it will elevate the art, educate the public, and benefit the profession.

I trust I may be pardoned for speaking boldly on this matter, as I feel this was the only thing that marred the effect of an interesting, well-written, and instructive paper.

If not trespassing too much on your space, may I suggest, *apropos* to combination printing, that if landscape photographers would always furnish themselves with double dark slides, and, when taking a view, expose the first plate say two or three seconds to get the clouds, then turn the dark slide quickly round and expose the other plate for the landscape, and use the two negatives in the way suggested by Mr. Cherrill, very good effects might often be obtained, as well as clouds more suitable for the landscape than those that are often used. GEO. HOOPER.

ON COMBINATION PRINTING.*

As it would be tedious and unprofitable to go through the whole series of pictures which I have brought to illustrate this paper, remarking on the particular methods adopted in each case, I therefore propose to jump at once from the first of Mr. Robinson's pictures to almost the last of them, and to consider in detail a picture which is, I believe, now in the hands of almost every member of the Society. I refer to a little print called *Watching the Lark*, which is printed from two negatives, and which is as good an illustration of combination printing as I can bring before you, as it is done on what I believe to be the most perfect technical system at which we have yet arrived. First of all, the foreground on which the child is seated had to be arranged. Had we the convenience of being able to take pictures of this kind out in the open air, the foreground would consist of a simple bank of wild flowers, weeds, &c., which would be always in a state of wild cultivation for the purpose. As, however, our space is somewhat limited, we have to work in our studio; and therefore the foreground is "made up" of an artificial bank on which turf, moss, and wild flowers are growing,† and behind this foreground a white background is erected. The little sitter was then posed, and the first half of the picture was taken. This negative when printed would represent the child, the foreground with the basket and hat, and all the distance, white, or nearly so. It was found, however, that the background printed a little too much for the sky, making it rather too dark, consequently a piece of tissue paper was cut to shield the sky portion, its outline corresponding with that of the hills; on this piece of tissue paper the clouds were *painted* with Indian ink. At the two bottom corners of the plate two marks were now made with black varnish, ; these, of course, printed white in the picture. A proof was now taken, and the outline of the figure cut out accurately. This was to be the mask of the landscape negative.

Where the outline of the figure comes against the distance, the line of junction must be exceedingly clear and defined; but where the foreground and background join there is more latitude allowable, and the mask need not be accurately cut, but may be torn carelessly with advantage. The mask is now fitted to its proper place on the landscape negative. Another print is then made on a piece of paper the size of the finished picture; this time the little white marks made with the varnish are cut away with a sharp pair of scissors. The print is carefully applied to the landscape negative, so that the mask made before exactly covers those parts of the print which are already finished. The landscape is thus printed in. Before, however, it is removed from the printing-frame, if on partial examination the joins appear to be perfect, two lead-pencil marks are made round the parts cut out at the bottom of the print on the mask. After the first successful proof there is no need for any measurement or fitting to get the two parts of the picture to join perfectly; it is merely necessary to cut out the little white marks and fit the corners to the pencil marks on the mask. There is no need to look if the two pictures are in proper position; they must be so; and, so long as the picture keeps in proper adjustment, the print can be put on and taken off as rapidly almost as if the work were from a single negative.

It was found that a sheet of tissue paper across the landscape negative would improve the distance, and that the application of a little black varnish dabbed on with the finger would serve to make the joining more perfect in one or two places. When all these little arrangements were once finished, we rattled off the two hundred copies for the Society at the usual rate of about four or five a day, with very few failures, and with still fewer bad joins.

The negatives are on the table, and I have also brought prints in various stages to illustrate the plan more fully. A similar mode of operation to that which I have just described may be used for pictures of any size; but when the paper is larger than about ten inches square, it becomes advisable to examine the position of the paper on the second negative before putting the picture out to print. In small pictures, as I have already stated, the system of gauges, which has been explained, is abundantly sufficient, and there should be no need whatever to examine the relative positions of the paper and the second negative; but in larger works there are greater difficulties to overcome, gauges cannot be made so accurately, and when made they do not admit of such perfect manipulation as in small prints; for this reason, though they should be made as much use of as possible, gauges must not be entirely trusted to. A variety of expedients have been resorted to by different operators to enable them the more perfectly to see the relative positions of the negative and paper. When the *May* was printed, Mr. Robinson used a printing table made of glass, so that by putting a candle on the floor the light shone upwards through the table and through the printing-frame, negative, and paper too, enabling the printer to see (somewhat dimly, perhaps) the position in which he was arranging the print. A much more simple plan than this is now adopted. By the means of gauges the print is brought as near the position required for it as possible; one hand is then placed on the back of the paper with a steady pressure, and one finger of that hand then points to a part of the picture where the join must be accurate. This can always be seen through to the back of the paper in printing. With the other hand the paper is now thrown back over the hand holding it down, and then it will be seen at a glance if the junction be quite accurate at that point at which the finger is held. This operation being repeated at several places determines the accuracy of the joinings with great exactness and very little expenditure of time. A half-finished print which I hold in my hand will well illustrate this method of joining. In this manipulation clean hands, as free as possible from perspiration, are needed. In summer time it is a good plan to dip the hands in water just before changing prints, and to wipe them quite dry with a clean cloth.

As in combination printing the size of the negative need not regulate the size of the finished work, it may sometimes happen, as in the case of the *May*, that the picture is larger than an ordinary sheet of paper; in this case no difficulty is found in getting the makers of albumenised paper to prepare special sheets of paper for the purpose. To sensitise a sheet of paper forty or fifty inches long is not such a difficult task as it might at first appear; it, however, requires two pairs of hands to perform the operation successfully. Across each end of the sheet a lath is fastened by means of pins. The dish containing the silver solution is placed on a box or small table in the middle of the room, so that there is space to go all round it. One operator now takes one end of the paper and the other the opposite end; one now lowers his end on the solution, but as soon as the paper touches the surface he again raises it, very gently, however, and the other as gently lowers his end till all the paper be wetted; the operation is now reversed, and the end last floated is again raised, the first end being lowered. This goes on till the time for preparing the paper has elapsed, when the sheet may be hung up to dry in the usual manner. This is not a difficult operation to perform; and, as far as I know, it is the only way in which very large (that is very long) sheets of paper can be prepared, as dishes are not usually made more than twenty-four inches long.

It was through some less efficient means being used in preparing the paper on which the *May* was printed that a line in the sky, or rather distance, has occurred. This line, a little darker than the rest of the surrounding parts, though scarcely noticed unless the picture be very critically examined, is a constant source of amusement to all who know its real history. I have heard the criticism dozens of times, "That large picture was not taken all at once, was it?" "No." "Oh, of course not; how stupid to ask! why you can see the join quite plainly if you look into it." Such is the overwise remark of the superficial critic. Not so, however; you *cannot see the join*, however closely you look; and the more closely you look the more you will be baffled to find it.

* Concluded from page 25.

† See *Year-Book of Photography*, on "Laths," by N. K. C.

I have also brought the following pictures:—*Fading Away*, 1858; *Holiday in the Wood*, 1860; *Lady of Shalot*, 1861; *May*, 1862; *Autumn, Stoneleigh Deer Park*, 1863; *Sleep*, 1867; *Returning Home, Lark, Group of Children, Gipsy, Clearing Up, Sunset, Rusthall Common*, 1868.

These are all examples of different phases of combination printing. As the pictures are hung in the order in which they were taken, you can by a glance see the differences which exist between them, and the improvements which have been made as one picture after another added to the practice of the artist.

Combination printing has by no means yet reached the fullest perfection of which it is capable; but I trust you will consider the improvement which is manifested in the comparison of the earlier pictures with those of more recent date, gives us no small hope of still further advance in the years to come.

This brings me to the most important part of my subject—the *art* of composition printing; not the art of composition, but the art of so taking a picture in parts as that they shall join successfully.

I cannot say very much upon this matter, for two reasons. One is that, important as it is, it is so eminently simple that there is not much to say; and the other that as each picture needs its own particular scheme or plan, no definite rules can be given, as in every case a somewhat different plan has to be adopted.

I may, however, give a few general hints. Join as much as possible in dark parts, or very dark and very light, but avoid joins of two half-tones in important parts of the picture. Keep the joins as much as possible in unimportant parts of the picture. In the *Lark* this was not done, for the reason mentioned in a chapter of Mr. Robinson's articles on *Pictorial Effects* in the *Photographic News*, viz., to show that combination printing with a join down a facial line in the most important part of the picture, was not only possible but practicable, even when large numbers of prints had to be made; it is, however, by no means to be recommended as a usual thing, and the rule is always to avoid such joins. Another rule of great moment is by all means to hide the joins, and, having hidden them, not only not to tell any one where they are, but to forget them. Critics are so exceedingly clever they can always detect a join when they know beforehand where it exists; but when they are not accurately informed beforehand, they often make the most absurd blunders, such as pointing to the line in the *May*, and often suggesting that they see the line very clearly "just there," when, in fact, they are looking at two points in the same negative.

Sleep is a good illustration of well-hidden joins. This picture has hitherto been printed by a professional printer. We have the negatives at home now, though I have never examined them; but until now I have never looked at them, nor do I exactly know how many there are. I should be strangely at a loss if asked to point out where the joins in the picture occur; never having printed the picture I really do not know where they are, and I do not believe they can be detected.

I do not feel that it is necessary to say much in favour of the legitimacy of combination printing. It seems to me a self-evident proposition that if you cannot take a picture at once you must do it at twice; and if in doing it at twice you can do it so cleverly that no one can find out where the once ends and the twice begins, who is the wiser, you or the critic who finds out the wrong line for a join, and holds himself up to ridicule by his remarks?

But combination printing is wrong, and illegitimate, and everything that is bad, and to be condemned if attempted by one class of photographers, viz., to those who cannot make pictures—to those, in fact, who do not understand composition. If you cannot make a true composition on one plate, it is quite hopeless to bring two to bear upon the subject; if you cannot see how a picture should be *composed*, you certainly will fail in seeing where the printing should be *combined*.

I believe that two reasons why a certain class of critics are so very fond of quarrelling with combination printing are—first, that they have never been able to succeed with it themselves; and, second, that they try to look upon a picture as being wrong when they hear it is combined. For the benefit of the latter class—though I do not suppose any such can be among my hearers this evening—I should like to point out a little matter connected with a group of children. This picture has received about as much adverse criticism as falls to the share of most pictures. The join between foreground and distance has been furiously pitched into from several quarters; but the real defect of the picture—I may say the real untruth of the picture—has been passed over with the most cheerful unconcern. The line of junction with the distance *must* exist; the critics knew that, so they found it out, but they did not find out the point to which I am about to refer, namely, how the rock in the foreground was done. With no other object in view than to see if the critics would find it out, and so far to test the value of adverse criticism, the rock in the foreground of this picture is not photographed from a real rock, but from a small piece of dried garden mould, taken full size. There it is. NELSON K. CHERRILL.

SPIRIT OF THE AMERICAN JOURNALS.

DISCOLOURATION OF SENSITIVE PAPER.—The subject of the discolouration of albumenised paper is attracting the attention of some of our American friends, for in the *Philadelphia Photographer* for the present month we find two communications on this topic. Some years ago a box or case was introduced by Messrs. Marion & Co. which, when closed, was airtight, and the lid of which contained chloride of calcium. The object of this was to keep the paper thoroughly dry, by which it retained its whiteness for a considerable period of time after being sensitised, dampness of the air having been found to cause discolouration of the sensitive surface. Of the atmospheric conditions most favourable for the preservation of printing paper, Mr. A. F. Clough thus speaks:—

"In winter we try to keep warm; in summer to keep as cool as we can, and that is where the trouble lies.

"The air holds a certain amount of moisture—the warmer the more it holds, in an invisible state. Where the air has a large amount at 60°, if it was raised to 80° it would become very dry, and anything that was moist hung in it would dry fast and completely. If the air is heated to 80°, and has a large quantity of water suspended, if it is cooled to 60° it becomes saturated, and any object will dry slowly and never become completely dry. Now, in summer, the air outside is warm, and holds a certain amount of water. When that air is brought into a cool room it becomes so near to saturation that the paper dries slowly and very imperfectly, leaving water enough to produce a change.

"Then there is usually a good deal of water in the rooms, which makes it so much worse. In cold weather the outside air is cool, and holds but little water in suspension. When that comes into a warm room it becomes dry, or in a condition to absorb moisture; so that the paper dries quickly and perfectly, thus preventing any change.

"What is wanted is to have the air in as good a condition to dry in warm as in cool weather. There is but one way to do it, and that is to use artificial heat in warm weather, and completely dry the paper. It is somewhat inconvenient to have a fire in summer, but a lamp can be used to dry the paper, or a small stove with a light fire, holding the paper as near as it can be and not burn it.

"I tried this the latter part of the past summer, and I found my paper kept a great deal better. Of course it won't keep as long as in cold weather, but it gets rid of the worst part of the trouble. Try it, if you have not already done so."

Writing on the same subject, Mr. J. L. Knight enunciates his views in a more direct and practical manner. He says—

"Take—

Silver	1 ounce.
Water	7 ounces.

When dissolved, add one ounce of alcohol and two drachms of concentrated liquor ammonia. Shake well, and let stand a few minutes to saturate. Then add pure nitric acid until the brown precipitate is fully redissolved. It will be very nearly neutral, of a slightly *milky* appearance, but will filter out clear and remain clear. When below working strength or bulk, make a new bath in the same way, using sufficient excess of silver to make up for lack of strength in the old one, and after clearing up with acid, add the two together and filter out for use. Float the paper from thirty to sixty seconds according to temperature, and do not fume at all. The paper will dry with great brilliancy, print rapidly, and will never be *mealy* unless there be radical defects in the toning or fixing bath. I have found no remedy for discolouring of the paper equal to the above."

Coffee Process.—Mr. Bardwell (as we learn from the same journal), in practising the coffee process, modifies it thus:—He coats the plate with dry dilute albumen by first wetting it with water, and then allowing the albumen to flow over it. When dry and collodionised in the usual manner, he washes, after sensitising, and pours over the surface a four-grain solution of bromide of ammonium, washing this off before applying the coffee solution, which he prepares by pouring cold water on the ground coffee, and allowing it to stand for several hours. After filtering, he adds only half the quantity of sugar usually recommended. When the plate has been coated with this, he dries it with considerable heat. He finds plates thus preserved to keep so well that at the end of six weeks they are sufficiently sensitive to permit a vessel to be taken while in motion.

On Stilts.—We find in our Philadelphia contemporary an amusing article entitled *The Photographer on Stilts*, which we shall reproduce next week, if possible. There are photographers who walk on stilts in

this country as well as in America. We have known of two or three of the class. One says:—"No use for *me* to join a photographic society; I already know all that can be possibly brought before the meetings." Another says:—"It would be a queer thing if *I* had to go to books for information concerning an art which I have both practised and taught for a dozen of years." There are few who are not acquainted with one or more walkers on photographic stilts. There are artistic stilt walkers, who do not comprehend and affect to ignore the scientific, and loftily pooh, pooh! the mechanical, department of photography; and there are, also, scientific stilt walkers, who consider the artistic department as something very much beneath them, and unworthy of the consideration of a man of science. And thus the stilt walkers go on.

The Tannin Process.—Mr. Charles Wager Hull observes that much has been said for, and very much more against, this class of dry plates in photographic work, &c.:—

"Much has been said for, and very much more against, this class of photographic work. Those who speak for it speak from experience; those who speak against it speak from theory, far oftener from prejudice; consequently, it has not grown in photographic favour as rapidly as it should.

"Some of your readers may wonder why I am again espousing the cause of a process (tannin), which they believed dead and gone years since. I will tell you. I have discovered another merit it has—one, so far as I know, not equalled by any other—to wit, the preservative; for a tannin solution once made is good until used, consequently you are *always* ready to prepare tannin plates. Need more be said?

"A few days ago a friend requested me to make for him quite a number of glass transparencies of a label. I informed him that I had but three plates which I could spare, which were upwards of three years old; so, on these I made for him three transparencies; they were just what he wanted, and were very fine. Since then I have prepared twenty other plates (in an hour and a-half), and, in their preparation, used a tannin preservative, which was compounded in *May*, 1866, and each plate is as good as any I ever made.

"The solution was made as follows:—

Water	80 ounces.
Tannin	500 grains.

"Dissolve and filter; after which add twenty ounces of alcohol.

"The solution is as good as when first made—of a clear, rich, wine colour, and absolutely free from mould or scum. It is well to understand that it was kept in a cool place, and was tightly corked.

"I have often exposed tannin plates two years old, and some of over three years, with uniform success, and now have nine stereo. plates over five years old, upon which I am confident I can produce as many good negatives. Is there any other process of which this can be said? If so, I would be pleased to hear of it, and of any advantages which it may possess over the much-abused tannin process."

Rectifying a Disordered Nitrate Bath.—Mr. D. Russell Holmes recommends the following way of curing a bad silver bath:—

"Put the nitrate bath into an evaporating dish; drop into it, carefully, concentrated ammonia until it is slightly alkaline; then heat it until it turns a dark purple colour, almost black, when it will throw down a black precipitate; let it cool and filter; then add diluted nitric acid enough to give a proper acidity. If you wish to fuse the bath, it should be filtered after the precipitate is formed.

"This I have found the most reliable and certain of any process that I have tried."

PHOTO-CHEMISTRY.*

The facts which I have cited prove a kind of persistent activity in light. M. Niepce de St. Victor discovered many other facts which appear to support this hypothesis. A sheet of white paper which has been insolated acts in darkness upon a sensitive preparation even at a distance. A great number of organic substances of a clear colour have the same property; it may even be communicated, although in a small degree, on the surface of a fresh breach in broken porcelain. He showed, lastly, that the influence of light on the respiration of plants continues to be exercised a long time after the insolation. Are we to understand that these mysterious facts are the indications of a chemical temperature—that is to say, of a vibratory temperature fixed by the solar rays and persistent after they have ceased to act? With our present limited knowledge it is difficult to answer that question.

Besides these actions—sometimes reluctive, sometimes oxydative—which light exercises upon sensitive substances, it communicates to them also the property of attracting vapours from the bodies for which they have affinity. Thus iodide of silver and sulphur fix the vapours of mercury after exposure to the light. This is the discovery made by Daguerre.

We have already stated that these chemical actions are not produced with the same intensity by the different coloured rays. The effect of the different regions of a very pure spectrum have been examined separately, and it has been proved that each substance has its rays which make a greater impression than the others. The chloride of silver blackens with the greatest rapidity under the influence of violet rays. It is impressed by all the region of the spectrum situated beyond the line F of Fraunhofer; that is to say, by the blue-violet and grey-lavender rays, but the maximum of the effect takes place about the line H. It is the same for the bromide and iodide of silver.

The decomposition of bichromate of potash is caused by the green, blue, violet, and ultra-violet rays. In these cases the obscure heat and the most luminous rays display themselves without any action; it is on the side of the violet that the reducing effects are produced. But the violet rays also act as oxidisers; they turn the guiacum blue, and combine oxygen with the bitumen of Judea and the essences. These are the same rays which cause the combination of chloride with hydrogen.

The red and yellow rays are, however, by no means inefficacious, only they act in a different manner; they continue and finish the work commenced by the violet rays. It is for this reason that M. E. Becquerel calls them *continuating* rays, and the others exciting. For instance, the chloride of silver, slightly impressed by the violet rays, blackens afterwards under the action of all the visible rays.

On the other hand, the most luminous rays exercise quite another effect; they deoxidise and whiten the guiacum which has been rendered blue by the violet rays.

M. E. Becquerel studied these phenomena by means of an apparatus which enabled him to measure the intensity of the electric currents which are created between two Daguerrean plates plunged in acidulated water, when the different rays of the spectrum are made to fall upon them. Then are to be observed two maxima of action—one in the yellow, and the other in the extreme violet. It is seen by these examples that the action of light on sensitive substances is much more complex than it would seem to be at first sight. That which is certain is this—that the effect of a light, the composition of which is unknown, upon anyone whichsoever of these substances, does not enable us to foresee what the effect will be on another substance. A light which gives a strong blue to the white guiacum acts very little upon a sheet of paper impregnated with bichromate of potash, and *vice versâ;* that which whitens the blue guiacum has no action upon the chloride of gold, and so on.

Which are the rays that act more specially upon the green parts of plants? This question is very far from being solved. We have seen that, stimulated by the sun, plants reduce water and carbonic acid; there is in this something analogous to the deoxidising action which the most luminous rays exercise upon the blue guaicum. At the first glance it would, therefore, seem probable that these are the same rays which affect the respiration of vegetables. Nevertheless, opinions are much divided on this point, and the results obtained by different experimentalists offer the most singular contradictions. If we go by the experiments of Mr. Draper, of New York, these are rays comprehended between the orange and the green; that is to say, the most luminous rays, and which determine the reduction of carbonic acid by the green matter in the leaves. Mr. Draper filled seven glass tubes with water charged with carbonic acid, which he placed in different regions of a solar spectrum after having put into each a long and narrow leaf of glass. At the end of a certain time he measured the oxygen disengaged in the tubes, and the following were the quantities collected in the six principal colours of the spectrum:—Red, thirty-three cubic centimetres; red and orange, twenty cubic centimetres; yellow and green, thirty-six cubic centimetres; green and blue, ten cubic centimetres; blue, none. Placed before a wood fire the tubes became heated without anything becoming disengaged. In comparing the effects produced by free light, or a light that had penetrated through a screen which had arrested the chemical rays, Mr. Draper found that they were almost identical; while, on the contrary, the light, sifted by an opaque screen which only allowed the chemical rays to pass, produced only an insensitive effect.

It may be supposed that chlorophyl is affected in the same manner as leaves are by the action of light. Mr. Stokes has shown that an alcoholic solution of chlorophyl, which is of an emerald green, absorbs by preference the orange, yellow, and green rays. This would undoubtedly be a striking confirmation of the views of Mr. Draper; but the experiments which have been directed immediately upon the vegetables made to grow under coloured glasses have given quite opposite results.

Thus Mr. Hunt attributes to the blue and to the chemical rays a beneficent influence on the germination and development of young plants. According to his experiments, they, on the contrary, become etiolated under the action of the yellow and green rays. Mr. Hunt, however, says that, though the influence of the blue rays is greater for hastening the germination and promoting the vigour of vegetables, their action is too stimulating to permit a plant to arrive at complete maturity under it, The sap appears to be entirely employed in the production of fine foliage of a deep green, but neither flowers nor seed can be obtained therefrom, unless in place of the blue rays the yellow be substituted, the latter being best adapted to the development of the vegetable. We will not mention a vast number of other results given by Mr. Hunt, as they appear to us by no means decisive.

The investigations by Dr. Gardner, which were made with prismatic lights, produced results which are in accordance with those of Mr. Draper. By raising in boxes exposed to the different colours of the

* Continued from page 618, vol. xv.

spectrum seed plots of turnips, radishes, peas, &c,, Dr. Gardner found that the green colour of the leaves was most developed by the yellow rays. The shortest time which sufficed to produce verdure from a seed plot of turnips in the pure yellow light was two hours. A shade of green produced in these rays in three hours and a-half appeared in the orange in four hours and a-half, and in the green in six hours; the blue rays produced no effect until the end of seventeen hours, and then the shade was only half the depth of green.

On the other hand, it is the indigo rays, according to Dr. Gardner, which produce the stalks. The young plants on which a spectrum is made to fall all incline towards one common axis parallel to the indigo ray; those which are exposed to the red, yellow, green, &c., incline towards this ray, whilst if the seed plot be exposed sufficiently long it takes the aspect of a corn field beaten down by two opposite winds.

In conclusion: it may be stated that the mode of action of light is but very imperfectly known, and requires to be elucidated by further and more decisive experiments. It will be necessary not only to examine in detail the effects produced by light on the different parts of living vegetables taken at different ages and under different circumstances, but also the modifications which organic matters in general undergo under the influence of the differently-coloured rays.

M. Niepce de St. Victor, after exposing to the sun starch suspended in water charged with a little nitrate of uranium, saw the starch changed into sugar. This observation is, perhaps, calculated to throw new light on the formation of sugar in fruits, and on the causes of the phenomena of their maturation. Many other facts, such as the alteration in vegetable fibres from which arises the bleaching of linen, &c., enter into the same category. By multiplying this kind of examinations we should probably arrive at results of the utmost importance for the theory of chemical affinities.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 26th.......	Liverpool Amateur (An. Meet.)	Free Public Library and Museum.
,, 28th.......	Oldham........................	Hare and Hounds, Yorkshire-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

At the usual monthly meeting of this Society, held on the 14th inst., the Rev. F. F. Statham, M.A., F.G.S., President, occupied the chair.

After the minutes of the previous meeting had been read and confirmed, the following gentlemen were duly admitted members:—Mr. Henry Greenwood, of Liverpool, Mr. A. H. Vernon, Mr. Price, and Mr. William Wainwright.

The Secretary read a letter he had that morning received from Mr. How, of Foster-lane, regretting his inability to be present on that occasion, to exhibit a number of transparencies by the magic lantern, as had been announced at a previous meeting. The Secretary said they would have to bear the disappointment in the best way they could, for, in consequence of the short notice received, he had been unable to make arrangements for a substitute for Mr. How's promised exhibition.

Mr. A. L. Henderson sent round for examination a variety of finely-executed vitro-enamels.

Mr. Howard (who exhibited several excellent transparencies which he had printed on wet collodion by means of a copying camera) made the following remarks:—I have here the dimensions of a very convenient form of camera for printing transparencies from any sized negative, from 10 × 8 downwards, using a quarter-plate or short-focus card lens. The camera can be used for enlarging or copying, and is for the amateur a most useful instrument. A base-board, forty-two inches long, has affixed to it a rigid body twenty inches in length, not quite in the centre, but in such a position as to allow two sliding bodies (one at each end) to play easily; one sliding body is fifteen inches in length, the other is seven inches. The focussing glass, the carrier, and the holder for the negative to be copied will fit either end of the camera. At the top of the rigid portion of the camera is a door which, when opened, allows the lens to be placed in any position that is desirable, by means of grooves cut at various distances, in which the lens front can slide. By this means any size lens can be introduced; and, by reason of the carrier fitting either end, the distance between the sensitised plate and the lens, or the object to be copied, enlarged, or diminished, can vary from about five inches to thirty-six inches, and all are perfectly parallel.

Mr. Simpson exhibited a specimen of mechanically-printed photographs by Herr Albert, of Munich. It was quite equal to an average good silver print on plain paper.

The following question, "What is the best way to convert gold residues?" was taken from the "question box," and Mr. F. W. Hart was requested to make some observations on it. That gentleman's remarks will be found at page 36.

In reply to an observation by Mr. Fitch, respecting the deterioration of the toning bath by exposure to light,

Mr. Simpson said that light would decompose it if neutral.

Mr. Hart stated that hypochlorous acid would preserve it. In reply to another question he (Mr. Hart) spoke of the stability of the acetate toning bath.

Mr. Henderson said he always used a large quantity of common salt in his toning bath.

Replying to a remark by Mr. Sebastian Davis, who considered it ideal to suppose that any gold remained unprecipitated in the lime toning bath,

Mr. Simpson said he had used the lime bath over and over again without the addition of any gold. Sometimes, when it got inert, the addition of the least trace of gold would start it into activity.

A desultory conversation on the cleaning of glass plates here followed, and it was arranged that the subject should be reopened for discussion on another occasion, when Mr. S. Davis would report on some experiments which he intended to try.

Mr. Taylor was requested to open for discussion at a subsequent meeting the question—"Is it desirable for a photographer to use dry or wet plates exclusively?"

The thanks of the Society having been conveyed to the gentlemen who had taken part in the evening's proceedings, the meeting terminated.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on the 10th ult.,—Dr. H. Vogel in the chair.

A letter was read from Professor Husnik, of Tabor, in Bohemia, with proof prints of his new process of phototypography, made from a Berlin negative. Professor Husnik writes as follows:—"I can obtain six hundred pictures from one stone. The printing is done with a book printer's press, hence a picture can be printed as a woodcut, along with text, and need not be moistened like a stone in lithography. These are significant points of superiority, and as the pictures on smooth paper resemble chloride of silver pictures, like the two proofs enclosed, it is expected that, when smooth paper is specially manufactured for it, this method will take the place of silver printing, and will pay for itself by providing twenty pictures for one if quickly handled. I will take another opportunity of making you acquainted with the special experience I have obtained through my experiments."

Herr Burkhardt spoke favourably of the prints received from Herr Husnik, but said he thought it would be necessary to see whether prints of large size could be obtained before giving a decision respecting the process.

The Chairman laid before the meeting a great number of prints which were produced according to the new discovery of Herr Albert. Some of these were twenty inches in size, and amongst them were to be found not only masterly reproductions after the strict manner of cartoons, but also clever photographs of oil paintings and architectural drawings, with the finest half-tones. The prints were partly of a brownish photographic tone, so that they gave the impression of a photograph on plain paper — two classes of tones being used. The pictures were mostly printed on paper. He (the Chairman), however, drew the attention of the meeting to a print on silk, and mentioned a sunshade that had been printed by the process. Prints varnished with gum-lac were similar to the usual albumenised photographs, but by far the greater number were printed direct on copperplate card-paper. Thirteen hundred good prints were said to be obtained from one plate. That the prints were printed with printers' ink, the Chairman proved by washing some proofs with benzine. He (the Chairman) added to his remarks that the prints of the usual negatives were changed right and left, as was seen in different architectural pictures; it was necessary, therefore, in making these pictures, to have reversed negatives. Their production was possible in two ways—firstly, by taking off the collodion film with tough collodion; secondly, by inverting the plates in the camera when photographing, so that the collodion layer was on the back. To these two practices Herr Albert had added a new one, which appeared to be the simplest. The process depended upon the employment of a prism, which was placed before the objective. One such has certainly been employed before in the Daguerreotype; it has, however, the disadvantage of absorbing a considerable quantity of the light. Herr Albert provides against this by silvering the base of the prism. By this the weakening of the light is diminished to one-tenth of the original quantity, so that a further exposure was necessary only for that fraction of difference.

The pictures excited the most lively interest; and on all sides it was averred that, in comparison with the results of all other photographic printing processes with ink, there was a beauty of half-tone in them hitherto unequalled.

Herr Kleffel said he suspected that probably the process depended upon the superior quality of relief in the negatives; for instance, with the horny collodion the image not unfrequently protruded—many plates appeared as if they were engraved.

Dr. Schippang said he was quite of an opposite opinion to that of Herr Kleffel, and he knew through private information from Herr Albert that the process rested on quite a different principle. What others had sought to attain on stone, copper, &c., Herr Albert had succeeded in carrying out by a new material altogether. What the process was

capable of doing could best be compared with Woodbury's productions. Of the latter some of the largest that were exhibited were only 7 × 9, and the gelatine process, it was well known, was always a doubtful one. In Herr Albert's copying process plate glass was employed as a groundwork; thus, he had a material which could be furnished at any time perfectly even, unaffected by any chemical influence. Metal plates and stones were, when compared with glass, coarse materials, in working which, for printing, considerable time and trouble must be taken into account. The usual printing processes hitherto had for their principal object the reproducing the old style of engraving, while by this was attained the reproduction of photographs through a printing process.

The CHAIRMAN laid before the meeting several landscape photographs made in Aden, as well as the first reproductions of the sun pictures photographed during the expedition. The sun's diameter in the original plates (according to Dr. Vogel's letter from Aden, published in September last) was ten lines; the diameter of the sun in the enlarged pictures laid before the meeting was thirty-two lines. The first two photographs showed the upper protuberances, the two others the protuberances of the lower limb. Of the first, he (the Chairman) showed also an enlargement, four times the size, besides a picture in the form of a sickle, of a partial eclipse.

Messrs. Sanders and Risse, of Norway, had sent the Society a number of preparations to be tested. The first was a sensitised collodion paper, similar to Obernetter's; then a so-called colloxylin, or pyroxyline produced from paper, to be employed like collodion wool; and, lastly, a sulphocyanide gold solution for toning both collodion papers and also the usual papers.

Herr GROSSMAN said he had had a similar colloxylin in hand for the last six months.

Herr KLEFFEL said he knew of one also at Hamburgh, but it was in an unfinished state.

Herr REINECKE stated that he had already, in 1857, tested a similar paper, and mentioned that it came from England to India instead of collodion wool.

The CHAIRMAN said that, in consequence of some successful experiments, he thought of employing the so-called "pyro. paper" in making collodion.

Herr GROSSMAN spoke of Benque's sugar-cane developer, and gave the following receipt for its preparation:—Take eight ounces of ammonia-sulphate of iron and two ounces of the finest refined sugar; pulverise each separately as fine as possible, and mix them together afterwards with a silver spoon. Then place in an evaporating dish, held over a spirit flame, some distilled water, and allow it to become well heated; then pour the hot water into another vessel behind, put into the dish the above-mentioned powder mixed together, and pour upon it so much of the warm water that the mixture becomes quite thoroughly wet, and then on this thick pap pour so much of the water that the whole will be covered. Now the vessel should be placed over a weak spirit flame and well stirred with a glass rod until light bubbles come and the surplus water has taken a smutty green-brown colour. The dish should now be placed in the air in a place to cool, which, after an hour or so, it is sure to do. Hereupon the dirty water is poured away from the crystals, or, if the water has evaporated too much, the surface of the crystals must be well washed, and the water be then poured away. The evaporating vessel remains with the clean crystals, for crystallisation, twenty-four hours in the air. If the whole mass be not then quite dry, it is well to spread it out on a glass plate and leave it in the air to dry.

RECEIPT FOR DEVELOPER.

Water	20 ounces.
Crystals above-mentioned	2 ,,
Alcohol	$\frac{3}{4}$ ounce.
Acetic acid	$\frac{3}{4}$,,

Herr KLEFFEL said he had tried the iron developer, but had obtained no particularly favourable results therewith; he found quite as effective a preparation by adding sugar in solution to the usual developer.

According to Herr Prümm's account, the sugar and iron developer worked with rather less intensity than the usual one; it gave a greyer picture with less strength in the whites, so that more details were obtainable in the deep parts without fear of overworking the whites. Besides this, Herr Prümm believed that the quality of light in the southern latitudes where Herr Benque worked was different from their own, and therefore different results would probably be obtained in reference to the effect of the developer.

Herr GROSSMAN remarked that Herr Luckhardt, of Vienna, had worked already for a year with the sugar developer, and certainly with great advantage.

After some remarks respecting a despatch from the Hamburgh Society, which had been unfortunately delayed, the meeting separated.

ANOTHER meeting of the same Society took place on the 16th ult.,—Dr. H. Vogel in the chair.

Herr Beyrich laid before the meeting a number of successful carbon prints in purple-black, cabinets and cards, executed by Marzocchini, of Livorno.

Herren Hechy, Kleffel, and Dahms gave an account of the proofs with the chemicals of Sanders and Risse, introduced at the previous meeting.

Herr HECHY remarked that the collodion paper broke easily, and in the usual toning bath went back considerably.

Herr KLEFFEL had obtained most favourable results. The paper, he said, held better than the Obernetter paper. In the usual acetic acid soda bath it became completely bleached, and in the sulphocyanide bath toned well in return.

Herr DAHMS said the collodion paper was exposed at the same time with a piece of sensitised albumen paper under one negative. The collodion paper printed rather faster than the albumen, took a brilliant colour, and was toned in Sanders's sulphocyanide toning bath. The pictures were in the beggining foxy, but became afterwards of a very fine violet-blue. When being fixed in a strong soda bath they went back very much. In a weak soda bath they lost less intensity, and took a fine, blue tone—at the same time the collodion film with the picture showed a tendency to loosen. The sulphocyanide bath was tried on the usual albumen paper, thinned with ten times the quantity of water. It toned slowly, but produced a picture of a very beautiful, warm, black-brown tone. The colloxylin collodion set rapidly when poured on a plate, consequently the upper part of the plate became solid and horny while the under part was yet dropping, so that the preparation occasioned some difficulty; the layer produced thereby gave, however, a strong picture. The raw colloxylin showed itself more difficult of solution in alcoholic ether than the collodion wool. When using fifty parts of ether and fifty parts of alcohol to two parts of colloxylin, there remained a residue after agitating it for hours. The behaviour of the collodion thus produced towards iodising salts could only be shown after a very careful settlement of the preparation.

The Chairman laid before the meeting two albumen pictures—one toned with the borax gold bath, and one with the sulphocyanide of gold. The latter showed, compared with the former, greater depths and more brilliant lights, and the bath possessed the advantage that the pictures went back but little. He recommended this to be further experimented with.

Herr Gahler exhibited a very simple method of arranging for the lighting of negatives to be retouched. The retouching lamp has a parabolic reflector, which is adapted to any of the usual petroleum lamps, and furnishes so intense a light that the smallest fault in the negative is immediately discovered. In order to moderate the light and make it evenly-proportioned, a ground glass is placed between the negative and the lamp, at the distance of one or two inches from the former.

The CHAIRMAN said that the apparatus had already been used with great advantage in the studio of Herren Löscher and Petsch.

The remainder of the business was of a private and local character, uninteresting except to the members of the Society.

Correspondence.

Foreign.

Philadelphia, December 31, 1868.

THE appreciable difference between the action of coffee upon dry plates and tannin I have always been disposed to trace to the difference in the tannic acid which it contains; for the term tannin or tannic acid is rather a generic term than a specific one, and indicates a class of substances closely allied but not identical, so that the coffee-tannic is not to be confounded with common or gallo-tannic acid.

I notice that the Rev. J. B. Reade is disposed to ascribe the peculiarity of coffee as a sensitiser to the presence of ammonia, and remarks that, under certain circumstances, alkali reveals its presence by its characteristic odour. It appears, however, by the investigations of Personne, that the alkaline substance developed in coffee infused under certain conditions is not ammonia, but methylamine. Coffee-tannic acid exists in the berry in combination with caffeine. Caffeine roasted or distilled by itself does not give rise to the production of methylamine, nor does coffee-tannic acid; but when both are torrefied together (as in the seed), methylamine is produced, and may be rendered distinctly evident by heating with a little caustic lime, which disengages it.

I showed some time back that the methyl bases, including methylamine, might be very easily formed by placing nitrate of methyl, together with concentrated liquid ammonia, in a strong bottle, fastening in the stopper, and setting in a warm place for a week. In *generating* ethyl bases by analogous treatment a higher heat must be employed, and *pressure tubes* must be brought into requisition.

This method of preparing methylamine and the other bases may become of interest to photographers should methylamine be found to have any special effect on sensitive films. This seems to me, however, doubtful; and, moreover, eventually the collodio-bromide process will probably displace the coffee and other dry processes requiring a nitrate bath.

Some years back I called attention very strongly to the advantages of chloride of silver for positive development, and afterwards showed that a totally invisible image upon chloride of silver, produced by the action

of a single magnesium taper on a sheet of chloride paper under a negative, might be developed to its most delicate details. Subsequently to this, I think, some experiments were made on chloride films in the camera, but am not positively certain. Lately I tried the following experiment:—

I prepared a collodion containing bromide of cadmium and chloride of calcium, to the exclusion entirely of iodide. So far as I know, whilst many trials have been made of chloride in connection with iodide and excluding bromide, none have been made with bromide and chloride excluding iodide.

This collodion, after standing for ten days, was tried in a moderately old bath, which worked well with ordinary collodions, and a plate with ordinary collodion was exposed immediately before for comparison. The chloro-bromide plate gave a faint image only, and covered up with fog. It is true that this experiment did not *rigorously* exclude iodide of silver, as traces were in the bath in solution, and might be communicated to the plate. As the bath had just been evaporated down and fused, there was no alcohol in it, and consequently very little iodide could have been in solution. The indications were not such as to encourage to further trials in that direction.

In the second volume of M. Becquerel's work on *Light* are some statements relative to the range of impressibility of the eye by light that are calculated to excite astonishment. Taking, he says, the light of an ordinary wax candle as a standard, and assigning to it a value of 1, the light of the sun will be represented by 50,000. On the other hand, there are very feeble phosphorescent bodies which are nevertheless distinguishable in the darkness, and whose intensity as compared with that of the standard wax candle is expressed by the fraction $\frac{1}{150000000}$. If, therefore, we start with the last feeble light as our unity, and measure back so as the better to compare the extreme terms of impressibility, we find their ratio to stand as—

$$1 : 7,500,000,000,000,$$

of which the first term in the ratio stands for the least light which the eye is capable of distinguishing, and the second for the greatest.

This calculation tends to impress us with an idea of the amazing adaptability of the eye, partly depending upon the extraordinary compass of the retina, partly upon the dilation and contraction of the pupil, and contrasts remarkably with our compass of the perception of heat. The term of heat which corresponds to absolute darkness of light is known to be about — 274 C, at which point the heat vibration disappears entirely and the maximum of possible cold is reached. From this point upwards the range appears to be unlimited. The portion of this which we can distinguish by sensation is extremely small, and that which we can measure by any contrivance is very limited compared with the amazing range exhibited to the perception of light.

I notice some remarks, by one of your correspondents, on the subject of a recommendation I made for bichromate solution for cleaning the fingers. He remarks that it is as poisonous and as dangerous as cyanide—either that or something nearly equivalent. It is altogether a mistake, and the observation I think is made without much familiarity with that chemical.

I believe that a great many corrosive solutions (and an acidulated solution of bichromate of potash falls into this category), if allowed to act for a long time upon even a sound skin, will do harm. But the very temporary application of this solution is undoubtedly not injurious. Even where there are cuts and abrasions the action is much less powerful than some have stated it to be. Some have said that in such places it produces deep sores and ulcerations. Now, after an experience of many years, I can say that I have a hundred times got this solution, much stronger than in the form that I have recommended it, into cuts and scratches, and it has never, in any single case, produced a sore. No result whatever has followed, beyond the mere temporary smarting which any strongly acid liquor will cause. I presume that if I dipped cotton into the solution and bound it fast to the cut or scratch I might think about ulceration, but have not thought that desirable. I should be curious to hear of any one authenticated case of a deep sore, or, in fact, of any ulceration caused by cleaning the fingers in this manner.

I am, of course, well aware (probably better than my critic) of the effects produced when chromic acid is allowed to act for a length of time upon the tissues, and this induced me to give very particular cautions in suggesting the use of these detergent solutions in photography. The effects which I refer to are as follow:—

In the manufacture of bichromate of potash, sulphuric acid is introduced into solution of the neutral chromate in order to obtain the common red acid salt. Great heat is occasioned by this addition; the liquid boils up, and a spray of hot bichromate solution is spread through the air of the workroom. This spray is inhaled by the workpeople; it does not seem to attack the lungs—at least not at first; but it produces a specific irritation of the septum which divides the nostrils, and with time this is entirely eroded. It has always seemed to me that the exposure of the workpeople ought to be avoided by a suitable disposition of apparatus, by operating under a hooded chimney with draught, or in covered vessels with pipes leading into the open air. But there is a recklessness in chemical works as to the health and life of those employed which is wholly unjustifiable.

In manufacturing cyanide of potassium no such danger results to the workpeople. The ferrocyanide is put into large crucibles, and a gentle fusion is effected. The iron falls down as carbide, and the cyanide is poured off and allowed to cool. No prussic acid escapes in this operation, and none so long as the cyanide is kept *thoroughly dry.* When moistened in any way the carbonic acid of the air attacks it and sets prussic acid free.

Now (and here is the point) these conditions in the two cases are reversed in the photographer's experience. The cyanide which was innocuous in the hands of the maker because dry, is always used by the photographer in solution, when it becomes dangerous. On the other hand, the hot spray of bichromate, which makes it dangerous to the workman, is unknown to the photographer.

I do not, however, mean to say that any corrosive poison should be carelessly handled; and if equally effectual means for cleaning fingers can be found with less active agents, they should undoubtedly be substituted. My object is simply to clear myself from the rather absurd charge of having recommended a practice essentially dangerous.

M. Carey Lea.

Paris, January 18, 1869.

I have to record this week a few more particulars of M. Duchemin's vitro-enamel process; for, thanks to M. Balard, a fresh communication to the Academy of Sciences was made through him last Monday, during the time I was writing my letter for your pages. This communication contains rather more ample details than those yet published, and which will help us to form a more correct appreciation of the process. The enamelled glass which is used for these pictures is ordinary glass, of the most fusible description, covered with a layer of this enamel:—

Arsenious acid	30 parts.
Nitrate of potash	30 ,,
Sand (finest)	90 ,,
Litharge	250 ,,

Upon this enamelled surface it is said that the writing with the ink I named in my last is as easy as with ordinary ink on ordinary paper. A minute's exposure to the furnace will render this writing indelible for ever. M. Duchemin says that, "for its application to photography, this enamelled glass should be flattened by a simple polishing, so that the *cliché* may be placed in close contact. If the polishing has been well done, and left the enamel sufficiently bright, the photograph will possess great sharpness." I should think that the pictures would be of very little value unless this flat surface were always ensured. Some attention being called to the desirability or necessity of flatness in the enamel, I fear it it is not always obtainable, and will, therefore, be a great drawback to the practical utility of the process. It is said that this enamel glass will shortly be offered for sale, and so all who wish can try and use it.

M. Duchemin says that the image upon these plates may be obtained in almost any way—by means of bitumen of Judea, perchloride of iron and tartaric acid, bichromates, &c. The latter is used thus:—A solution is prepared containing—

Gum arabic	72 grains.
Honey	24 ,,
Bichromate of potash	48 ,,
Water	5 ounces.

This is spread upon the enamelled glass, and exposed and developed as stated in my last. I see the proportion of black oxide of iron is stated in the formula I gave in my last to be fifty parts; it should be ninety parts. This is the correct formula for the developing powder:—

Oxide of cobalt	10 parts.
Black oxide of iron	90 ,,
Minium	100 ,,
Sand (very finely powdered)	30 ,,

When the picture is developed the bichromate in the film is decomposed by plunging the plate into a bath of dilute hydrochloric acid, composed of five parts of acid to 100 parts of water. The plate is washed and dried, and is then ready to be burnt-in. It should be placed in the muffle on a piece of cast iron, which is covered with a layer of chalk to prevent the glass from getting out of shape from the heat. One minute is given as the time necessary for the operation of burning-in.

Amongst the presentations made to the Photographic Society of France at their last meeting was a valuable work illustrated by photographs, executed by the process of MM. Tessie du Motay and Maréchal. It is a work on the flowers, fruits, and leaves of the chief varieties of the forest trees of France. It is published by M. J. Rothschild, the scientific bookseller. The text was written by M. Eugène de Gayffier, and the photographs were produced by MM. G. Arosa and Co., who are actively working the process of MM. Tessie du Motay and Maréchal. The work is embellished with 200 photographs, all from nature, and of the natural size of the objects represented. The work is entirely finished, but, from its importance, it is considered best to publish it in parts, at ten francs (eight shillings) each. The numbers will contain five photographs, well mounted on India-tinted paper, and the accompanying text will be on paper of the best quality. Eight to ten numbers will be published every year, so I suppose it will take four years to complete the subscriptions to this work. In order to get the work known, the *first* number will be delivered at six francs. Already a number of subscriptions have been received from manufacturers of tissues both in France

and abroad, which shows the importance of the work, and indicates a use to which such publications can be applied. The process of MM. Tessie du Motay and Maréchal seems to be making its way commercially, showing its practical utility.

I was interested in reading an account of a meeting of the "Chambre Syndicale" of photography, and thought a little explanation of the objects of this assembly, and the system of which it forms a part, would not be uninteresting, and might suggest some useful action on the part of English dealers in photographic materials and photographic artists. There exists in Paris a society called "L' Union Nationale," having for its object the protection of its members in matters of trade, and undertaking to furnish advice of all kinds, information of all kinds, and to conduct law cases connected with trade, recover debts, &c. This union is now composed of nearly fifty "Chambres Syndicales" or subdivisions, which each represent a trade. Thus there are the chambers of chemical products, linen goods, shoemakers, photography, &c. Each chamber has a president, secretary, and committee, whose business it is to look after its interests in a special manner. The principal of "union is strength" is well illustrated by this society. The work of the chamber of photography can be best shown by giving a few of the results which have been accomplished by its means. Since November, 1867, fifteen matters have been submitted to its arbitration, eleven of which have been satisfactorily terminated, and four only necessitated reports. Your readers will see by this that the general members of the Union can have their business matters, inquiries, &c., referred to the special chamber to which they belong, and thus obtain the best results. This, at least, is the theory of the Union. The photographic chamber will have shortly submitted to the deliberation of its members some plans which the committee are forming for procuring information *gratis* for *employés* connected with the trade, and who are in want of situations. A project will also be submitted to it for centralising the information respecting credit, &c., of customers; for it appears that in France also the customers of the dealers in photographic materials, &c., are frequently not very trustworthy. "If all will loyally agree together to realise this project, good results will not have to be waited for," says the chairman of the meeting. The Union itself is studying the question of the bankruptcy laws, and the photographic chamber is urged to support the Union, and give its aid in obtaining the desired reforms. A communication was made to the meeting to the effect that a photographer, or dealer in materials, who was unnoticed at the Universal Exhibition of 1867, has thought proper to award himself a gold medal! which he truly terms the only and unique medal of the kind. It was considered by the meeting that this was an indictable offence of "usurpation of titles," and could be punished. It appears that this is not the only case, and it was considered that such persons should be warned of the consequences of their illegal acts. I think I have explained enough to show the advantages of these legitimate trades unions, and should be glad if what I have said should lead to action on the part of those interested commercially in photography.

Now to conclude this letter with a few friendly words with Mr. George Price. I do not think this amiable writer ever abused anyone in his communications, and my saying I had not been abused does not at all intend to imply that others were less fortunate. I am much obliged for his estimation, and trust it may be more and more merited. Let him take my last remarks certainly not as sarcastic, but as conveying what I felt in a light, joking manner—"'twas my humour" for the time. They were none the less seriously meant, and contained truth, as many playful remarks do. I do *not* maintain that the albumen *is* dissolved in the cases quoted by Mr. Price; on the contrary, I think his experiments tend to prove that it *is not* dissolved, but simply abstracted from the paper, and mechanically suspended in, or mixed with, the active solution of metallic salt. I confess I *did* hold that the albumen was *dissolved* till otherwise instructed or led to believe by the experiments of Mr. Price. What made me "uncomfortable" was *not* having to give up my former belief, but being told that "*science knows nothing whatever about*" the law by which the albumen is removed from the paper. If this were true, I could see no chance of our ever finding out that law—"science," *per se*, *abstractedly*, knowing nothing of it. If Mr. Price had said that *scientific men* were unacquainted with the laws which would account for this removal of the albumen, there would have been a chance that some day or other we might find the explanation of the facts. There are many mysteries which are yet unexplained in all branches of natural philosophy, but which more extended research will probably solve. Possibly Mr. Price will say he agrees with me entirely, and did when he penned the phrase about "a law which science knows nothing whatever about," and which warranted my remarks about giving up the hope of seeing the true light any more. "'Twas my humour" to take his remarks as they could be fairly construed, for I believe Seience knows everything, whilst her followers do not. I know it is mighty "easy to suggest," but it is impossible for some to experiment, and nothing better is left for them to do. I trust the results of this little discussion will be to call more attention to the valuable researches of Mr. Price, and to engage new experimenters to find out the law which causes some metallic solutions to abstract a film of coagulated albumen from paper, whilst others have no action upon it. R. J. Fowler.

Home.

LIME LIGHT EXPLOSIONS.

To the Editors.

Gentlemen,—Referring to your request at page 22, I beg to state that I have had two explosions, in both of which instances I was burning pure hydrogen gas.

In the first I was increasing the pressure by placing my foot on and off the boards for the purpose of trying the different degrees of light that a certain density of picture required. I heard a snap in the nozzle of the blowpipe, and instantly a report—not a loud one—behind me. I looked round, and saw the oxygen bag in flames at the side—fed, of course, by the pure gas. I blew it out with my breath, but there was a hole as big as my fist. Not a weight was dislodged, nor was the noise heard in the next room, with the door open. The bag was scorched in a number of places besides, and was thus ruined.

The next accident occurred nearly at the end of the operation. I had some premonitory snaps in the nozzle, but went on. At last a louder report was heard, which seemed to come from the bag. I examined it, and at last discovered a brown stain. That was all that was visible.

In both the above cases the hydrogen passed slowly into the oxygen bag without stopping the flow of the latter outwards, hence the presence of a valve near the latter would not have prevented it.

The bags were both of the same size and shape, and between the same boards. Of course, they had not mixed in the most explosive proportions, nor are likely ever to do so under the circumstances mentioned, otherwise the explosions would have been more violent.

I now determined to investigate the cause of the flame passing into the nozzle; for, without such passage, there could have been no explosion, even if the gases were mixed in the same bag.

The explanation hitherto given of the flame not passing down the nozzle into the mixing chamber, where they are mingled in their most explosive proportions, was that the cooling effect of the nozzle reduced the temperature below the explosive point, similar to the wire gauze in the Davy lamp. I soon found that was wrong, for I could make it snap in the nozzle the moment it was lit, and the nozzle quite cold; or I could entirely prevent it, although the latter was red-hot, by simply having sufficient pressure on the bags.

The explanation is this: the gases must issue from the orifice faster than the flame travels backwards, and then all is safe. Whenever a snap in the nozzle is heard, the pressure is too little, either from being originally so, or from one or both bags being nearly empty, and when the pressure is supported partly by the folds of the bag; also, as the bearing surface gets larger as the bags get flatter, the pressure is distributed over a greater number of square inches, consequently each inch sustains less.

It is from these causes that the pressure of the gas becomes less as the bag gets empty, and they ought to have additional weights placed on them at that time. Cubical bags are more uniform, I think, and hold twice the quantity for the same length, breadth, and height. They can be kept in a box, with a board on the top in the form of a tray, to make it descend horizontally. A bucket of water as a weight is very convenient for such purpose.

The pressure of the gas is easily ascertained by fixing a piece of glass tube tightly into the end of the elastic tubing, and dipping it below the surface of water in a glass vessel, and then turning the tap. The water will be lower in ths tube than in the glass vessel, and the difference shows the extent of pressure of the gas. It should not be lower than four or five inches with coal gas, and five or six with hydrogen. I have burnt it with only two inches, but it is very liable to snap in the nozzle.

When the street gas pressure amounts to two inches of water, it can be burnt direct from the main; but the oxygen pressure must not be more, otherwise it will force the other back into the pipes and put the light out. Burning from the main gives a striking proof of the error of supposing that it is the cooling effect of the nozzle that prevents the flame passing always back; for, if you attempt to burn it when the pressure is under about two inches, it snaps as soon as the explosive proportions are reached every time it is tried.

The size of the nozzle makes a difference. I now generally use a small-sized gun nipple with the flange filed off to prevent a shadow being thrown. It forms a very good jet. It is not half the bore of the ordinary oxyhydrogen blowpipe, and it is almost impossible to make it snap, even with a very low pressure.

With the ordinary orifice, if the nozzle should by chance touch the lime, the velocity of the gas is reduced, and it generally explodes in the mixing chamber, putting, of course, the light out. Or if the taps are only turned on a little, for the purpose of economising gas, then an explosion in the orifice takes place from the same cause; but plenty of pressure tends to prevent all this, and with the small orifice nozzle it is impossible. All fluids pass through a small opening much quicker than through a large one, and there is then a chance of the cooling effect of the nozzle being of service.

For lantern purposes I now always use the small orifice. Of course the light is less, and so is the quantity of gas consumed.

I find a three-feet bag of coal gas requires about eight ounces of chlo-

rate of potash to supply the necessary oxygen. Put into a bag of the same size and shape, and one placed on the other with about forty-eight pounds weight on them, or less, they will give continuous light for upwards of two hours, and no danger of explosions.

It is easy now to understand why my first explosion took place. I took my foot off suddenly; the gas, by its elastic spring, threw the weights beyond their proper place for a moment, the pressure was reduced, and the flame travelled back to the bag. It was a large orifice I was using, and hydrogen gas.—I am, yours, &c., T. S. Reeves.

Exeter, January 18, 1869.

ALCOHOL AND ETHER.

To the Editors.

Gentlemen,—I think it right to correct a misapprehension on the part of your correspondent in India (*vide* Journal January 15, page 26) regarding alcohol.

I never found any difficulty in any part of India or Burmah in getting pure alcohol and rum or arrack 60 o.p. in any quantities. But let him beware of supplying his wants in the way indicated by you. The Excise is differently managed in India to what it is in this country. The making and selling of liquors for a district is let to a contractor *(goottee wallah)*, who will very soon find out any infringement of his patent.

My advice is to make his wants known to said contractor or commissariat officer, who will give or get permission to supply him. In this way I have purchased from a bottle to a hogshead of colourless rum and arrack 60 o.p. at two shillings per gallon.

I believe sulphuric ether is now extensively manufactured in Calcutta, Madras, and Bombay. The Indian Government is very liberal, and when such articles are not procurable otherwise, an indent on payment will always meet with attention.—I am, yours, &c.,

January 11, 1869. A Photo. Wallah since 1846.

INDIA-RUBBER GAUNTLETS AND FINGER-STALLS.

To the Editors.

Gentlemen,—As this subject is rather an important one to those of your readers whose comfort is affected by stained hands, or the use of cyanide in the cleansing of them, I must give an opinion exactly opposed to that expressed by "Oxoniensis" in your last. The old saw about "cats" and "mittens" finds full weight in my mind; but I have always thought how pleasant it would be for puss if she could succeed in finding mittens that, while not interfering with her sport, added to her comfort therein. But to business.

I commenced staining my fingers with silver some eight or nine years since, and was delighted one day to see some India-rubber finger-stalls, which I thought would be a comfortable preventative. I used them many times, but eventually considered that there were so many objections to their use I altogether discarded them.

To begin with: they are a nuisance to put on, requiring much time and more manipulation (and this, as "Oxoniensis" admits, must be repeated after each negative). They fit so tightly *when* on as to often cause pain and swelling of one's fingers. Mine were the ordinary sizes (my "kids" are "7¾"), and I will guarantee that the anxious amateur out for the day will prefer the stains to the stalls after the second plate. Then, as a *finale*, when working with plates as large as 12 × 10 and larger, I invariably found the developer had reached beyond the finger stalls, and all their unpleasantness had been borne for nothing!

For a long time I did my photography without "mittens," but, having determined that my tent as well as a camera should share my summer trip last year, and under the circumstances more than usually objecting to stains, with their necessary accompaniments of cyanide, and probably a hotel or similar supply of water, I thought I would try "gauntlets." I purchased a pair costing 6s. 6d., and although they are probably some three sizes larger than my gloves proper, I was, and continue to be, delighted with their use.

No one but the enthusiastic amateur who works on forgetful of, or unheeding, the amount of cyanide, pumice-stone, and labour his hands will require ere the stains he *must* remove before dinner will leave them—no one but he, I say, can fully appreciate the additional pleasure of easily taking off his "gauntlets" and finding that neither stains, wet, nor even the dark-room effluvia has passed upon them.

I have used them for plates from stereo. to 18 × 16, and (I suppose one is always careful in photography) have not yet had an accident attributable to them; consequently, I strongly recommend them to my brother amateurs, whose thanks will often be sent to me in thought should they adopt India-rubber gauntlets.—I am, yours, &c.,

January 20, 1869. E. Ryman Hall.

Negative Varnish.—Mr. Pearson, of Preston, has sent us for trial a sample bottle of his "crystal negative varnish," which we have tried with care. To use it the negative must be well warmed, when the varnish will dry with a hard and brilliant surface. The film is not only hard but tough, and altogether we believe it will form a fitting compeer to the various excellent photographic varnishes now to be met with in commerce.

MANY MITES FROM MANY MINDS.*

By Edward L. Wilson.

Never use a fixing solution twice, and stir your prints frequently while they are in it, and use warm water in cold weather, for hypo. makes cold water colder; air bubbles forming between the prints in the hypo. cause yellow spots. Wash your prints well in several changes of water after fixing.

Good prints are worth all the effort you can put forth to secure them. If you think photography is a mere mechanical business, and success more dependent upon good luck than careful manipulation, get out of it. You are in the wrong business.

If trouble comes keep cool, and calmly try to find it out and remove it. *Care* saves many a trial and much tribulation. Do not blame your chemicals when you are yourself to blame.

Good chemicals are always true; like clockwork they cannot be reversed in their action and work well.

Never delude yourself with the idea that successful photographers possess secrets which they preserve to themselves. It is a mistake; definition, manipulation, and cleanliness are all important things, but not *all* the important ones; composition, posing, light and shade, and many other things, demand attention.

Do not stop to theorise when careful practice is convincing.

If you get into trouble, it is a waste of time to try to convince yourself, by theoretical disquisitions, that you ought not to be in such condition, but acknowledge the corn, and work yourself out amiably and industriously.

Unsettled collodion, a polluted bath, dust in the camera, knocking the dark slide when the plate is in, sediment in the collodion, all cause transparent spots; opaque spots are caused by using an unfiltered developer, dust falling on the plate while being coated, little bits of dry collodion falling from the lip of the pourer, dust and dirt from the dark slide, and by a profusion of ether and alcohol in the bath.

In an over-exposed plate the shadows have nearly as dense a deposit as the high lights. If under-exposed the picture will be very intense where the light has acted most, and nearly transparent in the shadows. Prints from the former are weak and lack contrast, and from the latter are deficient in detail.

Lines on the plate may be produced at will—zigzag ones by a want of harmony between the bath and collodion; triangles extending from the bottom of the plate upwards by a scum floating on the surface of the bath; dark opaque ones running down from top to bottom by unequal and careless development; turtle-shell lines by too much ether and alcohol in the bath; and curved ones by a too strong developer.

If the collodion presents a mottled appearance it is too thick. Dilute it with a little plain ether.

Poor collodion, dirty glass, pushing the development too far in case of under-exposure, and intensifying a weak image, all create a tendency in the film to peel off when dry.

If the plate is immersed in the bath before the collodion is well set, opaque white marks and streaks will appear at the end of the plate where the collodion was poured off. If the plate is kept out too long, transparent marks will appear at the other end.

Do not keep your paper too long sensitised before printing, or too long after printing before toning. If you do, your prints will remain brown and leathery, and refuse to tone readily. They will act the same way when the toning bath is too alkaline or deficient in gold.

The photographer's first law—be cleanly.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A portable 8 × 6 folding camera, with three double dark slides and view lens, in leather case; an 8½ × 6½ Kinnear camera and binocular camera, with pair of double combination lenses; also, a 13 × 13 copying camera, with four dark slides. Any of the above will be exchanged for a doublet or triplet, or large card lens.—Apply, by letter, to R. M. Small, 44, Stanhope-street, London, N.W.

A complete lime-light apparatus, new, and in good condition, consisting of two slide gasometers (contents four feet each), splendidly got up, with brass slide rods and brass fittings (no weights required); also jets, lime-clock, lantern, with 4½ in. condensers and quarter-plate lens, for enlarging; retort, purifier, and Bunsen burner, for making gas; the whole apparatus is very portable, and will be exchanged for a No. 2B card lens, by Dallmeyer, or other maker of equal repute, a good camera, with sliding front and swing back, and doublet or triplet lens, by Ross, or other good maker. The whole cost upwards of £20. *Carte* of apparatus sent on receipt of stamped directed envelope.—Address, F. Mann, Gas Works, West Hartlepool.

⁂ No exchange notice can be repeated unless paid for as an advertisement.

* *Photographic Mosaics.*

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

Magnus Jackson, Perth—*Portrait of George Condie.*

Wells & Co., Leicester.—*Two Portraits of Rev. W. Woods, late of Leicester.*

R. Paterson, Preston.—*Photograph entitled "The Preston Photographic Almanac."*

Messrs. Pumphrey Brothers, Birmingham—*Photograph of the Moon, taken by Howard Grubb. C.E., with the Great Melbourne Telescope.—A series of Six Pictures, entitled "The Power of Music."*

☞ *Correspondents should never write on both sides of the paper.*

W. H. W.—Your confidence is not misplaced. Proper attention will be given.

R. P. (Preston).—The registration schedule sent by you was informal, but we rectified it by supplying another.

S. S. V.—The loss of light is not so great as you anticipate, nevertheless you may slope your roof to 45°, if its construction otherwise permit of its being done.

CYANIDE IN THE NITRATE BATH.—P. O'CONNOR AND R. VERVEGA.—Our attention has been directed by Mr. O'Connor, of Clonmel, to an extract from our ALMANAC, which has appeared in the *Clonmel Chronicle*—a reply to which he has sent both to that journal and to us for publication. Not knowing, or desiring to know, all the circumstances connected with the correspondence which has appeared relative to this subject, we think it better on the present occasion to make an extract from Mr. O'Connor's letter rather than insert it in its entirety, as it has reference not only to an article in the ALMANAC (that by Mr. Vervega on cyanide in the silver bath), but also to some other remarks which have appeared in our Clonmel contemporary. We should, however, like to have the subject thoroughly discussed, for which purpose we shall "state the case," after which our correspondents, Mr. O'Connor and Mr. Vervega, may treat the subject *pro* and *con*. Referring to Mr. Vervega's article in the ALMANAC, Mr. O'Connor says he considers it that gentleman's duty, "as well as the duty of any other author, to base such statements on absolute principles, in order to render his subject instructive. Mr. Vervega, consequently, should not have omitted to state that cyanide of potassium is a deadly enemy to the collodion sensitising bath, from the great amount of impurity contained in that salt, unless it is boiled in a certain solution and crystallised. It is then added in solution to the bath in small quantities of a certain strength, until a visible alkaline reaction takes place. The bath is then to be sunned and filtered, and made slightly acid with dilute nitric acid. This remedy will not do in all cases of fog, &c.; it will only act serviceably where fog with needle crystals of silver cause the annoyance, and its use in all cases in combination with silver is something to be feared, even in the instance of needle crystals in the bath, which is the only case out of about twenty-four cases of fog where its employment has any chance of success. It is as apt to kill as to cure; and even if it should cure, the bath is difficult to control, and has generally a changeable, exuberant activity, which makes the cure as bad as the disease. Also, the salts of silver in the bath are converted into cyanide of silver, which is of no value for photographic purposes, and can be only used for electroplating." Mr. O'Connor follows by stating the composition and some of the properties of cyanide of potassium, which having been already published in this Journal we need not here repeat; but, after stating that "cyanide of potash" [query potassium ?] is a molten mixture of prussate of potash and carbonate of potash, and that the mixture on cooling becomes white, he adds:—"The very purest of it does not yield more than about from sixty to seventy per cent. of cyanuret, and other samples by different manufacturers not beyond thirty-six. What a suitable companion for a silver bath!" We offer a remark on the foregoing before proceeding further. If it were imperative that no remedy for a disease were published without at the same time a statement of the principles of its action being also published, the world, and the photographic world in particular, would be ignorant of many things of which it is now aware. In photography, more than in anything else, successful practice has been far in advance of lucid theory. First comes the discovery, then the theory or principle on which it is based. Mr. O'Connor knows that in a certain state of physiological disorganisation the swallowing of doses of castor oil may and often does prove a specific; but is it imperative that the person who intimates this fact to another whom he believes to be ignorant of it should accompany it with a declaration of the principle of its action? The knowledge of the fact does not imply the knowledge of the principle of action, although the latter is, doubtless, desirable. Again, and with reference to the concluding observation quoted from his letter: Although a certain body may form a very unsuitable "companion for a silver bath," it by no means follows that it may not prove a medicine for the bath when in a disordered condition. In reply to further inquiries made both by Mr. O'Connor and Mr. Vervega, the history of the cyanide cure, so far as it concerns their purpose, is as follows:—In October, 1861, appeared in a contemporary a statement by Mr. Tulley, of Sheffield (although his name was not then connected with it), to the effect that cyanide of potassium when added to a silver bath disordered from certain causes effected a cure; and in 1865 Mr. Tulley further read a paper on the subject before the Sheffield Photographic Society. In our issues for October 12 and 26, 1866, we published two letters from Mr. Vervega on this same subject; and our issue of October 19, 1866, contained, in a report of a meeting of the South London Photographic Society, a reference to the fact of two pictures, by Mr. Vervega, having been exhibited as specimens of the efficacy of the cyanide cure. Having thus given our Clonmel friends what we believe to be all the historical information they ask for, we are now in a position to hear any further reasons for or against cyanide which they choose to adduce.

JAMES BROWN (Preston).—Our correspondent inquires if any of the "Helion" cotton recently mentioned by Mr. M. Carey Lea can be obtained in this country. Not being ourselves aware whether it can or not, we place the inquiry before our readers.

JOHN COCKCROFT.—Assuming your *carte* to be four inches in size, to enlarge it up to twenty-four inches by means of a lens of four and a-half inches in focus the sensitive plate or paper must be placed thirty-one and a-half inches from the lens.

W. D. H.—The body over the head of your sitter should be opaque; one or two trials will determine its best position. We have no practical acquaintance with the subject of the best material for, and construction of, backgrounds. Dealers now supply these things at far less cost than that at which you could make them for yourself. Your query concerning lenses is answered in our remarks to "E. J. H."

RSADW—W.—1. Both lenses being alike in focus and size of stop, the single lens will act more quickly than the portrait combination.—2. A drop or two of a six-grain solution of bromide of potassium added to the developer restrains fogging. We presume you allude to alkaline development.—3. Possibly, by trying another sample of coffee, the slight fogging complained of will be found to disappear.

W. N. D.—1. We were not aware that a lantern such as you describe cost so much. We purpose having one made in the course of next month, and shall be much surprised if it cost over half the amount you mention. We have carefully studied the optical principle of its construction, and believe it will prove a useful and effective instrument.—2. There must have been some exceptional circumstances connected with the selling of the apparatus, for in our own experience fair prices are usually obtained when they are in good condition.

E. J. H.—The lenses which you will find best for your stereoscopic camera, for such subjects as those you mention, are quarter-plate portrait combinations. It will prove of much use to you if the front lenses are adapted for being used alone. The most useful landscape lens for your larger-sized camera is one of about nine or ten inches focus. Several advantages arise from having a swing back, and, in consequence, we advise you to have your camera constructed with it. It costs a little more than the rigid instrument, but its utility is worth all the extra expense.

GEO. PORTEOUS.—You will see in *Punch* of the present week a very good drawing of the two-wheel or French velocipede. That much-revered gentleman is seen riding on one and his dog "Toby" on another. Admitting the ease and elegance of these instruments for locomotion, we still think (without, however, having made a trial) that a photographer desirous of carrying a tolerably large tent and camera would find a "three-wheeler" most convenient. For rapid travelling, without such baggage, the French form would undoubtedly prove to be the best.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, Yor Street, Covent Garden, London, W.C.**

SOCIETY OF ARTS.—On Wednesday evening last Mr. Samuel Highley delivered a lecture before the above Society *On Photography and the Magic Lantern, applied to the Teaching of History.* The lecture we shall have occasion to refer to again. At its close several beautifully-coloured pictures were exhibited by means of the lantern; but, owing to some defect or want of adjustment in the instrument, the success of the exhibition was marred by the want of brilliancy and steadiness in the illumination. Mr. Highley explained that this arose in consequence of his not having had an opportunity of previously adjusting the lantern.

APPLICATION FOR NEW PATENT.

January 8, 1869.—"Improved Method of Exhibiting *Cartes* or other Portraits or Pictures. No. 58."—THOMAS PALMER LUCAS, GEORGE H. JOSEPH HOLT.

METEOROLOGICAL REPORT.

For the Week ending January 20th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Jan. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
14	29·86	47	34	34	36	ESE	0·13	Dull
15	29 58	51	34	46	47	SW	0·15	Rain
16	30·13	53	38	39	40	WSW	—	Fine
18	30·40	45	38	39	41	SSE	—	Fog
19	30 48	44	39	41	43	SSE	—	Fine
20	30·38	43	30	31	34	SSE	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 456. Vol. XVI.—JANUARY 29, 1869.

SUGGESTIVE EXPERIMENTS WITH AMMONIACAL SILVER SOLUTIONS.

As the action of ammonia and ammoniacal compounds on silver salts is now attracting a considerable share of attention, we return to the subject this week for the purpose of giving a synopsis of some old experiments of ours on the action of different argento-ammoniacal compounds on albumen, as these experiments will serve to demonstrate that variation in properties which we referred to last week as being easily observable between the various compounds of silver and ammonia.

Three solutions were employed in our experiments.—1. *Ammonio-nitrate of silver* prepared by dissolving eighty grains of nitrate of silver in half-an-ounce of water, and then dropping in strong "liquor ammoniæ" until the oxide first thrown down was *almost* redissolved. The solution was then diluted up to one ounce with water and filtered.—2. *A solution of oxide of silver in nitrate of ammonia*, prepared by precipitating the oxide of silver from eighty grains of the nitrate by dissolving the latter in a little water and adding thirty ounces of fresh lime water. The oxide so precipitated was allowed to settle, and the solution drained away as completely as possible. The moist precipitate was then placed in a measure, and solid nitrate of ammonia thrown in until perfect solution of the oxide was effected; the liquid was then diluted to one ounce.—3. *Oxide of silver* was prepared as before, and then a small quantity of strong "liquor ammoniæ" dropped in and the mixture well agitated, care being taken not to add sufficient ammonia to wholly dissolve the oxide of silver; the solution was then filtered off.

In the following experiments ordinary white of egg was employed which had been beaten up with its own volume of water, and then strained. A saturated solution of hyposulphite of soda was used in each case. It is well known that when a little of this white-of-egg solution is added to an ordinary eighty-grain nitrate of silver bath, perfectly neutral or even slightly alkaline, a coagulum is produced which only partially dissolves when treated with a large excess of hyposulphite solution, and when the silver solution has been previously diluted with its own volume of water a considerable residue still remains

1. *Ammonio-Nitrate of Silver.*—A small quantity of white of egg was added to the silver solution; the resulting bulky white precipitate, when treated with hyposulphite of soda, only partially dissolved. The residue did not consist of a distinct coagulum, but was finely divided and rendered the liquid as turbid as milk, thus differing essentially in quantity and character from that produced by nitrate of silver *minus* ammonia. The original silver solution was now diluted with its own bulk of water. On treatment with albumen the precipitate was much smaller in quantity than in the previous instance, and was completely soluble in hyposulphite of soda, with the production of a clear solution.

2. *Solution of Oxide of Silver in Nitrate of Ammonia.*—When white of egg was added to the silver solution a white, curdy precipitate was produced; this, on treatment with hyposulphite of soda, gave a bulky residue, essentially different in character and greater in quantity than that obtained in the first set of experiments, but less than that afforded by plain nitrate of silver. The solution of the silver salt was now diluted with its own volume of water; on the addition of white of egg a precipitate was produced, partially soluble in hyposulphite of soda, the residue not being materially less in quantity than that obtained in the last experiment. Further dilution with water failed to render the compound resulting from treating the solution with albumen completely soluble in hyposulphite of soda, a considerable turbidity being always observed. We thus see that a well-marked difference exists between the action of the ammonio-nitrate solution on albumen and that of the solution of oxide of silver in nitrate of ammonia on the same body under precisely similar circumstances.

3. *Oxide of Silver in Ammonia.*—To a portion of the liquid white of egg was added. This caused no precipitate, or even cloudiness; but, on pouring in hyposulphite of soda, the mixture *at once gelatinised* on agitation and became white, but was *quite insoluble in large excess of hyposulphite of soda.* To some of the silver solution acetic acid was now added, so as to incompletely neutralise the ammonia. On the addition of albumen a faint cloud was produced; but on pouring in hyposulphite the mixture again almost gelatinised and became white.

It should be added that in all the above experiments similar quantities of materials were used, so that the results are all directly comparable.

Our design being to leave these facts for the consideration of our readers, we shall now offer but very few comments. We should expect, *à priori*, that the same experimental results would have been obtained with the ammonio-nitrate of silver solution as with that of oxide of silver in nitrate of ammonia; yet we find that this is not the case—the latter solution appearing to act much more energetically upon the albumen, coagulating it easily even when the solution was considerably lessened in strength. Setting aside other considerations, we have here an explanation of the superior brilliancy of prints obtained on paper sensitised with a weak bath of the silver oxide in nitrate of ammonia as compared with a bath of the same strength of plain nitrate of silver or of ammonio-nitrate of silver. Marked as the difference was observed to be between the ammonio-nitrate and solution of oxide of silver in nitrate of ammonia, it is much greater between either of these liquids and the simple solution of oxide of silver in a minimum of plain ammonia. In the latter case white of egg produces scarcely any precipitate, but on adding hyposulphite of soda a dense coagulum is formed insoluble in excess of the reagent. It is probable that the hyposulphite of soda acts here purely mechanically, as many saline liquids have the power of precipitating certain albumenous compounds from solution; but the singular point in the experiment under consideration is that the hyposulphite, even when present in considerable excess, appears to have no solvent action on this precipitate.

We shall now leave the subject with our readers, and shall be glad, indeed, if our remarks attract increased attention to a subject which possesses so much practical interest.

MR. McLACHLAN'S PROCESS.

We are glad to be able to place upon record, as we do this week, the results of Mr. Winstanley's experiments connected with Mr. McLachlan's well-known process; and, in doing so, we would take

the opportunity of disclaiming any intention of even appearing to detract from anything useful or real in the mode of preparing the nitrate of silver bath proposed by Mr. McLachlan.

In the article which we devoted to the then interesting subject, we specially pointed out that advantages were gained by adopting the treatment recommended, which advantages, however, we also showed could be secured by very much more simple means. Mr. Winstanley's carefully-conducted experiments fully bear out the opinion we originally expressed, that the useful statements of Mr. McLachlan were so thoroughly mixed up with the useless and inaccurate that it was extremely difficult to assign the fair meed of credit for a genuine step in advance.

Now that Mr. Winstanley appears to have fully taken up the subject, we hope that he will prosecute his inquiries, and aid in bringing into suitable prominence any features of the process which at present lie hidden.

THE LATE SIR WILLIAM J. NEWTON.

We have to record the decease of Sir William John Newton, who died on the 23rd instant, aged eighty-four years.

Some years ago the name of this artist was familiar to photographers, especially to the *habitués* of the Photographic Society of London, of which body he was Vice-President for several years after its organisation. In that capacity he regularly attended the meetings, occupying the chair on many occasions, and taking part in the discussions.

In the first year of the Society's existence he advocated the obtaining of a certain kind of artistic effect by putting the subject slightly out of focus, and thus lowering the sharpness. In that controversy—for such was the phase it assumed between the artists and the men of science in the Society—Mr. Shadbolt was the representative of the latter, and Sir William Newton that of the former, class.

Sir William Newton was one of those who set up a strong opposition to the claims of Mr. Fox Talbot to be the inventor of the calotype process; and he was equally strong in his advocacy of the claims of the Rev. J. B. Reade (the present respected Vice-President of the London Photographic Society) to be considered the inventor of practical photography. He experimented much with development printing of positives, and contributed several papers on this and other practical subjects. One of his papers, *On the Arrangement of the Sitter in Portraiture*, published in 1857, contained some valuable suggestions, which, even at the present time, cannot fail of being useful. No object, he said, could be taken *within* six feet from the lens, or it would appear distorted; the general distance should be from ten to twenty feet, which, for figures, would be more harmonious. If the point of sight be *near*, and the subject be a figure *standing*, the appearance would be as if standing on tiptoe; therefore, it required great care and judgment in selecting the *point of distance* for every subject, in order to obviate this evil. And, further: if the figure be standing upon a *dais* from one to two feet high, the effect is much more agreeable; indeed, whether the figure be standing or sitting, it is always better that the subject should be placed in an elevated position with reference to the lens, to be regulated according to the distance. This was the practice of all portrait painters, the reason being that the head appeared more raised from the shoulders (which is more elegant); whereas, if the lens be so placed as to point downwards on the head of the subject, it gave the appearance (especially if *near)* as if the head were buried in the shoulders, which is always ugly and vulgar with respect to portraiture.

We have given the foregoing as a sample of the good and practical suggestions offered to photographers in the days when the art was young.

Sir William Newton was born in 1785, and having at an early age gained a high reputation as a miniature painter, he afterwards was appointed painter in ordinary to Her Majesty. He was knighted in 1837, on the recommendation of Viscount Melbourne, then prime minister. Several years since he ceased to take an active interest in practical photography; indeed, his great age precluded its possibility.

MR. FRY'S METHOD OF MASKING.

During the few months that have elapsed since Mr. Fry published his "new method of masking," a good deal has been said in reference to that subject. The idea has been pronounced by some to be "admirable," by others to be "efficacious," and again by others to be "ingenious."

A transparent positive—the mask used in the new method—is, or ought to be, when the term is used without qualification, exactly the reverse, so far as light and shade are concerned, of the negative from which it was taken; as thus:—Any absolute blacks in the negative are represented by untainted whites, or rather by glass of uncontaminated purity in the positive; whilst, on the other hand, the clear glass representing the deepest shadows in the negative gives us perfect blacks in the positive, if there are to be any perfect blacks at all. Supposing all the gradations of shade, ranging from perfectly clear glass to what we call complete opacity, to be represented by figures beginning at 0 and ending at 10, then shade No. 5, which is exactly between clear glass and the dense deposit, will in the positive be represented by the same shade, the sum of which two together gives us No. 10, or absolute density. No. 9 in the negative gives us No. 1 in the positive; No. 8, No. 2; No. 7, No. 3; and so on in each instance, the sum of the two figures being equal to 10.

If now we place together a negative and a transparent positive, with their corresponding parts coinciding, it follows that the depth of shade produced by this combination is equal to No. 10 or absolute opacity, through which we shall not be able to produce any impression whatever in any reasonable time; and even were an impression produced, it would be exactly the same in every portion of the paper, and precisely the same effect would be obtained by giving that sheet a momentary exposure to diffused daylight, without the use of either the negative or the positive. If, then, in the proposed method a properly-exposed, a fully-developed, and an exactly-balanced positive is to be used, no result whatever can, under the circumstances indicated, be produced by its aid which could not be more easily and more conveniently produced without it.

The writer does not remember to have read in any description of the new method of masking that any other than a perfect transparency was to be used. If, however, such is to be the case, what is the particular variety of technical imperfection required to produce the result in view? An under-exposed transparency, *i.e.*, one in which the first 6 or 7 shades of the negative are represented by the last 6 or 7 in the positive, whilst the shades 8, 9, and 10 of the former are alike represented by zero in the latter, will certainly give us, when used in the manner indicated, an accession in density of the tones 8 and 9 of the original negative without increasing the tint produced by the shades 0 to 7, thereby giving a similar result to what would be obtained if a softer negative had been used. I do not remember, however, to have read that this under-exposure is necessary, and, if it be, then the proposed means of improving the results obtained from dense negatives depends for its efficacy upon an ill-defined and possibly uncontrollable variety of error. Supposing, however, that the transparency required is to have every shade of the original negative represented by the inverse *half*-shade, *i.e.*, No. 9 in the one to be given as 0·5 in the other—*i.e.*, No. 1, the inverse ÷ 2—and No. 5 by 2·5, then the resulting sums of density in the combination of positive and negative will, when compared with those of the negative alone, stand thus:—

Original Negative.	Combination.
0	5
1	5·5
2	6·0
3	6.5
4	7·0
5	7·5
6	8·0
7	8·5
8	9·0
9	9·5
10	10·0

Reducing these figures again to a scale terminating in zero instead of 10, we have the highest shade as 5, which is tantamount to having a negative of half the strength of the original, and which will consequently give, but with longer exposure a much softer and, at the same time, a properly-balanced result, which an under-exposed positive would never do.

Thus employed, the new means of masking would prove useful for printing from over-intensified negatives, but, to my thinking, not otherwise; and even in this case the "dodge," it seems to me, involves a necessity for more skill in its employment than is needed to produce a negative which will give satisfactory results without any manipulation to remedy so unworkmanlike a defect as over-intensication. D. Winstanley.

"SPIRITUAL" PHOTOGRAPHY.

In 1862 or 1863—the exact time is immaterial—Dr. Walker, of Edinburgh, exhibited at a meeting of the Photographic Society of Scotland some *carte* photographs which he had received from America, and which purported to be "spirit photographs;" that is to say, when a certain person sat for his portrait, on developing the image a second figure was found to be brought to light under the action of the developer, and this second figure was supposed to be that of some departed friend who had been visible to the eye of the camera, although not to that of the photographer or sitter.

A few evenings ago we were present at a crowded semi-scientific, but mixed, meeting, composed of anthropologists, students of mental and natural philosophy, spiritualists and materialists, who had met in conference to discuss the question—Is there any other hypothesis than that of *spiritualism* by which the phenomena or manifestations usually associated with that subject can be explained? The discussion was opened by a well-known gentleman whose profession it is to examine witnesses and address juries, and his auditory included all classes and conditions in society from noble lords downwards. What arguments *pro* and *con* were put forward, or what was said or done, we need not stay to inquire, but must hurry on the reader to a another meeting, after which we shall sum up.

At the last meeting of the South London Photographic Society, in the course of a somewhat desultory conversation on the best method of cleaning glass plates for negatives, Mr. Sebastian Davis stated, as the result of his experience, that an image was often so deeply impressed in the glass, after the removal of the collodion film, that the cleaning of the surface of the plate, even with nitric acid, failed to effect a complete removal of the picture, which will often make its appearance when the plate is again used for receiving another picture.

Having stated thus much, we are in a better position to discuss the subject of spirit photographs.

When we saw those referred to as being in the possession of Dr. Walker, we believed that they were produced in consequence of imperfectly-cleaned plates. The secondary or spirit image could not possibly be said to be a likeness of any person; it was too indistinct for that. The conclusion at which we arrived was that which every photographer at the present day would entertain.

The subject of spirit photographs, it is proper to observe, was only incidentally mentioned at the conference to which we have just alluded; it was not discussed in any way. These photographs, which, merely for the sake of convenience and apart altogether from their alleged origin, we shall designate as "spirit photographs," may be obtained in a variety of ways.

In the first place, they may be caused by the resuscitation of an image which previously existed on the same plate, but which had since been cleaned off. Now, there are certain kinds of glass and certain peculiarities of their surface which are highly favourable to the retention and subsequent redevelopment of an old picture. A soft, colourless French glass, which at one time was much used for covering Daguerreotypes and glass positives, seemed to possess a fatal facility for retaining an image. If the picture were washed off, and the plate were only cleaned by means of whiting and water, the ghostal image of the former subject would be almost certain to "put in an appearance" when the new subject came to be developed.

There is, also, a certain condition of the chemicals favourable to the production of the "spirit photograph." If the collodion be colourless, and the silver bath on the verge of giving foggy pictures, it will be found that the deposition of silver by the developer will be more influenced by the state of the surface of the glass plate than when the conditions are such as to render fogging more difficult if not impossible. Witness, for example, those markings made by the cloth used in cleaning the plate. Invisible to the eye, showing no "sign," even if breathed upon, when the plate has been sensitised and developed they appear with startling and annoying distinctness. We have, with chemicals in this delicately-poised condition, successfully developed one of the thermographic images of M. Moser, formed by heating a glass plate when another body, such as a shilling, was placed upon it. The consideration of the above appears to us to form an explanation of the existence of those "spirit photographs" which we have seen.

We are assuming perfect honesty on the part of the photographer; but, if he were at all skilful and desirous of cheating, it would be the easiest matter imaginable for him to cause any number of "spirit" pictures to appear in the finished picture. To do this, it is only necessary that either before or after the exposure in the camera the figure which it is sought to be made to appear should be printed on the iodised plate from a transparency with an opaque ground. An exposure to the light of a candle or gas flame for a few seconds suffices to produce the image. In this way we once, to the profound amazement of a clerical friend, took a portrait of him which, when developed in his own presence, showed him supported on the right by the *Apollo Belvidere*, and on the left by the *Greek Slave*.

That there was a trick in it *somewhere* our friend did not entertain a doubt, but, notwithstanding all his theological acumen, he failed to discover it. The object we had in view was to give him a practical illustration of the fallacies of an assertion he, in the course of a sermon, had made, to the effect that the powers of the photographer were limited to the representation merely of that which was presented before his camera. As his statement had been made with more self-sufficiency than his very rudimentary knowledge of photography warranted him in indulging in, the method thus adopted to convince him that it was unsafe to enter the pulpit with no more stock-in-trade for illustrations than was obtained from a popular cyclopædia was quite satisfactory, and, in order that the cure might be permanent, we refrained from enlightening him as to the means employed.

Some time ago a photographer near Manchester (Mr. Whitham, of Littleborough) had a lens which might, in the hands of a charlatan, and in a country in which faith was placed in spirit photographs, have realised a fortune for its possessor. By its means photographs of "the double" were occasionally obtained. On the ground glass one image alone was visible, but in the finished negative a second and fainter image was seen standing alongside of the primary figure, the secondary image being the exact counterpart of the principal one. The subject was so interesting that, agreeably with our request, Mr. Whitham sent us the lens for the purpose of examining it. If we remember aright, the conclusion arrived at was that, in consequence of some peculiarity or defect in annealing one of the discs of glass of which the lens was formed, coupled with an alteration in the density of the lens by the excessive pressure of the screwed ring by which it was retained in its cell, double refraction had been induced. To one who wished to make capital out of the *Doppel Ganger*, a doubly-refracting lens of this kind would prove a boon.

What we have written will, we trust, point to a reasonable, a chemical, and an optical source of the so-called "spirit photographs." In addition to those we have ourselves produced, we have seen altogether about a dozen alleged "genuine" productions, all of which were referable to one or other of the causes we have indicated; and we submit the foregoing as our contribution to the elucidation of the question which, as we stated, was under discussion at an assembly at which even one of the authors of the Atkinson and Martineau correspondence did not seem to consider himself out of place, viz.:—"Is there any other hypothesis than that of spiritualism by which the phenomena usually associated with that subject can be explained?" And we sum up by saying that, from the photo-spirit point of view, *there is*.

ON THE IMPORTANCE OF A FEW OF THE LEADING PRINCIPLES OF THE ART OF DRAWING, AND THEIR BEARING ON PHOTOGRAPHY.*

There are books innumerable published on the different departments of the art of drawing; but there are, as yet, very few that have been written expressly for the guidance of the photographer. What I bring before you tonight is a careful selection of what I conceive to be the most useful principles in the treatment of photographic subjects in general.

To all concerned in the prosecution of this subject, there are two works in particular that I would recommend every photographer to obtain and study, viz., Rowbotham *On the Art of Sketching*, and Frank Howard's *Sketcher's Manual*. From these works I have taken several illustrations, which will be explained in due course. These two alone, so far as the principles of drawing are concerned, are sufficient to educate and store the mind for landscape work. In addition to these I shall give a little of my own experience in portraiture. On both subjects I am desirous to bring forward such opinions as will most likely produce some discussion; and I crave your kind forbearance when I touch on what I conceive to be abuses of art or errors in judgment of treatment.

I need not say in this Society (where every one knows more or less the importance of selecting one view of an object before another) how necessary it is that careful arrangement be made in order to secure the best effect. Were it nothing but the many beautiful impressions from the camera which have now come before us from several of our members, we must be convinced of the superiority of such works as have been taken under the influence of intelligence and good taste over those that have not.

* Read at a meeting of the Edinburgh Photographic Society, Nov. 18, 1868.

Of course nothing can be done in photography without good chemicals and careful manipulation; but as the former can be purchased, and the latter now comparatively be easily acquired, there can be but little credit taken for what may be produced, if all the consideration be only that of placing the camera before the centre of view, focussing, and developing. Viewing the object or scene carefully, waiting for the best quality of light, knowing how much is to be embraced, and especially where the *forte* points which give expression to the scene are to be rendered, is something to be cultivated, and must be carefully considered. Study of art is most essential for the photographer as well as for the draughtsman, if he would take the place of an artist. And I would say, further, that in order to pursue his profession with success he must ardently love it for what it can bring within his reach—not merely for money, but wealth of thought and feeling. Without the love of nature art will never be properly pursued. In proportion as the mind's eye, as well as the external eye, is cultivated so will the enjoyment from nature be heightened. Shakespeare found "sermons in stones, books in running brooks, and good in everything." The highest aim of art is not merely to please, or even instruct, but to lead to the contemplation of the beautiful and good. In the pursuit of art you will at once perceive the importance of any one forming an attachment to it—of weighing well what department in it he is fitted for, and most likely to follow; for, among the many, there will only be one in which he will excel. An interesting query is suggested here, from the extraordinary enthusiasm that is exhibited by some in the pursuit of knowledge, viz., whether the reason of so many of our greatest men in Art remaining in single blessedness be not the fact that they have been too early wooed to it by a charm, which, as it grew, has blinded them to regard it as stronger than that of woman's.

It is to be feared that photography has suffered much from a false love—that of making fortunes; for it was not the fault of the discovery in itself, but from its cheapness and the ease with which the formula could be gone through, that Tom, Dick, and Harry took to it; consequently, vice in art never made greater strides than it did upon the commencement of photography. The tricks and contrivances of producing effects of relief, and also of colour, apart from the impression, have been most degrading. There is no wonder that those who were following the profession conscientiously, and endeavouring to excel, what between these abuses, very low prices, and other discouragements, have been forced in many cases to relinquish their efforts, and even pander to popular, but ignorant, notions of art.

From this state of things it was also not to be wondered at, that the sun of miniature painting set very rapidly. It is most sad to witness now the entrance room of the Royal Academy in London, which formerly (not more than twenty years ago) was filled with this kind of art—work from the hands of the most highly-cultivated minds—now only represented by one or two faithful followers, but for whom the art would entirely become extinct. All sympathy and help to those still clinging to the wreck! for we fear they are only now to be regarded as the last of a noble crew of a noble ship.

Now that photography aims to take the place of such a department of art, and even a still higher department—that of composition figure subjects, where considerable æsthetical power is exercised—we can never hope to see that fully realised and sustained, until the work from first to last not only manifests itself to have come from the hands of good photographers, but also thorough artists, such as Lake Price, Robinson, Rejlander, and others of our own countrymen have proved themselves to be. Such knowledge of arrangement and treatment of effects as they have evinced, would do honour to any academy of fine art.

But to proceed. Let us consider what constitutes a picture.

"Is it not always a picture that comes from the camera?" is a question that naturally arises in the mind of the uneducated in art. From the apparent fulness and perfection of the impression, the mind, never having been brought in contact with, or rather wrought upon by, the beauties of nature, or, it may be, incapable of seeing them, of course never feels them in representation. Again: a person may be so content with mere matter of fact that he may be dead, as it were, to all sense of what a fact may suggest, when properly treated. To handle a thing and to look at it are two different things. It is not what things are in themselves, but what they appear to be, and what they suggest, that is the sphere of art. The former is the sphere of science. These distinguishing characteristics are of the greatest importance in enforcing the study of the picturesque. It is not the most minute resemblance or transcript of a tree, rock, or burn, from which we may have taken an impression by the camera, that constitutes that. Respecting minuteness, it may far excel a work of the hand, but possessing that so completely, unless effects of light are taken advantage of, it may give importance to everything alike, and very likely importance to the most grotesque forms, that thrust themselves upon the sight. If there be no charm felt that makes us go again and again to a scene, then it is because we have not been able to apprehend its constituent loveliness, or it has not presented to us such elements of attractiveness essential for art to build upon.

It is delightful to hear the expressions of admiration that a beautiful afternoon or evening commands, when great breadth of light and shade is upon the scene; but not less commanding is the power that is manifest by putting that same scene again upon canvas, and that, it may be, from a few outlines made upon the spot. Fine sensibility, intelligence, and experience can only do this.

My definition, then, of a picture is, not a representation of objects standing equally apart, or equally effective—nor is it, as is often done by glass houses alone, having the light so diffused over the whole subject, that the results present no indication of the source of it; but it is an object, or company of objects, so rendered that the most interesting, the most beautiful, the most expressive, will predominate, and that according to their value and importance, so that, by fine distribution and play of light, the source of it is distinctly felt, repeating, as it were, by echo, the forms which gave them out; and being thus bound together all the parts appear in harmony, producing the very ideas and feelings the artist intended to convey.

To be able to produce this with the camera at all times and under all circumstances is not to be expected; but it is wonderful how very little—even a part of an object—may constitute a picture when one is able intelligently to apprehend and properly direct it.

Full pictorial effects of nature, particularly over large surfaces, is very rare; especially in composition and effects of light and shade it is seldom fully united. These are generally to be found only in parts of a scene, and the expression of nature in landscapes, being liable to change according to circumstances, particularly under showery weather, that it is only by sketches, and a good memory, that the spirit of a scene is to any extent realised by the painter. If anything be worth securing by the camera, surely it is such effects. It is comparatively seldom that we see clouds or their shadows fleeting over the face of hills, secured in our photographic impressions. We have seen, however, magnificent effects of sunlight both from sea and land; and who does not hail these as far transcending the tame effects which are produced from cloudless skies or by slow processes! We can never say we are masters in photography until instantaneous effects are more in our power; for, it is through these, in a great measure, that we are likely to succeed in getting the completeness of nature—at least in point of effect. It is through chemistry, or some fine mechanical appliance, *within the camera* that we may hope to see this brought fully within our grasp.

In composition many painters take great liberties with distances, particularly middle distances. One does not like to question the judgment of such a man as Turner, but, certainly, whatever his motive has been, he did not scruple much when dealing with this department. Some will say we would never have had such conceptions but for the play of his imagination here. All very true; but the question may still remain—Which rendering is best, not to speak of being truest? The great danger in such liberties being taken is that of over-doing them, so that when one visits any spot, especially having historical interest connected with it, he is likely to feel very much disappointed.

It is well that the photographer cannot take such liberties even by any position which he can take. It is in the foreground that he is likely to be untrue, by introducing objects too near the camera. In this he will have to exercise great care and judgment, for while he cannot place a tree here and a stone there to suit his taste, yet he can move his camera, giving a new centre to his view, as is seen by all the parts converging; and so, by a right knowledge of composition, letting the place suggest the most agreeable construction to which he would wish to conform it.

Still-life objects—a portrait or a group, any object which you can traverse—are entirely within the power of the photographer. It is not so much the want of capacity in the means, but the exercise of the means in an artful manner, that is the great desideratum for constituting pictures by the camera.

I shall now first call your attention to some of the elementary principles that are more or less common in the construction of any picture, noticing some things in particular, in the art of perspective, which, by improper direction, may be exaggerated by the camera.

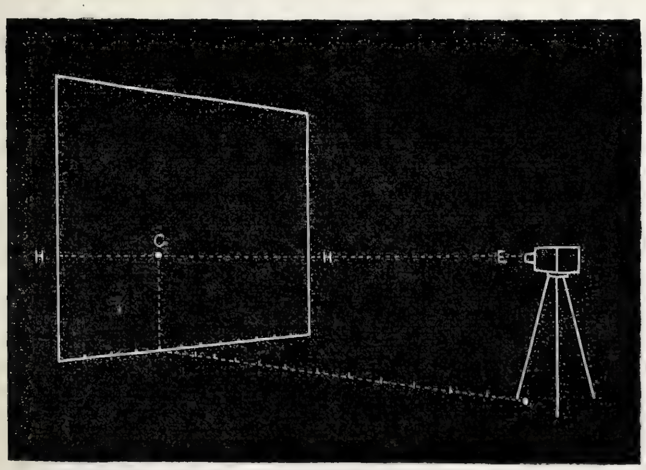
Proceeding, then, to work, the first thing to be considered is, when a landscape is the subject, how much of the scene is to be included in the view (for the full limit of the lens should not be embraced, as I shall shortly show). Then the next is, whether the shape or bounds of the picture which most becomes the subject should be constructed

with the greatest length lying in a horizontal or vertical position. There must always be one side longer than another. This is indicated by having drawn on the focussing glass a few lines in both directions of certain proportions. The relative bearing of such lines is of the greatest importance, for much of the expression of the picture depends upon the boundaries. There are a great variety of sizes—some originated by mere taste and the regulation of the eye; others from the claims and necessities of the subject. But there is one form which I would strongly recommend, and to which I would like to see all shapes more or less approximating. It is governed by a most simple rule, and at any size agreeable—I mean the length of the longest boundary line, or length of the picture, determined by the diagonal of the square of the shortest line, or breadth of the picture. This relative bearing of length and breadth I would recommend for every cell in the slide of a landscape camera, but particularly for the line to be cut for mounting. This proportion will generally be found to be most applicable to landscapes when used in a vertical form.

Another good proportion is three parts to five, or twelve by seven, inches. This is specially suitable for subjects of a more lengthy character, but to be used only horizontally, and having the horizon considerably lower than one-half of the picture, if the subject be flat and extensive. In choosing a subject, you determine in your mind whether it should be treated in a vertical or horizontal form. The photographer has a great advantage over the draughtsman for determining this, the boundary line being easily discovered by the aid of the focussing glass. The sketcher frequently uses a small frame of certain proportions, being cut out of a small card, which he carries for aiding him in selecting subjects, and at once determines the boundaries by looking through it between himself and the object—no more being taken in than that which falls within the radius of the eye, without shifting the head. This quantity is easily regulated by a very simple method, which, if applicable to the artist, may be very helpful to the photographer, in determining how much of the subject should be embraced.

In fixing the base line or bottom boundary of the picture to be taken, this line should never be at a distance nearer (whatever farther) than twelve paces from the point of sight—that is, the spot where the artist or camera stands. I generally prefer it much further. However, having made at the very least that number of paces, a conspicuous mark, such as a white handkerchief or hat, is then laid. This is to stand as the centre of view. The sketcher then paces on both sides of that six yards and marks them also, which is to constitute the extremity or corners of the base line. Applying the bottom of his small frame to these points as he looks through it from the point of sight, he sees all the parts that are prominent in the picture. Watching and weighing well the relative bearing or distances of these from the boundary lines, one or two principal marks are made on his paper, which guide him in filling up the rest of the work. See diagram No. 1.

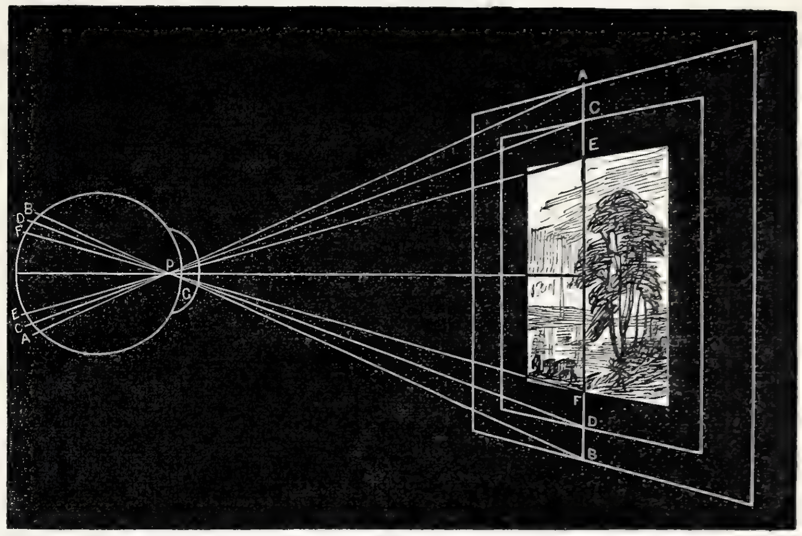
Diagram No. 1.



Although the camera does everything for the photographer in the way of drawing, and, keeping all the lines in perspective, rendering it apparently unnecessary for him to study that department of art, yet he must never forget that perspective may be overrated with the lens as well as by the eye, seeing that it all depends upon the judgment that is exercised in taking the station point, or point of sight (the situation of the camera); but by keeping in recollection that simple method of calculating the distance (of twelve paces at least) from where you would wish the picture to begin, and making the base line of the scene of the same dimensions, you can seldom go wrong, because the field of view taken in by that is within an angle of 60°, the largest that should ever be taken in fixing the position of the eye with reference to any object to be drawn or photographed without exaggeration.

But, in order that this be thoroughly understood, as I conceive it to be of great importance from the many shortcomings of it that we witness in the work, especially of beginners, arising either from not feeling any apparent defect, or not being in circumstances—that is, not having range enough between the camera and the object to accomplish it without exaggeration—those who have felt these exaggerations and closely examined the cause of them are prepared for all that I may say on this part of my subject, and they must bear with me when I endeavour to bring these elements down to the greatest simplicity. Very few who take to photography as a pastime are as much taken up with the pictorial production as they are with the chemical, consequently they take no thought of the defects of perspective, and it may be long, if ever, before they will think of them unless they are directed. See diagram No. 2. I have here represented a section of

Diagram No. 2.



the eye and different extents of plane of view (in perspective), in order to let you see the lines determine the boundary line of the size that is best. We take a vertical-shaped picture in place of a horizontal, as the angle that I wish to point out is better seen by it. A B represents a field that could not be seen well without moving the head, as you see from the visual ray A A and B B, that passes into the retina. C D represents a field still beyond easy access without moving the head, at least objects lying in the immediate foreground would be much too acute in perspective (such as will be seen in Diagram No. 3, next to be explained). E F represents a field the proper quantity, *i.e.*, within an angle of 60° with the axis of the eye. You will understand, then, from this, that according to the distance of the eye or camera from the plane of the scene to be represented, a certain angle should embrace the view; the longer the vertical line is—that is, the distance from your eye, or the lens to the object—the narrower will the angle be, and consequently embrace less. The shorter the vertical line is—that is, the nearer the eye or camera is to the object—the wider will be the angle, and consequently embrace more. The farther you are from the object the truer does it appear; the nearer you are the more the perspective becomes exaggerated, and, therefore, appears false.

I trust I have said sufficient on this subject as the basis of a most important discussion (for those who may wish to take advantage of it) relating to the question—When is truth in representation best realised? Some may question all that I have said regarding exaggerations in perspective, they may say—Are they not facts, because we see them, and why not represent them? I may be told that careful drawings have been made with the eye, and yet all that I complain of as to exaggeration is just as prominent in them as any photograph that might be found fault with. My answer to all this is—I admit that exaggerations are derived from the object being seen in that aspect, either by the eye or camera—I admit also that we should draw and photograph to appearances and not as the object is really in itself. But as to the question—When is truth in representation best realised, or (as artists are in the habit of calling it) the truths of appearances best rendered?—certainly it is when we are impressed by representations as we feel the truths of nature stand in true relation to one

another, and that is, I maintain, when the principle regarding taking a sufficiently long station point or distance from the plane of view is carefully considered.

All that I have said regarding defects of viewing the object too nearly, relates not merely to landscape or architecture, but also to portraiture. Perhaps they are a little more apparent in the latter, frequently arising from want of accommodation. Hence the importance of long ranges of distance from the sitter; and in all cases when large impressions of nine inches and upwards are required, they should be taken from a well-defined quarter-plate-sized negative.

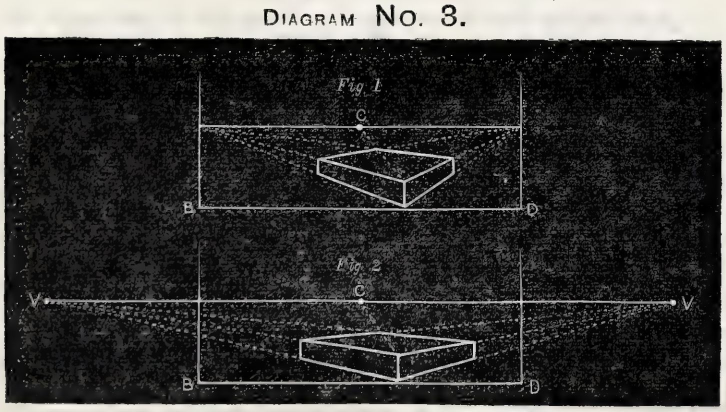
Having made use of several technicalities, I am led now to explain them. This part of my subject may be considered unnecessary, seeing that the more absolutely practical part to be understood has already been taken up. Indeed, I would encourage every photographer to make some study of them as they are explained in Rowbotham's little work *On Sketching from Nature.* That study would go far to facilitate the right direction of the camera, and also an intelligence would be imparted that would give great value to the criticism on photographic works.

To understand the use and operation of certain technicalities that I have employed, or may yet employ, you must imagine them as they operate between yourself and the object in nature. I could illustrate them by the operation of the lens and camera alone; but then I fear, that not being simple enough, the mind would not sufficiently apprehend them.

Suppose then, that you had never seen a camera, and on your being brought to a scene in nature, or any object having lines receding in it—such as architecture, or an individual seated and reclining—that between you and any of these objects a large sheet of glass (equal in size to the distance from it to where you were to view it) was erected perpendicular to the ground on which it was resting and that level—divest yourself of the fact that it is a real scene, and imagine that it is a picture with a glass over it. When once the illusion was realised, suppose you were able to reach it from the spot where you were standing, you would feel no difficulty in being able to trace all the lines that pass through it, and with a little white or black paint you could leave your tracings on the glass, forming a transcript of the scene. This plane, then, whether real or supposed, is called the vertical plane. You have it in the focussing glass of the camera, or its impression. The draughtsman has no such instrument. In his case this plane is only supposed. It is called the vertical plane, or plane of picture, in contradistinction to the plane of view, which is horizontal, and therefore called the horizontal plane. A straight line, then, drawn from the eye or camera, *i.e.* (the point of sight) perpendicular to this vertical plane, is called the vertical line, because when used in working out a drawing it stands in a vertical position.

It is on this vertical line, as seen in diagram No. 1 from E to C, that the perspective of objects, especially in the foreground, depend for being truly rendered. Although I have mentioned twelve paces from where the camera is to be placed from the plane of view (to be photographed), yet I would not confine myself to that. In some subjects—such as buildings that are large in their features, and requiring considerable range to embrace all that is seen at an angle of 60°, or even in portraiture which is often attempted near hand—then I go farther back, because in such, the mouldings, features, and limbs, rapidly go out of proportion, especially when an effort is made to make the picture large. When I wish such subjects treated with the perspective quiet, the vertical line must necessarily be long.

Diagram No. 3.



Here in diagram No. 3 (illustrated by Rowbotham) we have two objects exhibited under the drawing of different lengths of vertical lines.

In *fig.* 1 we have a block of stone distant from the camera only one-half of the length of plane of view or picture (that is, comparing it with the number of paces I have given, viz., twelve). The distance here, from C the centre of view to the boundary of the picture (where the vanishing points are), is only six paces, consequently you see the result—the perspective is much exaggerated; the nearest corner appears to be drawn out towards the spectator.

In *fig.* 2, we have the block distant the whole length of the plane of view or picture from the centre of view on each side to the vanishing points V V, equal to the twelve paces (as recommended), and it appears at once to be perfectly true.

By after bounding the plane of view at its base (as I described before, that is, finding the length of the plane of view, and going back with the camera a corresponding length), the photographer will find the marks or objects laid on the ground at the base line of the scene most useful guides in cutting the print for mounting.

As to how the vanishing points V V on the horizontal line are found, I shall explain hereafter. Norman Macbeth.

(To be continued).

MR. McLACHLAN AND THE COLLODION PROCESS.

No one will have forgotten the immense excitement which prevailed in photographic circles during the early portion of last year, when Mr. McLachlan, of Manchester, made the announcement that he had reduced the practice of the collodion process not only to an absolute certainty, but that he was able to produce what was generally considered to be a fabulously large number of negatives out of a comparatively trivial amount of nitrate of silver, and had, moreover, ascertained beyond a doubt the real nature of the change which took place when a film of iodide or bromo-iodide of silver was exposed to the action of light.

Those who have read with attention manuals of photography such as those of Messrs. Hardwich (of England), and Charles Waldack and Dr. Towler (of the United States), and have subsequently bestowed equal attention upon the majority of such articles on the chemistry of photography as have appeared in the photographic journals from time to time, must, it seems to the writer, have acquired an amount of information on that subject quite sufficient to enable them to carry on the collodion process, if not with absolute and unerring certainty, at least without fear of any sudden and incurable attack of those photographic ills known as "fogging," "pinholes" "comets," "lines in the direction of the dip," "marblings," and so on. Indeed, with a good light, good apparatus, and a liberal supply of commercially-pure chemicals, the collodion process ought to be, in the hands of a well-read and careful operator, one of very considerable certainty.

Still, however, there are few, even among the best of photographers, who would assert with Mr. McLachlan that they could *produce and dispel at will* "lines in the direction of the dip," "brain marblings," and so on; hence one great source of interest in the announcement which that gentleman made. Again: the bath prepared according to the method adopted by him was to remain in perfect working order almost to the last drop—another item increasing that interest. Moreover, so large a number as 400 perfect half-plate negatives were to be produced from a solution containing only two ounces of nitrate of silver. We can scarcely say that the collodion process is one which necessitates a large expenditure of nitrate of silver, still the figures here given are so obviously different from those with which our ideas of what is possible are associated, that this statement also added to the interest which Mr. McLachlan had created. But greater still than this was the declaration that the subtle influences of nature which held together the molecules of iodide of silver had at length been traced to their deep-seated stronghold, and compelled to take their place in the classification of science.

After it had been published that such a discovery had been made, and when the promise had been given that the details would shortly be divulged, expectation stood on tiptoe, and anticipation strained every nerve to become possessed of the wonderful secret even before its possessor should let it go. About this time permanganate of potash—which, if I mistake not, had already been frequently proposed (in the trade circulars of photographic dealers) as a means of clearing a discoloured printing bath—was brought upon the carpet, and received an amount of attention which seems to have enrolled it as one of the standard remedies for a disordered bath. When at length Mr. McLachlan made a partial disclosure of his scheme at a meeting of the London Photographic Society an almost general disappointment was the result. Photographers had expected that some almost unheard-of substance, with a name of perhaps thirty sylla-

bles, would have been introduced into the silver bath, as panaceas are introduced into the stomach, with the effect the said panaceas are asserted to have of curing every imaginable variety of complaint. When, however, the great step towards the desired end was declared to consist in exposing the silver bath to the action of solar light, the idea was met on the one hand by incredulity, and on the other by many varieties of "explanations," amongst which may be mentioned the suggestions of the formation of oxides of chlorine, and the unusually pure state of the silver produced. Expressions of derision and a feeling of amusement on the part of photographers and others seem to have been the prevailing result.

To some extent, however, the tables are now turning. Mr. Dawson (if I mistake not) in the pages of a contemporary journal, a few weeks ago, mentions some experiments he has made with a sample of the purest of pure nitrate of silver, with which it is stated he obtained very satisfactory results when the bath was even in an alkaline condition. I think, however, the gentleman alluded to forgot to give the credit of the alkaline bath to Mr. McLachlan, to whom I am of opinion this suggestion is entirely due. From the proceedings of one of the American photographic societies it would appear that the subject has been receiving attention there, and that experiments which have been made have resulted in a satisfactory manner. A perusal of these facts would, one would think, prove gratifying to Mr. McLachlan; but I understand he has abandoned entirely the perusal of photographic literature since his kindly-intentioned but scarcely methodical disclosure of his ideas and experiences in connection with the collodion process.

I must confess that I myself could scarcely see in what way we might reasonably anticipate such unbounded success (after reading the details of the disclosure). Still, however, I had had opportunities in abundance of becoming acquainted with the extent to which Mr. McLachlan excelled in his practice of the collodion process. That gentleman's acknowledged and regretted want of acquaintance with chemical science caused his expressions to assume an intangible and almost incomprehensible form to chemical minds. In a conversation I had with him, shortly after his return from London after the meeting of the Photographic Society, he mentioned several things to me in language which was, on the other hand, perfectly plain and quite unmistakable, amongst which was that iodide of silver alone is so altered by the action of light as to become readily soluble in nitric acid. As the chemical terminology used by our friend had been found to have a meaning in many instances peculiarly his own, I asked him what he meant by iodide of silver. He replied the sediment which was deposited upon the addition of a solution of iodide of potassium to another solution of nitrate of silver. I asked if either of these two substances was to be used greatly in excess of its combining quantity with the other. His reply was that the nitrate of silver was to be, but only slightly, in excess. He further stated that the resulting precipitate was to be tolerably well washed by decantation, and exposed, with occasional agitation beneath the surface of distilled water, to the direct action of the solar rays, and that the iodide of silver which had been thus treated would be found to be perfectly soluble in nitric acid. I asked him what he meant by "soluble," telling him that the element iodine was perfectly "soluble" in water, but was by comparison with other substances spoken of as an "almost insoluble" material, inasmuch as water is only capable of taking up one-seven-thousandth part of its own weight of this body. He stated that the actinised iodide was as freely soluble in nitric acid as nitrate of silver was in water. So far there was something definite to work upon, and I accordingly commenced to experiment.

I took two similar eight-ounce stoppered bottles, both of which had been perfectly and carefully cleaned, and introduced into each sixty grains of pure nitrate of silver, which was then dissolved in two ounces of distilled water. To each of these solutions fifty-five grains of iodide of potassium were added, and the contents well shaken until the reaction between the substances named became complete. The precipitate in each bottle was washed, by decantation, in fourteen changes of distilled water. All these operations were conducted in the "dark room," in the yellow light of which the volume, the colour, and the granularity of both precipitates appeared exactly identical. One bottle was then carefully folded in an ample quantity of brown paper, and, after being sealed, was locked up in a cupboard. The other was placed upon a shelf outside a south window and exposed for three weeks to the burning sun of the past summer.

During this time it was agitated several times a day in order that as large an amount as possible might be subjected to the solar action. After this period of time, which Mr. McLachlan stated was longer than necessary, both the bottles were again taken into the "dark room," the brown paper removed from the covered one, and their contents compared. The exposed sample was very decidedly darker in colour than the one which had been retained in darkness, and, when both were agitated simultaneously with the four ounces of water which each bottle contained, the exposed precipitate subsided with much greater rapidity than the other, and appeared to occupy eventually but about one-half its bulk. The water in each bottle was then carefully decanted from the precipitate, and replaced in each case by one fluid ounce of chemically-pure nitric acid.

The contents of each bottle were again agitated, and the precipitates allowed to subside, after which the volume of each was compared with a mark which indicated its amount after subsidence and before the addition of nitric acid. No diminution whatever was apparent in either, from which it would appear either that the experiment had not been conducted according to the method adopted by Mr. McLachlan, or that that gentleman was in error in supposing the actinised iodide to possess the amount of solubility previously indicated. The contents of that bottle which had been exposed to light were then carefully introduced into a chemically-clean flask, and heated to the point of ebullition, after which the whole was allowed to cool to the temperature of the surrounding air, when, although a diminution of the precipitate still did not appear to have taken place, it had lost its dark colour, and appeared now, so far as colour was concerned, identical with the unexposed portion, which was subjected to similar treatment as to heating, &c.

A piece of chemically-clean platinum foil, having a superficial area of eight square inches, had then ten drops of the pure nitric acid used poured upon it, which was evaporated by a gentle heat, and the platinum ignited to bright redness. Upon removal from the flame no trace whatever of saline matter was visible upon its surface, showing that the nitric acid used contained none in solution. A similar quantity of the nitric acid which had acted upon the unexposed iodide was then carefully decanted from the bottle and dropped upon the platinum foil, which, after evaporation and ignition, presented a slight but distinctly visible stain. The platinum foil was again rendered perfectly clean, and ten drops of the clear acid from above the surface of the exposed precipitate were then dropped upon it, when the processes of evaporation and ignition were again proceeded with as before. In this instance a much more decided stain resulted, apparently about three times as great in quantity as that obtained in the former case. I ought to mention that the nitric acid referred to was perfectly transparent and colourless. A four-ounce stoppered bottle containing a few grains of moist iodide of silver, which had been prepared and exposed by Mr. McLachlan, was treated with about half-an-ounce of the pure nitric acid used in the foregoing experiments. In this instance, after a few moments' agitation, the acid was perceived to have a decided tinge of brown colour, and yielded, after evaporation and ignition on the platinum foil in the same quantity as before, quite as decided a precipitate, although the amount of acid used, in proportion to the amount of iodide acted on, was enormously greater.

From these experiments, it seems to me, one of three things is to be deduced, which are—Firstly, that the exposure of iodide of silver to the action of light does not result in its being rendered, to any mentionable extent, soluble in nitric acid; or secondly, that the directions given by Mr. McLachlan to bring about this solubility were not sufficiently explicit; or thirdly, that the small quantities used in his own experiment of exposure, &c., were contaminated with some amount of accidental impurity, introduced either by the use of impure chemicals or by an insufficient appreciation of the niceties required in analytical chemical manipulation. From the exquisite beauty and perfectness of the negatives obtained by Mr. McLachlan, and from the ease and certainty with which these results are produced by him, together with the admission by Mr. Dawson and one of the American photographic societies of the successful use of the alkaline nitrate of silver bath, I conclude that Mr. McLachlan is really in possession of some valuable knowledge in connection with the use of photographic chemicals; and I am sure that if he were met with more consideration and less ridicule he would willingly place the information he possesses, to the best of his ability, at the disposal of us all.

David Winstanley.

ELECTROTYPING AND ELECTROPLATING.

No. V.

When the amateur in electroplating has made himself familiar with the afore-mentioned elementary principles of copper deposition, and is able to overcome the various difficulties which present themselves, he may advance a step farther, and find himself in the midst of a process which besets him on all sides with vagaries, and instances of refractory deposition peculiar only to itself.

That process is the depositing of copper on iron and steel. The reason why it is so difficult to deposit copper on iron in different conditions is because it decomposes copper in its various solutions, and throws it down in the shape of a black powder, so preventing adhesion and regular deposit. To prevent this decomposition it is necessary to cover the surface (and the surface only is sufficient) with a coating of metal which, electrically considered, is not repulsive to copper or decomposed by the iron.

There are several methods of accomplishing this. Perhaps you will say—Why not blacklead the surface? If that surface will serve in other instances, why not in this? You will remember that in the introduction to my articles on *Electrotyping and Electroplating* I told you I should dispense with all explanation which involved the aid and intricacies of chemistry to bring about their solution, so that you must be satisfied with knowing that it would not do.

The relation between iron and copper, when viewed in their metallic state, is very different to their relation when viewed in their chemical and electrical state; and the more you see of the action of these two metals together (one in solution), I am pursuaded the more you will be induced to think with me that the magnetic influence (of which iron possesses the most) has more to do with the decomposition of the copper solution than electroplaters as a general rule give it credit for. It must be an influence peculiar to itself in more than one sense of the word, because if a thin slip of iron or steel be immersed in a solution of copper, it is immediately blackened, and the copper is thrown down in powder, and all this without the aid or impulse of electricity as derived from the battery. It must not be taken for granted that it is impossible to deposit copper on iron prepared with blacklead; that would be going too far, and saying too much. It can be, and very frequently is, done; but the quality of the deposited metal is not nearly so good as that obtained by the proper process, and this proper process constitutes with professional men different trade "dodges." Each has his different mode of preparing the surface of the iron, and each his own theory respecting the metallic base which is deposited on the iron to receive the copper deposit; and it shows an intimate acquaintance with the details of the art to be able to select a base which will destroy or prevent the magnetic influence which is created when iron is brought into connection with copper in solution.

If, then, you have an article composed of iron which you wish to copperplate, either for the purpose of retaining it in its copperplated condition or as the intermediate coating between the iron and a coat of silver, you must, in the first place, go over the surface of the iron with a piece of fine emery paper to remove any irregularity of surface, or must then place it in a solution (boiling) of potash and water, and brush it well to remove grease.

Now to the under side of the object or any convenient or out-of-the-way spot attach the plating-wire—that is, the wire proceeding from the zinc of the battery—and by that means suspend it in a solution of nitrate of copper, which may be prepared as described in my former article on copperplating, stopping the process, however, when the copper is dissolved in the nitric acid without evaporating. You have now a strong acid solution which acts energetically on metal. If the article be large, and it is not convenient to prepare a quantity of the solution large enough to dip it, the solution may be brushed on the surface with a soft brush well charged with the solution. The dipping process is the most certain and satisfactory; but if the brushing be done well the result is just the same.

You will perceive that when the nitrate solution comes in contact with the iron the copper is deposited on it in a thin film. You must continue dipping until you are assured it has received a good coating, then place it under the tap and allow a plentiful stream to pour over it. You have now a film of copper on the iron, but a very unstable one. The superficial coating is not sufficient to prevent the local action of the sulphate solution (to which it will be subjected further on), so that the film of copper already on the iron requires to be fixed, which is effected by another salt of copper, the chloride. After you have well washed the copper film, lightly *brush* over the coppered parts a solution of chloride of copper—which is made in the same manner as the nitrate, with the substitution of hydrochloric or muriatic acid for nitric—place it in a warm situation, when the copper will very sparingly dissolve. When the acid is saturated decant the clear solution, with which solution go over the coppered parts, when the film will by this means become fixed, with the addition of a further deposit of copper obtained from the chloride solution. Immediately after every application you must dip the article into water to remove all traces of the acid, or it will eat through the previously-formed film and decompose itself by its action on the iron, which is the sole reason why the nitrate solution is used first to deposit a preparatory film of copper on the iron. You must repeat this process—nitrate solution, washing, chloride solution, washing—until you judge you have a sufficiently thick coating, when the wire may be connected with the battery, the article placed in the ordinary sulphate solution, and the process will go on satisfactorily.

Here ends my article on copperplating—a phase of the art replete with troubles, but which amply repay you for the trouble expended in surmounting them. Pay attention to the details of this process to better fit you to properly understand my next communication, which will treat of *Silverplating*, as an intimate acquaintance with copperplating is necessary; because, in the majority of cases, a copper base is deposited on the various articles previous to depositing the silver. NON SAPIENS.

IMPROVEMENT IN FINISHING PICTURES.

AMONG the most recent American patents is one granted to Mrs. Sarah A. L. Hardinge, artist, 57, Fleet-street, Brooklyn, for a method of finishing pictures. Very beautiful and charming effects are said to be produced, and the improvement promises to have an extensive introduction, as it may be employed by any artist with entire success.

The patentee states as follows in the specification:—

THIS invention consists in the employment, in combination with the surfaces of photographic prints, lithographic prints, woodcut prints, engravings, and all kinds of pictures, whether upon paper or other material, of a translucent sheet or film such as wax, upon which film the inks or pigments used in colouring or finishing the picture are laid. In carrying out my invention I take any ordinary print or picture—as, for example, a photographic print—and upon the face thereof I place a sheet of ordinary white wax, sufficiently thin to be so translucent that, when the wax is in close contact with the picture, the principal outlines thereof can be discerned through the wax. I then carefully press the wax film into close contact with the surface of the picture, either by hard pressure or by means of a roller, or by passing the picture through a roller press or other suitable press. In order to apply the necessary pressure I cover the surface of the wax with fine paper. The application of suitable pressure serves to harden and condense the wax, making an excellent surface for the reception of inks and colours.

The translucent film of wax thus applied will adhere very closely to the surface of the picture, which is then to be finished up by laying upon the film any suitable inks or colours that may be desired for the finishing of the picture, such as oil colours, water colours, India ink, &c.

One of the peculiar advantages of my improvement is that the harsher lines and defects of the picture are more or less covered or softened, while the general effects of the lights and shades are blended and improved. This renders the use of my invention specially advantageous in connection with miniature colouring, as the skilled artist is enabled to preserve completely the original likeness, and yet with a comparatively small expenditure of time to produce the most charming and exquisite effects by stippling and colouring.

The facility with which the background of the picture may be altered, lightened when too dark by the application of white colours, or darkened with dark colours when too light, or otherwise artistically changed, will be obvious. Alterations and corrections in the picture may also be readily effected. In case of accidental injury to the surface of the picture, it may be easily repaired and preserved. The border of the translucent film may be embossed with any suitable ornamental composition.

In other examples, where the picture consists of a profile or other naked figure, the semi-translucent material, after being applied upon the surface of the picture, may be traced with a needle or pointed instrument around the form of the profile, and all of the film except that directly upon the profile may be removed, and the edges of the film then levelled down to the background. In this way the film-covered portion of the picture, when coloured up and finished, will appear to stand out in relief, forming a medallion picture of very beautiful appearance.

In the general use of my improvement the artist is enabled to produce accurate, lifelike colours and effects with a facility which results from no other process with which I am acquainted.

The use of the film herein described serves also to prevent the original picture from fading, and to preserve it from injury, from moisture, and from atmospheric changes.

Buy the best camera-boxes and the best lenses you can afford, and keep them clean and in good order. They are the cheapest.

Keep the dust out of your camera; your lenses clear; wipe the dark slide out often; keep your ground glass in place when not exposing, and your lens capped or covered.

Do not waste your money on every process adventurer that comes along. The most successful photographers are producing their results by well-known formulæ. Why spend your money for those you know nothing about? Ask your journal first.—*Photo. Mosaics.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 3rd........	North London	Myddelton Hall, Islington.
„ 3rd........	Edinburgh......................	Hall, 5, St. Andrew-square.
„ 4th........	Glasgow	Andersonian University.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Memorial Hall, Albert-square, on the evening of the 14th instant,—Wm. Tudor Mabley, Esq., Vice-President, in the chair.

The minutes of the previous meeting having been confirmed, Mr. R. Hampson was elected a member of the Society.

The Chairman then requested Mr. Winstanley to proceed with his experiments on the production of artificial light.

Mr. Winstanley (who was seated behind a table, on which was arrayed his new apparatus for the production of artificial light) then rose and explained the arrangement to the members. He said that every one who had attended the first few of a course of lectures on elementary chemistry would be familiar with the intensely brilliant and beautiful light emitted during the combustion of the element phosphorous in a jar of oxygen gas. They would also have observed that this light had its intensity gradually diminished as the amount of oxygen in the jar became less, and gradually obscured as the amount of phosphoric acid by which it was surrounded increased. He said it had occurred to him, some years ago, that if these objections were removed and the phosphoric light maintained at its brilliancy, it might be utilised both for general illuminating and for photographic purposes. The apparatus before them, he said, was intended to afford the means of producing at will, and maintaining at pleasure, this particular variety of artificial light; and he had no doubt that they would agree with him, before the evening was over, that it was not far from answering the purpose for which it was intended. [During the time the speaker was making these remarks, the blue flame of a Bunsen's burner played about beneath the phosphoric apparatus, from the upper part of which bright flashes of flame, accompanied by wreaths of white smoke, occasionally made their appearance.] He said that the amount of heat required to evolve the phosphorus vapour at a sufficient tension to afford a continuous light was more than the Bunsen lamp beneath was capable of affording; but he had found that if a stream of carburetted hydrogen gas were caused to pass into the chamber containing the vaporised metalloid, this vapour and gas would become associated together, and would pass out from the jet provided for that purpose in a continuous and burning stream. He (Mr. Winstanley) then turned on a tap affording the required stream of gas, whereupon the light immediately became continuous. He said this light, though brilliant, was very inferior to what resulted when pure oxygen was used to aid the combustion. A stream of this gas was then caused to mingle with the flame, whereupon its brightness was enormously augmented, and the ample room in which the experiment was conducted became brilliantly illuminated, much to the satisfaction of the members, who made demonstrations of their approval. He (Mr. Winstanley) said simple as the apparatus might appear to be, the mechanical difficulties which had to be overcome in its construction were considerable, and had it not been for the skill and kindness of their old friend Mr. Noton (who had constructed the arrangement before them, and to whom he offered his sincere thanks), he feared he should not have been able to appear that evening to perform the experiment they had witnessed. He said between that time and the next meeting of the Society he intended to try if he could not illuminate an interior so as to photograph it with groups of figures by the aid of this light, and, in the event of his being able to do so, he intended to perform that experiment at the forthcoming *soirée* of that Society.

The Chairman said he quite believed, from the brightness of the light and its diffusive nature, that such an experiment would be attended with success.

Mr. Atherton and other gentlemen expressed their belief in the accuracy of the Chairman's opinion.

The Secretary said he thought the flame itself was not as bright as the heated portion of the disc in the lime light, but he considered that the amount of illumination afforded was decidedly greater.

Mr. Winstanley remarked that that idea was in accordance with his own—that the flame in no individual part was so bright as the ignited cake of lime, but from its enormously large area, when compared with that used in the Drummond light, he considered it superior to that as a source of artificial light. The large size of the flame would, however, be an objection to the use of the light for what were known as "optical purposes." There were also one or two sources of danger to which he would direct attention at some future time.

The Chairman stated he had great pleasure in proposing a vote of thanks to Mr. Winstanley for bringing the matter before them, and he was sure that that vote would be carried with acclamation, which was accordingly done.

In answer to a question from a member,

Mr. Noton said he had seen the paragraph alluded to in The British Journal of Photography, for the 18th December last, at page 601. He was very glad to see that one eminent photographer approved of such a simple mode of operation to get some of the iodide out of an overcharged bath without such an enormous dilution with water as had been prescribed over and over again. It was also very satisfactory to find the Editors of The British Journal of Photography now designating the process as "a most effective mode," and that "its simplicity will recommend it to every photographer," &c. He had also seen Mr. A. L. Henderson's communication to the Editors of The British Journal of Photography of the 24th December, noticing the mode employed by Mr. R. Manners Gordon, and differing from him. Mr. Henderson could not have tried the experiment at all, or there was no iodide of silver in the solution of nitrate of silver he used. Mr. R. Manners Gordon's reply to Mr. A. L. Henderson, in The British Journal of Photography for the 1st Jan., 1869, had not escaped notice; and the interesting fact that Mr. M. Carey Lea had introduced the same order of proceeding in his new *Manual of Photography* showed that another first-rate chemist and manipulator was convinced of the utility of it. Perhaps it may not now be considered hasty or premature to draw the attention of all who feel interested in such matters to a short paper read at a meeting of the Manchester Photographic Society on the 10th of May, 1866, and which was published in The British Journal of Photography for the 25th of May following; but it would be necessary to see the Journals of the 1st and 8th of June, in reference to a "printer's error" in the last two lines of the paper, which was afterwards amply explained by the Editors at page 277 of the last-mentioned number.

Mr. Noton laid upon the table a "metallic" self-adjusting carrier for lantern pictures, capable of taking in any size of mount, varying from three and a-quarter to three and three-quarter inches in breadth, and said that at the next monthly meeting he would have a drawing and description ready for publication.

The Chairman announced that *soirée* and art-union tickets could be obtained on application to Mr. Jones, at the Memorial Hall.

The members then adjourned to the committee-room, where the trial and selection of lantern pictures for exhibition at the *soirée* took place.

Correspondence.

Foreign.

Paris, January 25, 1869.

I have just received the lithographed regulations of the proposed Photographic Exhibition of which I wrote in a recent letter. The Exhibition is "got up" by the French Photographic Society, the regulations are framed by it, and the circulars are issued from that body. The administrative committee of the Society wish to give to this Exhibition all the interest and all the importance possible, and appeal to all practical and amateur photographers to give it their strong and earnest support. They beg also that all who have any intention of exhibiting would let their wishes be known *at once*, and the amount of space they will require. The committee cannot insist too much upon this point, as all the preparations have to be made in so short a time. The committee also call particular attention to the necessity of sending with every photograph full particulars as to the subject and the special process employed in its production. These particulars should be accompanied by a number, which shall correspond with that on the photograph. The object of the latter clause is to prevent all confusion, and of the former to enable the committee to issue a complete and useful catalogue. All demands for admission must be addressed to M. Laulerie, 9, Rue Cadet, Paris, before the 15th of March, but the committee hope that exhibitors will not delay sending in their demands till the last day.

This Exhibition is to be held in the Palais de l'Industrie, in the Champs Elysees, and at the same time as the exhibition of paintings. The Exhibition will be open on the 1st of May, and close on the 31st of July, being open for three months.

Now, in order that British photographers may judge whether it is worth their while to exhibit, I will give the rules, which must regulate all exhibitors:—

1. The Exhibition shall open May 1, 1869.
2. The Exhibition shall close July 31, 1869.
3. All demands for space must be sent in before March 15, 1869.
4. All objects for exhibition must be sent *carriage paid*, addressed to M. Laulerie, Porte No. 1, au Palais de l'Industrie, Champs Elysees, Paris, between the 1st and 10th of April. *None received after.*
5. These objects should be advised to M. Laulerie, and a list sent signed by the sender. A list also should be sent *with* the package.
6. All photographs should be framed.
7. Foreign exhibitors are advised to send their pictures *unframed* to their agent in Paris, and request him to get them framed here, to avoid expense of carriage. Photographers doing this must request their agent to send the framed pictures to M. Laulerie, at the Palais de l'In-

dustrie, *before the* 10*th of April.* If foreign exhibitors have no agent in Paris they can send their unframed pictures, and all the information respecting them, *carriage paid*, to M. Laulerie, Secretary to the French Photographic Society, 9, Rue Cadet, Paris. M. Laulerie engages to have such photographs carefully and economically framed at the exhibitor's expense; but insists that they must reach him from the 1st to the 5th of April, *not later.* Photographers who employ their own agents here should *also* advise M. Laulerie, 9, Rue Cadet, Paris, of what they have sent for exhibition, and to whom it is sent.

8. No pictures are admitted which have been previously exhibited at the exhibitions of the French Photographic Society.

9. Exhibitors should put their names on their pictures, or upon the mounts or frames where several pictures are shown together, but it is *expressly prohibited to place above or inside the frames any inscription which by its size or composition shall present the appearance of a business advertisement.*

10. It is required that the name of each subject shall be given upon it, and a short account of the negative process employed, such as wet or dry collodion, waxed or plain paper, &c. All other information, as to the mode of operating, &c., will be received with pleasure.

11. *No mention of price* must be seen on pictures or their frames. Exhibitors who wish to dispose of their productions should send full particulars to M. Laulerie, who will inform the public when asked.

12. No picture shall be withdrawn before the close of the Exhibition, even if it should be prolonged beyond the end of July.

13. All works sent for exhibition will be submitted to a jury for admission. (The Committee of the French Photographic Society has not thought it necessary to limit beforehand, in a general manner, the number of pictures which shall be allowed to each exhibitor, but it advises exhibitors to facilitate the labours of the above-named jury by making a judicious choice themselves of their pictures, especially if they be portraits and *carte-de-visite* photographs.)

14. The French Photographic Society takes upon itself *all general expenses* of the organisation of this Exhibition, with the following few exceptions:—

A. Exhibitors shall pay a fixed rate of 10 francs (8s.) per mètre of surface occupied by their productions. B. Those who require anything special, in the way of a table, glass case for enamels, &c., stereoscopes, &c., shall pay at the same rate calculated upon *all the sides* of such "installation," and this "installation," whatever it may be, shall be made at the expense of the exhibitors. Moreover, exhibitors requiring these special attentions must arrange matters with M. Laulerie *before the* 1*st of April.* C. Exhibitors *must pay, before the* 31*st of March, one-half* of their wall space and other expenses, calculated from the space *they* applied for. The remainder must be paid for between the 15th and 25th of April, calculated according to the space *accorded by the jury of admission.* D. If the amount paid before the 31st of March is found to be too much, the surplus will be returned. E. In case of non-payment by any exhibitor, the Committee reserve to themselves the right of retaining the objects exhibited, which will then become the property of the French Photographic Society. F. Supposing an exhibitor withdraws his support, and does not send his pictures after their admission by the jury, the money he has advanced shall be placed to the credit of the Society.

15. All objects exhibited must be taken away within one week of the close of the Exhibition.

I suppose there are very few persons who exhibit at exhibitions of any kind for the sake of exhibiting, or more familiarly speaking, for the "fun of the thing." Everyone expects to get something by exhibiting, either in honour or profit. Generally speaking, I fancy most exhibitors "go in" for both as much as possible. In the Exhibition of 1869 I note there is *no mention* of awards for merit, and there *is* a special mention that "no tradespeople are allowed," for no advertisement in any guise is tolerated, and no prices are to be attached to the objects for sale. I presume, however, no objection will be made to the affixing of a ticket upon such objects, with these words, "For sale," or in French, "*à vendre.*" Probably the object of these regulations is to give a "fine art" character to the photographic exhibition, as it is to be held in conjunction with the exhibition of paintings, which takes place every year in the Palais de l'Industrie; for no one ever sees trade announcements on paintings, although I believe I have seen many ticketed at fabulously high prices. Foreign exhibitors who incline to send their productions with this understanding will be obliged, however, to pay for the privilege, the carriage to Paris and back, the cost of frames, the cost of wall space, and installation. How much would that be per square yard of plain frame from London, say—

Carriage to Paris	8 shillings.
Wall space..	8 ,,
Carriage to London	8 ,,

or 24s. per square yard, without contingent expenses. Of course the exhibitors' names will appear in the official catalogue, with an account of their productions; and we correspondents of photographic and other journals will be criticising all the productions, and that should be better than any medal or prize award. Did not the pictures of Adam-Salomon become famous before the jury awarded the author the silver medal? Does not this prove that honest criticism is worth more than honourable mentions? for if the silver medal had been all that had been gained by M. Salomon, he might not have been much heard of beyond the boundary of Paris. All photographers, therefore, who see it thus, and who do not mind expense and trouble, must make haste and get their productions ready; for they have only two months to do them in, and those months are not favourable for photographic operations in England. If your correspondent can render any service *through the pages of this Journal*, he will be very glad if he be able to do so.

I would suggest, for special objects for exhibition here, all photo-engraving, photolithographic and photo. printing in pigments, all styles of vitro-enamel photographs, transparent photographs for lantern, instantaneous transparencies for the stereoscope, views of the Holy Land and the East, &c. (when *well done)*, English landscape photography, the *finest* portraiture, with and without retouching. If anything be sent, let it be first class and new, and not the old things which have done duty in 1867 and at other times. R. J. Fowler.

Home.

ALCOHOL AND ETHER.

To the Editors.

Gentlemen,—I observe that in a recent number you state how to make alcohol and ether.

Although the article appeared to be intended for those residing abroad, there are some points in it which may safely be discussed by those who reside under what you term the "excellent and wholesome" Excise regulations with which we are favoured, although in what respect they are either "excellent" or "wholesome" I, for one, am at a loss to know. The heavy duties on alcoholic liquors do *not* prevent drunkenness, if we are to believe the Lord Provost (Chambers) of Edinburgh, who is at present engaged in a tour through the dens of Paris, and who reports that in Scotland, with all its restrictions, its religion, and its general advantages, there is *very much more* drunkenness than in Paris, where intoxicating liquors are so low in price. But to my subject.

I observe that you recommend chloride of calcium, carbonate of potash, and lime as suitable bodies for mixing with the alcohol when it is desired to strengthen it. Now from my own experience—and I do not mind confessing that since I read your article I have tried the making of alcohol (merely by way of amusement and experiment) sufficiently often to enable me to have a certain amount of "experience" with the process—I find that no amount of distillation will cause the alcohol to be obtained of the highest strength unless one or other of these substances be mixed with it.

There is a difference, however, between them. For photographic collodion any of them will answer sufficiently well; but for purposes where absolute purity is required, the best substance to mix with the spirit is quicklime. If chloride of calcium be used, it is, I believe, in danger of forming a compound with the alcohol.

With reference to the process of concentrating the alcohol by means of a bladder, the way you propose is quite good, and is that which has for many years been employed by varnish makers, French smugglers, and others. Professor Graham (of the Mint) has proposed the following method (which is ingenious and effective, although slow) of strengthening alcohol:—

A large, shallow basin is covered, to a small depth, with recently-burnt quicklime in coarse powder, and a smaller basin containing a few ounces of the spirit to be strengthened is made to rest upon the lime. The whole is now placed under the low receiver of an air-pump, and the exhaustion continued until the alcohol evince signs of ebullition. Of the mingled vapours of alcohol and water which now fill the receiver, the quicklime is capable of uniting with the aqueous only, which is therefore rapidly withdrawn, while the alcohol vapour is unaffected; and, as water cannot remain in the alcohol as long as the superincumbent atmosphere is devoid of moisture, more aqueous vapour rises, which is likewise abstracted by the lime, and thus the process goes on till the whole of the water in the alcohol is removed.

This process, as I have said, is ingenious and effective, but is too slow. For obtaining anhydrous alcohol, there is no method that equals that of distillation from the quicklime. Last week, by way of experiment only, I made from the cheapest treacle that could be procured about a quart of rum, which is so strong that the swallowing of a tea-spoonful would make one gasp for breath. It is quite strong enough for collodion, but I cannot manage to divest it of its abominable flavour. Can you, or any brother reader, give me a hint how to do so?—I am, yours, &c., Z. Z.

January 25, 1869.

[The odour of the rum may be almost wholly removed by repeated filtrations of the spirit through freshly-burned wood charcoal, and redistillation. This process is more effectual when the spirit is dilute than when strong.—Eds.]

FINGER STALLS.—GLOVES.

To the EDITORS.

GENTLEMEN,—I am sorry to differ, even slightly, with your correspondent, Mr. Hall. He has not quite understood what I meant to say about finger stalls and gloves.

My objection (not mine only, but to my knowledge the objection of many) is that the gloves as now made are too clumsy and too large. For instance: the size of my ordinary gloves is "7," the smallest India-rubber gloves I can get are, perhaps, "10;" so that in using these there is every chance of injuring the film with the ogre-like fingers extending an inch beyond my own.

I agree with Mr. Hall that gloves are the best, if they can be procured of small size and neatly made. Until they can be so procured I believe finger stalls to be the best. They quite prevent all stains under the nails, and everyone will agree with me that stains under the nails are the most annoying. The probability of stains reaching beyond the finger stalls is extremely slight, even with careless manipulation in developing.—I am, yours, &c., OXONIENSIS.

MR. HIGHLEY'S LECTURE AT THE SOCIETY OF ARTS.

To the EDITORS.

GENTLEMEN,—My attention has been called to your remarks ou the want of brilliant lighting of the Russian historical lantern slides I exhibited after reading my paper at the Society of Arts, on the 21st inst.

Although many thought me over-fastidious in drawing attention to the shortcomings of the light, undoubtedly it was not up to the standard I have always been in the practice of showing at public exhibitions, as well-known members of our lantern trade could testify; but my surprise is that I ever got the light I did—nor could I, had not the optical parts been of an improved character—for, after the lecture, I found that the stopcock of the oxygen bag was tightly plugged, and, though there was a hundredweight on the bag, at the conclusion, after showing fifty pictures, this bag was more than half full, when I expected to find it nearly empty.

Had you correctly reported what I did say, it would have been that, on the previous evening, I had arranged my apparatus, centered it, and got a brilliant disc, but that on the following day I found all my apparatus had been removed and placed on another platform, so that I had not an opportunity of readjusting it till the evening of the meeting. Now, as I got a beautiful disc on the Tuesday evening, clearly there was no obstruction then, and any dust or fluff in the Society's room could only be of a nature that would readily be blown out of the stopcock on the two half-hundredweights being replaced; but the obstruction did not start, even with a man's weight in addition, and only yielded to steady ramming. *How* it got so plugged is a mystery. The notion that it was maliciously done is abhorrent to my mind, but I have reason for believing it possible!

"Out of evil oft comes good." Let us all take a hint; and even though we have gone over our apparatus previously and found all right just before commencing an exhibition, let us suspect every part and test it afresh, rather than be subjected to such an unanticipated annoyance as I experienced on that occasion. It would occupy too much time to discover the source of such accidents during a public exhibition.

There was not, as you suggest, any "defect" in the apparatus itself. All was in perfect working order on the previous evening; and I have such confidence in what my new system of apparatus will do, that I should he happy to test it against that of any other maker, at the next meeting of any of our London photographic societies. Conditions: gas bags equally weighted; mixed gas jet; lime ball; any optical arrangement that is not a copy of my own. The test: a photographic positive of the microscopic enlargement of the diatom *Heliopelta* (which not only gives detail but half-tone) cut in half, and each half mounted as a separate slide, the blank half being blacked out; the half image of this object being thrown on the screen by my lantern, the other half to be placed in competing lanterns and the image projected beside mine and adjusted till of equal size. It would be at once evident which arrangement was the best in the competition. I would adopt the same fair test with any other maker's lantern fitted with Argand burners, oil, or paraffine.

I throw down the gauntlet. Will any one in our trade take it up?—I am, yours, &c., SAMUEL HIGHLEY.

January 26, 1869.

[We did not report, "correctly" or otherwise, what Mr. Highley appears to have said at the close of the meeting in explanation of the non-success of the exhibition, and for the simple reason that, being seated within a dozen feet of the gas bags, and from what we saw being somewhat apprehensive of an explosion, we, together with several other gentlemen, took advantage of a more than usually long interval in the exhibition and left the hall; hence we were not aware that special attention had been directed to the defects in question. We regret, for Mr. Highley's sake, that such "hitches" should have occurred at a crowded meeting, and they teach him and all of us the necessity and value of such a system as that generally adopted by exhibitors (among others, by those who manage the "popular" meetings of the Edinburgh Photographic Society, at which no hitch occurs), viz., to devote half-an-hour before the meeting assembles to seeing that everything is properly adjusted. Respecting the challenge given by Mr. Highley to lantern makers, it is for them to respond or not as they feel inclined; but we would suggest for his consideration the propriety of exhibiting at the next meeting of the Society of Arts one of his most "improved" lanterns, in order that any lurking doubt as to its efficiency which may have remained in the minds of those who were present at his lecture might be dispelled. We may state, however, that the "test object" proposed by him is not that which is most suitable for testing the capabilities of a good magic lantern; but on this subject we shall say more in our next number, when we give a *resumé* of the lecture itself.—EDS.]

EXHIBITION IN MANCHESTER.—We have great pleasure in directing the attention of our readers to a *soirée* and exhibition to be held next month in connection with the Manchester Photographic Society. There are so many excellent photographers in and around Manchester as to ensure that the meeting and exhibition will prove a great success; but the Council are naturally desirous of having a large and varied display, for which purpose they request the co-operation and assistance of their brethren in other places. We ask our readers to respond to the request by forwarding, as early as possible, some pictures for exhibition. The exhibition will be open for two days—the 15th and 16th of February—in the Memorial Hall, Manchester. On the evening of the 15th there will be a lantern exhibition of transparencies, taken chiefly by the members of the Society, together with a few short experiments on light and other matters of interest. An art-union, entirely photographic, will be held in connection with the exhibition, the drawing for prizes to take place about the middle of March. We trust the meeting will be as pleasant as it is sure of being successful. Communications should be sent to Mr. C. Adin, Hon. Secretary, Memorial Hall, not later than the 6th February.

APPREHENSION OF A PHOTOGRAPHIC PUBLISHER.—Mr. Henry Ashford was apprehended on Thursday, the 21st instant, and was brought before the Police Court, Guildhall, under the following circumstances:—A warrant had been issued by the court against him nearly twelve months since for publishing indecent photographs, and he was apprehended by William Turner, an officer of the court, and placed before Sir R. W. Carden to answer the charge.—William Henry Burgess said he was an agent employed by Mr. Graves for the purpose of detecting those who pirated his copyrights in engravings. About twelve o'clock that morning he met the prisoner, for whom he had been looking nearly twelve months. He gave him into the custody of Turner, who took him under the warrant. He had not had time to communicate with Mr. Graves, and therefore he wished for a remand.—Mr. Martin (chief clerk) said he held in his hand thirty-seven warrants against the prisoner for thirty-seven convictions of £5 each for infringing Mr. Graves's copyrights. The present warrant, however, was for publishing indecent photographs.—The prisoner was remanded.

BALL'S PATENT GAS FIRE.—We recently saw in operation, at the office of Mr. C. E. Elliott, 36, Jewin-street, one of the fires bearing the above-named designation, and we believe that its introduction into photographic studios for heating purposes would prove a boon to photographers during the cold winter months. It consists of three Bunsen gas burners placed underneath any ordinary grate, the grate itself being filled with a kind of fuel similar to coke in appearance, but quite different in its nature, and indestructible. It is thus obvious that when the grate is once filled no further attention is necessary. To light this fire it is only necessary to turn on and ignite the gas, when in a short time it presents the appearance of an ordinary coal fire, but without smell, dust, or smoke. The patent fire is invaluable where a good fire is required in a few minutes, and only wanted for a short time. How often a fire in the studio proves a great evil—one having to endure the smoke frequently in first lighting the fire, the constant feeding of the same, then the dust and dirt of raking out, and, not least, the domestic putting her blacklead brush on the carpet, or upsetting the blacklead, and thus having gilt or other ornaments, velvet, furniture, &c., ruined! Besides, a person often wants a fire for an hour or two only, but a coal fire requires a long time to burn up, and the dirt and trouble prevents its being lighted; but with this fire a good heat is obtained in ten minutes, and in twenty minutes a good, hot, bright fire is secured. In private life it is also calculated to be invaluable—thus: a gentleman finds he has an hour to spare, and desires to spend it in his library; but there is no fire—it is not worth while to light it—for by the time it is of any use the hour has gone, and the pleasure he should have enjoyed in his library is lost. With the gas fire, it is lighted and extinguished at will. Another advantage is that there being no sparks the fire may be lighted and the door locked, whilst the most valuable books, documents, &c., may be left in close proximity to the fire. We advise our London readers to call at 36, Jewin-street, and see for themselves what we have here described.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

J. GARLAND, 15, Weston Street, Pentonville Hill, will exchange a first-class camera for a small turning lathe or a six-inch head.

A glass-house, 18 × 8, well arranged, will be exchanged for a velocipede or canoe in good condition.—Address, A. WARD, 19, Whitecross Bank, Salford, Manchester.

A quarter-plate camera (walnut, with two dark slides) and lens, by Hermagis, will be exchanged for magic lantern, backgrounds, or anything useful for the studio of equal value.—Address, R. JONES, Broad-street, Leominster.

An excellent cabinet lens by an eminent maker will be exchanged for any of the following:—Stereo. lens by a good maker (arranged for views), rolling press, lime light apparatus, or lantern slides.—Address, W. K. MEUNS, Photographer, Chipping Norton.

A compact four-wheel pony phaeton, thoroughly renovated with four new wheels, suitable for a pony about eleven hands, will be given in exchange for a good dissolving view apparatus, complete, to the value of twelve guineas.—Address, A. D., Beaufort Gallery, Chepstow.

*** No exchange notice can be repeated unless paid for as an advertisement.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

Charles Mitchell, Bristol.—*Five Photographs of the Rev. John Wesley, from a Statuette by Andras.*

☞ *Correspondents should never write on both sides of the paper.*

"A MERE PHANTOM."—We should prefer them in the form of transparencies. To effect registration, fifteen stamps are required with each picture.

W. M. STEWART.—The series of lectures referred to are suggestive and useful. They are very short, and are mainly descriptive of a certain set of slides sold by the firm you name.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—We have received the report of the last meeting of this Association as we were going to press. Will appear next week.

S.—1. If you write to Newman, of Soho-square, and describe what you want, he will be able to supply you. Of this we feel assured, because we obtain from him all the transparent colours we use or ever require.—2. *Cyanine* is better than Prussian blue, but *both* are useful.

B. J. F.—You may practise the Wothlytype process "without let or hindrance"—because, in the first place, the patent was not valid, and, secondly, the United Association of Photography, by whom the patent was held, has gone out of existence, or, rather, is in the course of being wound up. Moreover, if we remember rightly, the patent was taken for only three years; if so, it has expired.

"BALANCE."—The subject is one in which we are not well versed. We have seen many balances in which the angle of the knife edge was greater than 30°; but one (and a good one) which we have examined since we received your letter appeared to be of that angle. We presume the authority to which you allude is *Ure;* if so, you may accept the statement as being generally correct.

W. A. BRICE.—Your letter is one which cannot be answered hastily, but we shall communicate with you as soon as a definite course of action has been agreed upon. The optical "mems." are being attended to. On the subject of wide angle *versus* large angular aperture, we find a good deal of misconception to prevail; we, meanwhile, state that a lens cannot possess both these properties, or, if so found, they cannot be simultaneously brought into action.

PHANTASMAGORIA.—Do not place more weight upon your bags; you have already a hundred weight more on each bag than we should care to employ. Have you tried the effect of making a wider aperture in your jet? If not, do so. It is probable that the condensers you are at present using will give as much, if not more, light than if they were larger, seeing that a greater angle of light (owing to their shortness of focus) may be received on them. On this subject see our remarks in the ALMANAC.

H. E. M.—Procure a lead tray, and on the bottom of it place some finely-powdered fluor spar (Derbyshire spar). Pour over it twice its weight of sulphuric acid, and by means of a proper support so place over it the glass to be "greyed" that the gas liberated will be brought into contact with its surface. It decomposes glass with great rapidity. You will not succeed with the liquid fluoric acid; because, although it will dissolve the glass, it does not leave the surface dull, but shining, and hence it is unsuitable for your purpose.

VITRO.—1. We have not forgotten the subject of which you have reminded us; and we shall not much longer tax your patience.—2. It is an infringement of copyright to make transparencies from illustrated books or engravings. You must get the permission of the proprietor of the copyright before you can exhibit them; and see that the permission be given *in writing.*—3. The Transparency Exchange Club has hitherto had no prints which were copies either of engravings or paintings; they have all been produced from original negatives.

J. M. S.—Your troubles are caused by the organic matter in the negative exciting bath. It was inconsiderate to use it for sensitising even a single sheet of albumenised paper, and to your doing so is attributable the disordered condition in which it is now found. Add a few drops of a solution of carbonate of soda until it be neutral, then add small doses of a diluted solution of permanganate of potash until a pink hue is retained for a considerable time before it disappears. If you have a chance of placing it in the sun for a few hours, do so; but if not, filter the bath and add a few drops of nitric acid much diluted.

SYNTAX.—1. By placing the almanac which contains the description of the valves in the hands of any clever gas-fitter or worker in brass, you will get them readily constructed.—2. Before we could advise you, we should require to have a description of the lamp you at present have, in order to know something concerning its power. If you even furnished the name of the maker we should be able to arrive at a tolerably correct estimate of its capabilities. We *can* aid you, but in the meantime request you to write again, and enclose an envelope for reply.—3. The zirconia cylinders have not yet been commercially introduced.

"GLASGOW."—The pyroxyline was bad. There is no remedy for it but either distilling off the ether and alcohol, or mixing it with some castor oil, and using it for transferring films. We have had a sample of pyroxyline sent to us, obtained from the same maker, which possessed properties similar to that in your possession, and by no kind of treatment could good collodion be obtained from it. Concerning your carbonate of silver queries and difficulties: you do not appear to be aware that we have had some articles on the subject within the last few weeks. If the information there given do not meet your case write again.

GEORGE FRANKLANDS.—Although dissolving views, properly speaking, can only be produced by means of a *pair* of lanterns, an effect somewhat akin to the dissolving view proper may be obtained by a single lantern. A general idea of the manner in which this may be effected will be got from the following:—Immediately in front of the aperture for receiving the pictures let there be another aperture in which is fitted a frame for receiving two pieces of glass, painted as clouds and capable of being worked from right to left, and of opening and closing up. The details of this method were published by us some years ago; we cannot enter more particularly into them at present. Instead of the two slides, a single graduated one may be employed, in which case it must be placed closer to the lens—preferably adjoining the diaphragm.

GEORGE F——D.—The substance you enclosed is bisulphide of tin, or the well-known *aurum musivum* of japanners and gilders. There are five or six ways by which it can be made, one of which is as follows:—Melt twelve ounces of tin by means of a gentle heat, and add six ounces of mercury. To the powdered mass, when cold, add six ounces of salammoniac and seven ounces of sublimed sulphur (flowers of sulphur), and, after thorough admixture, place the compound in a glass flask on a sand bath, gradually heating it to low redness, and continuing this heat until white fumes cease to be disengaged. At the end of this time the *aurum musivum* will be found at the bottom of the vessel in the form of soft and brilliant gold-coloured flakes. It answers as a substitute for gold for many purposes.

PATRICK O'CONNOR (Clonmel).—We stated the reason why we only gave an extract from your letter. We omitted what we considered irrelevant, and published as an extract all the rest. We willingly comply with your request, either to publish your present letter "exactly as it is written" or not at all, and have no difficulty in selecting which course to adopt, especially after reading the statement with which you commence your communication, to the effect that you "have come to the conclusion that the adducement of further reasons for or against cyanide would not be worth the trouble, as its effects on the silver bath are too well known to need further investigation." *In justice to yourself* we will not print your letter, for few communications, indeed, can stand the crucial test of being printed "exactly as written." You do not appear to be aware of the fact that the subject *has* already been treated by both chemists and "skilful photographers." It is no new subject, we assure you.

LONDON GAZETTE, *Friday, January* 22.

NOTICE OF SITTING FOR LAST EXAMINATION.

W. DAYNES, Rugby, photographer.—Feb. 11.

METEOROLOGICAL REPORT.

For the Week ending January 27th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Jan. 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
21	30·18	41	32	33	36	S	—	Fog
22	30·37	40	32	31	34	SE	—	Fine
23	30 21	34	29	30	31	SE	—	Fine
25	30·08	39	26	28	30	S	—	Fine
26	29 87	47	29	37	39	SW	—	Dull
27	29·76	44	36	36	38	SW	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 457. Vol. XVI.—FEBRUARY 5, 1869.

MR. WINSTANLEY'S PHOSPHORIC LIGHT.

The account of the meeting of the Manchester Photographic Society, which we published last week, could not fail to prove of interest to those of our readers who are interested in the production of a good and convenient light suitable for photographic purposes. The interesting experiment of Mr. Winstanley with phosphorus points to many curious and useful modes by which the luminosity of an ordinary gas flame might be enormously increased, and its chemical power also augmented. The account of Mr. Winstanley's experiment at once reminded us of a suggestion made to us long since by a distinguished physicist, with whom we happened to be discussing the merits of several methods of artificial illumination. Of this suggestion we shall say more anon.

For the benefit of those of our readers who may have overlooked the report of the meeting of the Manchester Society we may explain what Mr. Winstanley's ingenious plan is. So far as principle goes, it is dependent on the fact that when ordinary wax-like phosphorus is burnt in air white and solid phosphoric acid is produced, and this combustion is attended by the production of an intense light. Every schoolboy knows that the light emitted when phosphorus is burnt in pure oxygen is still more brilliant. Mr. Winstanley sought to utilise this fact with the design of obtaining a powerful light for photographic purposes, and carried out the idea in the following way:—A quantity of the wax-like variety of phosphorus was placed in a suitable vessel; through this vessel a current of common coal gas was passed, the direction of the stream being so regulated that it could pass over the phosphorus and then escape through a jet fitted for the purpose. When the coal gas is passed over the phosphorus at ordinary temperature, and then ignited at the jet, it, of course, burns with its usual flame; but when the phosphorus is heated it commences to volatilise, the luminosity of the flame greatly increases owing to the combustion of the phosphorus vapour, and fumes of phosphoric acid are produced.

At the meeting already referred to Mr. Winstanley pointed out that, though this phosphoric gas flame gave a light of much greater brilliancy than that of ordinary ignited coal gas, yet the intensity of the light could be greatly augmented by feeding the phosphoric flame with pure oxygen. When this was done, the report says—"The brightness of the flame was enormously augmented, and the ample room in which the experiment was conducted became brilliantly illuminated." We congratulate Mr. Winstanley on his ingenious and successful experiment, and hope that further results may flow from such well-directed efforts.

There are just two points that we must for humanity's sake touch upon here. Those of our readers who have not had much experience in the more dangerous class of chemical experiments little know what a disagreeable substance phosphorus is to manipulate with; and it is only good and careful experimenters like Mr. Winstanley who may venture to use this new gas flame. We must confess to a great antipathy to employ any more phosphorus than is actually necessary, as in our juvenile days we received a burn of such severity that the strong scar still remains to warn us when chemical proclivities would tempt us to forget our former experience and meddle with this dangerous body. We would, therefore, caution the more inexperienced of our readers against meddling with our new but treacherous ally.

Again: the product of the combustion of phosphorus with free access of air is a highly irritating acid, or, rather, a white smoke, which becomes a powerful acid on coming in contact with the moisture always present in the air. A little of this smoke, when allowed to escape into the atmosphere of an apartment, gives rise to a most disagreeable choking sensation. This latter objection to the use of the phosphoric flame could of course be to a great extent removed by the employment of a suitable chimney communicating with the air external to the apartment. We may add that any disagreeable fumes escaping removal by the chimney can be quickly rendered harmless by a little liquid ammonia placed in a shallow dish near the apparatus.

Having said so much about Mr. Winstanley's plan, we now come to the suggestion of our friend which we referred to at the outset. This suggestion was simply to try the effect of volatilising magnesium by heating the metal very strongly in a stream of hydrogen, and then to ignite the gas as it issues from the vessel containing the heated metal. It was anticipated that in this way a brilliant magnesium light would be obtained, owing to the combustion of the metallic vapour along with the gas. It is obvious that zinc might be employed in the same way, since it is about as volatile as magnesium.

The idea was suggested by the well-known fact that most metals which are volatile at all distil most easily in a current of hydrogen, which appears to operate in such a case, not only by preventing oxidation, but also, owing to its extreme levity, facilitating distillation by allowing freer scope for diffusion of the metallic vapour.

Since the account of Mr. Winstanley's experiment came before us we thought it would be particularly interesting to try the suggestion of our friend, and, though failures are rarely worth recording, yet the question to be tried in the present instance is of sufficient interest to render any experiment upon the subject worth mentioning.

In the case of magnesium, which requires a very high temperature for its volatilisation, coal gas obviously could not be employed, since carbon is readily deposited on subjecting the gas to a very high temperature; we therefore used pure hydrogen in our experiments. In the first instance, we placed some metallic magnesium in powder near the end of a tube of very hard and infusible glass, the portion of tube immediately beyond the metal having been drawn out to a fine jet. A current of hydrogen gas was then passed through the tube and ignited at the jet; of course the gas then burnt with its usual nearly colourless flame. The glass tube was now heated close to the jet so as to melt the magnesium; but the only difference observed in the flame was a tinging with yellow. The blast of a powerful gas table blowpipe was now brought to bear on the tube, and the temperature so raised as to render the glass tube very pliable; the gas flame had now become of a bright yellow colour, with occasional flashes of bright white light—probably due to particles of the magnesium having been carried forward by the current of gas. The yellow colour was found, on examination with the spectroscope, to be due solely to the presence of sodium. The amount of

magnesium vapour which ultimately reached the flame was extremely small.

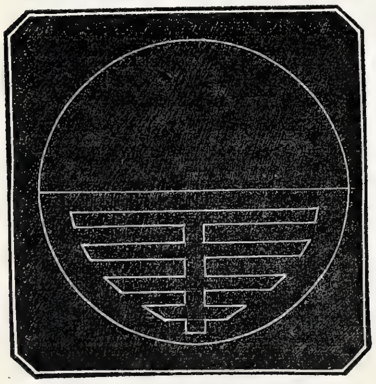
Having failed on a small scale, we repeated the experiment with the aid of a powerful wind-furnace and a stout metallic tube, but the result we obtained was little superior to that already mentioned; so that, for all practical purposes, Mr. Winstanley's plan fails in the case of magnesium.

The principle of the method followed in the above instances has received less attention than it appears to deserve at the hands of those interested in the production of cheap and brilliant artificial lights, and we hope now to see it extended in some useful direction.

ON NEW DIAPHRAGMS.

Everyone knows that the difficulty which is encountered in obtaining clouds in a negative arises from the excess of illumination which they receive. The darkest part of a cloud is often lighter than the brightest part of the rest of the landscape. Various contrivances have been suggested to obviate this difficulty, the oldest and best known of which is the common sky-shade.

About a year ago I contrived an arrangement which is represented in the margin. The figure there drawn represents a set of parallel narrow bars, connected by a transverse bar. This is cut out of soft, dark paper—blotting, not sized, paper—and is attached to the lens itself with the aid of a little paste. I used it upon a view lens, the lower half of which it partly obscured. The bars must be not too wide nor too near together. Their proper size will always depend upon that of the diaphragm with which they are used; each bar, and each space between the bars, must be less than half the diameter of the stop used, otherwise a shadow will be produced, and will show itself on the ground glass and in the negative. When this cross-barred diaphragm is properly made and properly applied it does not appear at all upon the ground glass, and its effect is only to largely diminish the illumination of the sky.



Other occupations have prevented my working with this contrivance as largely as I intended, but in a few trials made I succeeded in getting some beautifully-defined and shaded clouds, as perfectly, or almost as perfectly, as if they had been taken alone, and without reference to the rest of the landscape, which, by the aid of this contrivance, was obtained simultaneously and fully exposed.

I considered this paper arrangement as a merely temporary one, and intended to have a similar figure cut out of thin metal and fastened to a ring, which should hold it in its place. Although the paper was only lightly attached to the glass, and could be easily removed by moistening with water, yet still greater facility of changing was needed, as it might be desired in the course of a morning to take some pictures with and some without this secondary stop. The metallic substitute would obviate this objection. Before, however, I carried out this intention I saw mentioned an idea suggested by Mr. Sutton, which, although an ingenious one, seems to have attracted no attention whatever. I caused two stops of the sort proposed by him to be made for me. They have been exceedingly well executed by Mr. Zentmayer, and I am disposed to consider the invention one of the most valuable that has been brought forward for a long time. It has even an advantage, as I shall show farther on, that was not foreseen by its inventor.

The idea is simply that the plate in which the stop is pierced shall be *inclined*, instead of being, as usual, at right angles with the axis of the lens. Thus the beam of light admitted from the foreground corresponds with the full size of the diaphragm, whilst that from the upper part of the picture is greatly reduced in size. The inventor calculates that, by inclining the stop at an angle of 35°, the proportion of light admitted from the foreground will be four times that from the sky. Thus the sky portion of the picture is kept back, and time allowed for the foreground to impress itself.

The mechanical contrivance to effect the object consists of a tube of metal slightly conical, and of a size to pass by its smaller end into the largest of the stops, and, by reason of its conical form, to catch fast when passed halfway up. Inside of this conical tube is a piece of metal which occupies an inclined position, and in it an opening is made of such a size as is judged proper. It should have the same diameter as that of the stop with which the lens is most commonly used, or may exceed this by a little.

The inventor suggests a second advantage—that even when it is not desired to attempt clouds, or when there are none to attempt, it may frequently happen that if we suppose the view to be divided by a diagonal line, one of the parts will be much less illuminated than the other, and so tend to produce too great a contrast in the negative. In such a case he would propose to turn the stop round to an angle of 45°. Thus, of the light coming from the less illuminated part, a much larger proportion is admitted, and a useful approximation to equalisation is obtained.

This application of the inclined stop I believe to be not only effectual, but to equal in usefulness the original object of the arrangement.

On banks of streams with elevated sides, or in any uneven country, it will very often happen that masses of shadow present themselves, into which it will be an object to get as much detail as possible. These cases present themselves in very varied forms, but with the common characteristic that one of the front corners of the picture is deficient in illumination by comparison with the other, and in all such the inclined stop will be useful.

I now come to a third useful property of this stop, and one which does not seem to have been observed by its inventor.

Anyone who is familiar with landscape-taking will have observed *that the two upper corners are the weak point of the picture.* In the most ordinary general positions assumed by the principal portions of a landscape, it will be found that the central objects, which are most commonly in the distance, can be got into reasonably good focus, together with the foreground, but often not easily with the upper corners, if the objects in these last be at some distance. If, for instance, the upper corners be occupied by trees farther back than the foreground, these will often present serious difficulties. To get them into satisfactory focus along with the rest requires a great reduction in the size of the stop, and then the boldness and character of the picture suffers.

Now the inclined stop offers in such cases a very welcome aid. It operates for the foreground like a large stop for objects along the horizontal line as a medium stop, and for objects above that line as a small stop. In this way we can have an improved definition of the upper corners without the reduction of the stop otherwise necessary. It is true that there is a greatly-reduced illumination of the upper corners, but the objects that fill these upper corners—if, as in the case which I am expressly supposing, they are in the middle distance—are most commonly so well illuminated that a reduction of light is mostly rather advantageous than otherwise. If the upper corners are filled by *near* foliage, the use of this stop will, of course, be improper, unless, indeed, the foliage be in strong sunlight. (If both upper corners be occupied by near foliage, and one be in sunshine and the other in shadow, then one of the previously-mentioned properties becomes applicable, and the stop may be turned diagonally, so as to let in most light from the shaded foliage.)

The third-mentioned quality which I have pointed out—that of functioning as respects the upper portion of the picture as a much smaller stop and giving increased depth of focus—appears to me to be at least equal in utility to the other two indicated by the inventor.

In this new stop, therefore, I think we shall find a useful addition to our appliances. I have not as yet had an opportunity of testing it as fully as I wish and as I expect to do, but, from what I have seen of its action, my impression is altogether favourable.

M. Carey Lea.

TRIPLE CONDENSERS AND SINGLE OBJECTIVES.

In another page will be found a summary of the paper read by Mr. Highley at the Society of Arts, to which we referred last week when commenting on his communication to us.

The special topics to which we intend confining our observations are triple condensers and wide-angle object glasses. "*I* have introduced," says Mr. Highley, "the triple condenser." In committing himself to the publication of this statement, Mr. Highley's memory or his historical acquaintance with his subject have not proved so trustworthy as might have been desired, for, at a date considerably anterior to his "introduction" of the triple condenser, it had been recommended and published (with an illustrative engraving) in the pages of The British Journal of Photography; and, at a date long anterior even to the last alluded to, triple condensers were articles of commerce. Thus much in connection with the historical bearing of the subject.

The advantages we previously stated as being in favour of condensers of this kind are such as cannot be lightly esteemed. They secure wide angle of light owing to the shortness of focus attained,

and a more perfect correction of spherical aberration than can be secured with two lenses only. There are, however, two drawbacks to their use: when the focus is short the heat arising from the flame is apt to fracture the first lens, even when (to permit of expansion) it is burnished quite loosely in its cell. The other—which, however, is not worthy of being taken into consideration, when spherical aberration has to be got rid of at all events—is the loss of light from absorption and reflection; and, as the elements in a compound condenser are necessarily thick and possess violent curves, the loss from this source is considerable.

So much attention has of late been bestowed upon the subject of condensers that, for those of the standard kind of three and a-half inches diameter, the focus is now so short, even with the double condenser, that the angle of light is as great as could be included by the triple, inasmuch as the first surface is capable of being placed at the distance of minimum safety from the light. Under these circumstances a triple condenser would transmit *less* light than a double one. For ordinary practical purposes, therefore, a double condenser may be made as good as, if not better than, a triple one.

For purposes of extreme delicacy, in which the light emitted by a *small* piece of lime is required to be converged to a similarly small point, and by means of the shortest possible road, a triplet condenser, although better than one composed of two lenses, will be found insufficient. In connection with this, it may here prove useful to publish the description and curves of a condenser, or, rather, of that portion of it required to convert strongly convergent into parallel rays. The condenser in question is that of Professor Henry Morton, and is composed of four lenses, three only of which are collecting lenses, the other being the condenser proper, and it (the condenser) varies with the work required to be done.

The three lenses which we shall describe are of the following diameters and curves:—That which is placed next to the light is a plano-convex of four and a-half inches diameter, the radius of curvature of the rounded side being four and a-half inches. The distance of the flame from the plane surface of this lens is two and three-quarter inches; hence any person, by means of a foot rule, can realise for himself an accurate idea of the great angle of light included. The other two lenses are five inches in diameter, and, counting from the light, the radii of curvature of the centre lens, which is a meniscus, are thirty inches, and six inches; third lens, fifty-two inches, and eight and three-quarter inches.

This system, in Professor Morton's estimation, is the most effective for bringing the rays emitted by a lime light to such a state of parallelism as to be useful for exhibiting the effects of polarisation.

"This part of the combination," says Dr. Morton *(Jour. Franklin Institute)* "is never changed; whatever we do with rays in a lantern it can never cause harm to bring them parallel first. The condenser proper, or rather condensers, we change with the work. These" (he farther says) "are shifted on and off without disturbing the light, so as to give the best effect with each objective." Shortness of focus is, in the collecting system, of the greatest importance, the brilliance of the light being involved; a strong, parallel, luminous pencil being secured, it may be used at convenience to suit the desired purpose. Hence, in a proper system like that described, the fourth lens, or that farthest from the light, must be modified in its shape to suit circumstances.

We now turn for a few minutes to Mr. Highley's object glass. He gives a side blow at the achromatic portrait combination, which, as every well-informed optician knows, is the best means of obtaining a crisp, non-distorted image on the screen; and, while admitting the necessity of achromaticity, he asserts that the double combination lens absorbs too much of the light, to remedy which he says—"So I employed a single achromatic power of wide angle to secure as large a picture as possible at a short distance from the screen." A wide-angle single achromatic lens is necessarily a somewhat deeply-curved meniscus. Even Mr. Highley will, we presume, admit this much. A wide-angle lens of this description requires a stop in front before the haziness, consequent upon spherical aberration, is so dispensed with as to give good definition, whereas a portrait lens requires no stop; and where, then, is the alleged gain? Besides, lenses of the kind advocated—single lenses with a stop in front—are those which have for many years been in actual use. They may or may not have been achromatised, this depending upon price; but in the main the system is the same.

The objection to wide-angle, single object glasses is the distortion. A picture to be exhibited in the lantern by means of such an objective must be distorted in the drawing, in order to appear straight on the screen. It was the recognition of this fact that obliged us to state last week that the test object proposed by Mr. Highley was *not* a test. What we propose as a much better test is one somewhat more familiar—a photograph of an engraving containing straight vertical lines near the margin. This will prove at once a test for definition and distortion.

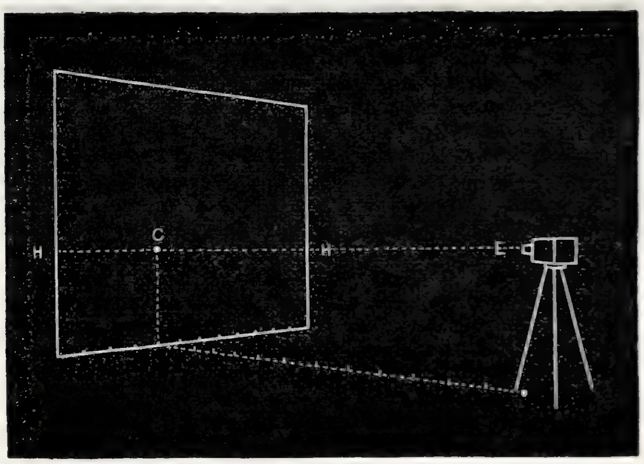
Mr. Highley knows something about microscopes, and therefore scarcely requires to be reminded that in a given power of object glass—say a quarter of an inch—both illumination and definition are *very* much better obtained by a combination of different lenses than by a single lens in which, although the loss of light by absorption is less, the aberrations are infinitely greater. If Mr. Highley wishes to have an object glass which will give the maximum of light with the minimum of focal length, he will have to seek it in a combination of lenses, achromatic or otherwise. An achromatic objective composed of a plano-convex and a meniscus will be found to form the best of the single-lens systems (as contradistinguished from the portrait combination) that can be obtained, although we have formed an excellent objective of two plano-convex achromatics, both being mounted close together and the curved sides being placed next the picture.

ON THE IMPORTANCE OF A FEW OF THE LEADING PRINCIPLES OF THE ART OF DRAWING, AND THEIR BEARING ON PHOTOGRAPHY.*

PART II.

THE particular point where the vertical line meets on the plane of view is called the "centre of view" or "centre of picture," because all the objects in the view perpendicular to this vertical plane appear to concentrate themselves there. But you are not to suppose, when I say "centre of picture," that I mean the centre of the paper or glass on which the drawing or impression is made, for sometimes the centre of view may be seen towards either side of the picture, according to where you stand opposite to the vertical plane. See diagram No. 1, at C.

DIAGRAM No. 1.



Hitherto this point (the centre of view) has been called the point of sight, but you will see how erroneous this is (in fact it is a complete misnomer), for the point of sight, or camera, is at the other end of the vertical line. See diagram No. 1, at E. At this, the centre of view, then, if a line be drawn across the vertical plane parallel to the base, we have what is called the horizontal line. See diagram No. 1, at H H. This line is constituted entirely by the height of the point of sight from the ground. This, of course, is determined by the nature of the ground. For instance: if it be flat, low-lying ground, having the camera about four feet from the ground and dead level—such as the pavement on a street—the horizontal line should fall in about one-fifth, and not more than one-fourth, of the breadth of the picture, if it be of a horizontal shape. If placed about six or ten feet higher—such as the low flat of a house—then it would rise to about one-third of the picture. If from two stories, it would rise considerably—it may be nearly one-half of the breadth; and if from the face of a hill, it might rise to nearly a third from the top. Beyond that it is not desirable, as it is sure to give a bird's-eye view to the look of it—a treatment that is only adopted when the purpose is panoramic or descriptive, like a map.

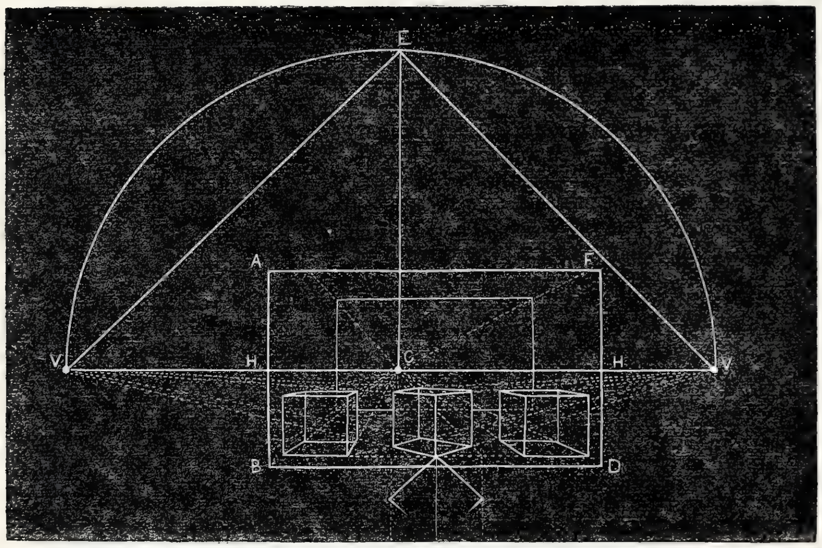
All objects, then, lying in the same plane as the horizontal plane of the scene, have this line—not only to show where the centre of the view is, but that, because they are lying horizontally, therefore this is their horizon. If they were lying off the level, either rising or falling, then this would be indicated by these objects having other

* Continued from page 52.

lines by which they were regulated. For instance: if you look down Howe-street, Edinburgh, you see all the lines that are perpendicular to the plane of the picture, such as houses, run towards one common horizon, determined by your sight; but amidst all these, there are objects more or less lying off the level, such as the pavement, going down the street, and which have a horizontal line considerably below the common one. Having got nearly to the bottom of the street, on looking back you see exactly the reverse. As the street rises, the pavement, and all the objects contingent are seen running to a point higher than that which is common to all the buildings, of course lying at right angles to the plane of view. So you see, then, that there may be horizontal lines innumerable formed according to the surface of the ground, whether level at one place and undulating at another. The former is to be found in architecture, the latter more or less in rustic subjects.

I shall now call your attention to the vanishing points of perspective. They are made on the horizontal line of subjects lying either at right angles to the plane of view, or those that are not lying to it at right angles. In the former, which makes what is called "parallel perspective," the vanishing point is to be found in the centre of view. See diagram No. 4, at C. In the latter

Diagram No. 4.



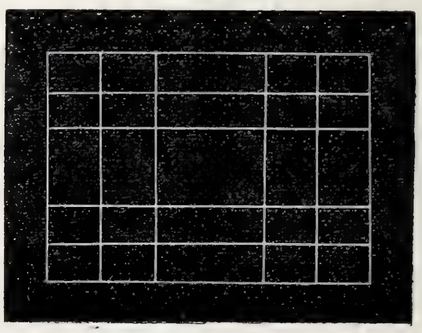
—that is, those not lying at right angles to the plane of view, which is called "angular perspective"—two vanishing points are formed, one for each side of the object. See diagram No. 4, at V V. The length of the vertical line here has been made the same length as that of the picture; it might have been longer, but never shorter. The centre of view here is not in the centre of the picture, which I would never advise, for reasons I shall afterwards explain. From the centre of view C to the point of sight E draw a semicircle. Where they intersect on the horizontal line on both sides the vanishing points V V are discovered. You will notice, then, that at the point of sight E, the lines which go from E to V on both sides of the vertical line leave E V at right angles to one another, consequently forming a span of 90° on the horizontal line. This is common to the vanishing points of angular perspective. Parallel perspective has its vanishing point only in the centre of view, excepting when the limit or depth of object is required. This is done by the use of either of the vanishing points lying out of the field of view. See diagram No. 4, at V V. Where they intersect on the line drawn from the centre of view that is the depth of the object.

The blocks at each side of this diagram are in parallel perspective along with the room in which they are placed, as you see by the lines on each side of the block running to the centre of view. The block in the centre, lying at half a right angle to the plane of view, is of course drawn on the rule for angular perspective. The sides of all objects so situated to the plane of view have the lines of the sides of them running to the vanishing points out of the picture. The depth of objects in this position is determined by a geometric scale formed at the base of them. Finding the ground plan of it, and bringing one of the corners to meet the one you are to make in perspective, draw a line from the extreme corner at the side of the ground plan up to the base line; then from this draw a line to the centre of view. As this line passes on its way through the vanishing lines of the sides, the intersection there marks the limit or depth of the object. Diagram No. 1 is also an illustration of the same. Both the plane of view and the camera there are drawn in perspective, as supposed to have been seen by the spectator after that the photographer had definitely fixed the camera in relation to the proposed distance from the plane of view. The operation is viewed there at half a right angle. The depth of the plane of view and also the camera in that diagram were drawn by a geometric plan having been formed at the base of each, as already described in diagram No. 4. In diagram No. 1 you have the number of paces between the camera and plane of view, and also the same constituting the length of the picture, all carefully measured off—each pace made out by the intersection of lines from the centre of view and the two side vanishing points. If you make a yard the size of each pace, the relative proportion of that to the plane of view is as nearly as possible twenty-two feet by thirty-six feet, and the camera stands about seven and a-half feet from the ground. I could have represented it standing about the height of an ordinary stand, but, having first represented the horizontal line lying at a third of the plane of view, of course the point of sight of the operator or his camera must be consistent with it, and so regulate the whole.

Having touched more or less upon every principle of perspective of importance to the photographer, I now proceed to call your attention to a few things that bear upon composition, both in respect to what is to be aimed at and what is to be avoided in the departments of landscape and portraiture. But, before doing so, I should like to bring before you the principle on which agreeable forms are more or less based. When once this is understood you will better appreciate the forms that will be afterwards recommended.

Howard, in his *Sketcher's Manual*, has a chapter or two on certain points in the picture—one class termed *feeble*, because they feebly affect the eye or impress the mind, and another class termed *forte*, because they are striking to the eye. For instance: the centre of a picture square in its boundaries is weak, because it is equidistant from the top and base, and also from the sides. The farther that any particular feature is removed from the centre the more expressive will it be. But it is not every situation that may be at an unequal distance from the boundary line and corners, which becomes a *forte* point. The inequalities in distance must bear a mathematical ratio to each other, such as one and two-thirds, two and three-fifths. The way to find them is this:—Divide a plane of view, or focussing glass (the length being greater than the breadth), into three equal parts each way; every intersection will give a *forte* point. Again divide the outer spaces into two equal parts, and every intersection will also give a *forte* point. See diagram No .5.

Diagram No. 5.



I shall now show the application of this principle to a picture. What particular *forte* points may be made use of will depend upon the character and disposition of the subject. But one general rule must be observed, if variety is to be preserved, viz., not to use two corresponding points in the same drawing so that a tree, occupying the point obtained by the first intersection, a figure introduced to give effect in the same drawing, should occupy a point obtained by the subdivisions. As the scene is more or less extensive, and as the object introduced to give effect is smaller or greater in proportion to the whole drawing, so may the points more or less distant from the centre be used. As the horizontal line is a most important one in the picture, it is desirable that it in particular be a *forte* point; and, for the same reason, the centre of view being on that line, the principal *forte* point should be secured for it.

To secure this horizontal line, divide the plane of the picture into three parts, similarly as the plane of view in diagram No. 1 is divided, and you have the choice of two lines for the horizontal line. Or divide it into five parts and you have the choice of three lines; but, as those nearest the centre are weakest, take the two lowest if possible, unless you are on some eminence, which, consequently, makes you take either of the two highest.

I have called your attention to the fact of this principle of finding the most effective situations for objects in a picture, seeing it is the only way to account for the singular, or rather striking, beauty of irregular composition—a kind that is very much wanting in photographic work, and more especially in portraiture, where one has more liberty of treating the subject, and consequently very apt to arrange too symmetrically. How many are charmed with what is considered a mere chance hit from nature, that is, having taken nature as they found it! but all the while, unknown to the photographer, it was the fact of objects happening to lie on *forte* points there that constituted the happy result. I would much rather see a photographic impression done without regard to composition than any attempt to have the parts too finely balanced; for, ten to one, unless the photographer know the principle I have explained, he is sure to be painfully neat if he attempt to compose. Happily in landscape the material cannot be much moved about, but the camera can; so look well to the standpoint, for the lines of composition mainly depend upon that.

It holds true, also, in reference to light and shade and colour as well as individual forms that, whatever parts are generally expressive and characteristic of the subject, having more or less certain forms of light and shade, also degrees and variety of colour, these should lie on such *forte* points as will best command their expression. This brings me to composition in general. NORMAN MACBETH.

(To be concluded in our next.)

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Is it or is it not legitimate, when grouping together materials for a composition photograph, to take a negative from a lump of coal or of common earth and make the print from it do duty in the "get up" of a picture? Everything, I think, depends on circumstances. If the lump of coal or earth be intended to represent the structure of a rock, and for this purpose be defined so well as to defy examination through a magnifying glass, or to mislead, it is wrong, and is quite as much a lie as some of the numerous representations we so frequently see pourtrayed on canvas by the brush of the painter. But the case is different when, from the lowered state of the definition, the structural details of the lump of coal are not visible in the photograph. It is evident that, under these circumstances, it serves merely as a foreground accessory, and not as a geological specimen. As for a photograph being an embodiment of truth, bah! it is nothing of the kind. Did not a talented architect, a vice-president of one of our London photographic societies, once say that a photograph of the river and the New Houses of Parliament, taken from the locality immortalised in the ode of *The Ratcatcher's Daughter* as "t'other side ov the water," was quite untrue to nature, because it was taken by means of a lens of short focus, and included a wide angle of view? That he said so stands on record. Photographs, therefore, may deceive, even when taken without any intention of deception entering the mind of the photographer. John Tomkins, the cowfeeder, gets a dozen *cartes* for three and sixpence, and sends them to his friends, who see him with pillar'd and curtained, pianoforte'd and whatnot-ed surroundings, at which even a Rothschild could not afford to turn up his nose. Even Miss Perkins, of Paddington-green, is "took" in profile to hide the fact of her having, years before, lost her dexter eye in a pothouse brawl. She, like the talented patron of art aforesaid, is seated in a lordly hall, modelled, it may be, after the palace of the Cæsars. Truth in photography! What a farce! The head of a respectable and modest lady was once so skilfully posed on the body of one of the *demi-monde* that it was impossible even for two photographic experts to discover at what part the union had been effected. He is a rather simple person who now-a-days accepts a photograph as a representation of innocence and truth merely *because* it is a photograph. Before we do so, we must know somewhat of the circumstances under which it has been produced.

The subject which has suggested the above reflections was brought forward at the last meeting of the London Photographic Society, when a paper was read by Mr. Cherrill on *Composition Printing*. In this paper he gave some details connected with the production of Robinson's picture, *Watching the Lark*, which I feel sure will be read with interest by those who are fortunate enough to possess a copy of this the best, or one of the best, productions of that artist. In the course of the paper allusion was made to the fact of a lump of earth having been made to do duty as the original of a rocky mound in the photograph, this having been done with the view of ascertaining whether any critic would be sufficiently sharp-sighted to discover the trick.

Mr. Lea's new *Manual of Photography* is a very important contribution to our photographic literature. I, at least, have been much pleased by a perusal of it. It appears to me, however, that in his description of Mr. Gordon's gallico-gum process he has omitted a special feature of the process—that of flooding (is this the right word?) the plate with gallic acid previous to the application of the preservative solution. I observe that a writer in your own Journal, in describing this process, also made the same omission. Stay, let me do an act of justice. Mr. Lea designates it the *gum process* merely, and does not give it as that of Mr. Gordon; but under whatever name it is known, when the process is carried out as recommended in your Almanac, it is really a most admirable one, and will be much practised.

In connection with the photelectric process of Mr. Dallas, it occurs to me to "wonder" how a process would work in which a ground was laid on a copper plate by means of powdered asphaltum, which, when the plate was heated, would adhere to the surface and form a sensitive and aquatint coating. Or what would be the effect of coating a plate with a solution of the same resin, but containing water in such proportion as to cause it to break up, when dry, in those minute globules which, as in the aquatint ground, are formed when water is present? A sensitive surface thus formed would, after exposure to the light, be capable of removal, partially or wholly, in proportion to the action of the light through the *cliché*, and of permitting unequal action of an etching fluid. I merely throw out the suggestion, not having given it much of the close, deliberative attention so necessary to carry out any process to a successful issue. I have, however, sufficiently pondered the subject generally as to have struck the trail of what I think may prove to be a very valuable process of photo-mezzotint engraving. Whether the results will prove equal to those of Mr. Dallas's process it is not for me to say. In theory it appears to be sound, and I cannot discover a flaw; in practice it may prove otherwise. Before I again make my monthly appearance I shall have made some experiments in this direction, and will then report upon my success or otherwise.

What are photographers to understand by the various things that have of late appeared in your Almanac and Journal relating to the registration of photographs? It seems to me to amount to this—that photographers have small chance, indeed, of recovering penalties for infractions of their registrations, and, if they are wise, they will not attempt to do so in ordinary cases. The counsel for the defendant will, I may presume, proceed thus to question the plaintiff:—"You sue the defendant for copying the photograph of Mr. Smith; but, before I ask you to put in the proof of registration, I shall, first of all, ask you to show me the document by which you, at a date previous to that of registration, became the possessor of the copyright in the picture, and were thus entitled to register it?" Now, if this question were put to my fellow readers, how many would be prepared to carry on the case?

As the descendant of one who was closely allied, both in his social and diplomatic relations, with the obnoxious "exciseman," I must really enter a sort of mild protest against your articles on alcohol and ether—especially the alcohol. The facility of making alcohol is admitted; it is one of those things that any person, even a fool, can do. But you have not dwelt with sufficient force upon the consequences of persons in this country trying its manufacture. Nay, I should almost fancy that the tenor of the article will be to encourage your readers to do so. Let me seriously warn them against defrauding the revenue by engaging in the practice of illicit distillation. I do not say it is *morally* wrong; but it is undoubtedly legally wrong. If you knew as well as I do how easy it is to commit this sin by means of a tin kettle, a Bunsen gas-burner, and sixpennyworth of gas tubing bent in the form of a worm, you would better appreciate the possible evils that might follow such a tentative course.

I observe that the death of Sir William J. Newton is recorded. Well, I have nothing to say either for or against the deceased gentleman, only I would remark that many of those whose names were at one time familiar to photographers as "household words," are now rapidly passing away from our midst.

What a valuable and suggestive paper is that of Mr. Norman Macbeth, of Edinburgh! In thus eulogising it I speak the sentiments of many artists, both of the camera and the brush, with whom I have mixed during the few days that have elapsed since the first part of it was published. I shall look forward to the concluding portions of this very valuable paper with great interest.

PHOTOGRAPHY AND THE MAGIC LANTERN APPLIED TO TEACHING HISTORY.

As we stated last week, Mr. Highley read a paper on the above subject, before the Society of Arts, on the 20th ult., and we now present such extracts from it as will enable our readers to appreciate the author's treatment of the principal topics introduced, for we may premise that the paper is not a short one.

After some observations of an introductory nature—in the course of which he stated that the pictures to be exhibited at the close of his paper had been prepared by him for Col. Tchepelevsky's course of lectures *On the Manners and Customs of Nations from the Earliest Historical Periods to the Present Day*—Mr. Highley referred to the fact that many heads had been at work during the past five years to try and discover compounds and forms of lamps that would give the greatest amount of light, with the least amount of trouble and discomfort in preparation, to meet the requirements of those who only required the lantern for occasional family use, or were nervous as to employing the most powerful light-giving apparatus; others had been trying to obtain still greater power out of the oxy-hydrogen jet, and simpler or safer ways of manipulation; and a few had aimed at securing the most intense light attainable by man—the electric light. Wilde had been so successful that from a pair of carbon points, half-inch square, placed on the top of a lofty building, the light evolved was sufficient to cast the shadows of the flame of street lamps, a quarter of a mile distant, upon a neighbouring wall; and whereas at noon, on a clear day in the month of March, the direct rays of the sun took *one* minute to darken a piece of sensitive photographic paper, the light emitted at two feet from the reflector of this electric lamp darkened it to an equal degree in twenty *seconds;* and on a day in June, Mr. Crookes estimated that this electric light had three or four times the luminous and calorific power of the sun at mid-day, and that at a cost of only one halfpenny per hour, practical not theoretical value, for the driving power of the giant induction machine of Mr. Wilde's invention.

Speaking of the argand lamp, Mr. Highley says:—

"*Argand Burner.*—We have tried to improve on the old-fashioned camphorised sperm oil lamp, and to this end have employed paraffine oil, which gives a most brilliant light, but has the drawback that the vapour from the wick evaporates and covers everything within the lantern with an oily dew when not in use, and the oil itself oozes through the slightest flaw in the metal-work of the lamp, and produces a result alike unpleasant to smell and touch. If the lamps are constructed so as to place the reservoir outside the lantern, and proper samples of oil are employed, paraffine is perfectly free from danger. The pleasantest way, however, is to use the crystallised or solid paraffine. This gives a pure, white, brilliant light, is perfectly free from smell or danger, and, if spilt, immediately solidifies, and can then be peeled off anything it settles on; the only drawback is, it takes a long time to melt a mass of it, and this is not always convenient. Where house gas is always attainable, a naphthalised argand burner furnishes one of the most convenient lamps for all ordinary purposes, as it gives a brilliant light, requires no trimming, and is ever ready for use."

On the subject of magnesium lamps, Mr. Highley observed that the light emitted was unsteady and of too blue a colour to show properly such pictures as required copper-coloured skies or red sunsets.

"*Oxyhydrogen Light.*—The oxy-spirit and oxy-house-gas jets still retain their old form, but the myth of 'safety jets' is passing away—that is to say, the notion of securing safety by wire gauze or water chambers—as cases are on record where the mixed gases have passed back and exploded in the reservoirs. The whole secret of safety lies in a nutshell. Keep the oxygen and hydrogen in separate bags; always have sufficient and equal pressure weights on both bags, and never remove the weights from either bag while the gases are burning. I am now referring to all forms of jets where the gases are mixed just before they issue from the nozzle, and impinge in an ignited state upon the lime ball. If the above rules be followed, it is better to employ jets freed from all the impedimenta of longitudinal wires and cross fences of wire gauze, or safety-valves of other constructions; to paraphrase the well-known order, I would say—'Put your trust in Providence, but keep your pressure up.' The bore of the nozzle, in relation to the pressure employed, is a matter of importance in the proper construction of a jet; for, if too large, the gases run back and burn within the nozzle tube, often causing a series of sharp explosions, which, if not dangerous, are unpleasant to the ears of a nervous exhibitor or of the audience.

"*Condensed Gas System.*—Undoubtedly the usual arrangement of gas bags, pressure-boards, and weights is a cumbrous one, though presenting advantages to the travelling lecturer in other ways. The Americans have lately advocated the method of condensing the gases in metal bottles, as presenting the advantages of compactness and extreme portability, economy, with the greatest amount of pressure attainable, which in other words means security from the gases mixing, running back and exploding, and also increased intensity in the light produced. By this arrangement the gases may be kept at hand any length of time, and ever ready for use, which is not the case when the gases are stored in India-rubber bags, for by an endos- and exos-motic action, they pass through the pores of such receptacles, and become deteriorated and unfitted for use in the course of a few days. As regards comparative space occupied, while a single gas bag of 6 cubic feet capacity within its pressure boards would measure 36 by 24 by 24 inches when filled, and its weights 17 by 6 by 5 inches, a pair of 6 cubic bottles would only occupy a space of 30 by 12 by 6 inches, when packed in a stout travelling-case. As regards comparative cost, a stout gas bag with pressure-boards and weights would cost £4 14s., while a bottle in case would only cost £2 12s. 6d.; and the bottle will not wear out, while the gas bag must every now and then be replaced. As these bottles must be sent to the manufacturers to be pumped full, the cost of the generating apparatus is also saved. This leads us to the only drawback to the system; the bottles must be sent to be refilled, as the pumping apparatus is costly, and requires the greatest care and experience in manipulation; in fact, the only danger in this system occurs at this stage of filling. But though, undoubtedly, this is a drawback to those who have to lecture night after night, the amateur, on the other hand, would regard the saving him the trouble of making the gases as an advantage; and he has only to make a point of returning the bottles to be refilled immediately after each exhibition to obviate this one drawback, especially as he can obtain the gases cheaper than he could make them for himself. To the photographer this form of apparatus presents great advantages for enlargements, being ever ready for use. But this system is not a new one, for it was employed twenty years ago by Mr. Adams, the well-known lecturer on astronomy and physics. A pair of condensed gas bottles are before you, so that you may judge of the intense light obtainable. They consist of wrought-iron cylinders, 2½ feet 3 inches long by 4½ inches in diameter, capped with most carefully-constructed valves worked by lever regulators, and are capable of holding 6 cubic feet of condensed gas. These are tested before sale to 60 atmospheres, or a pressure of 900 lbs. on the square inch, and as the pumping pressure seldom exceeds 25 atmospheres, or less than half the test pressure, perfect immunity from danger is insured. *A priori*, we should fancy that as the pressure is always on the decrease, the light would also be decreasing, unless the valves were under constant regulation; but practically this does not happen, for, if properly manipulated, we have not to alter the taps more frequently than with the gas bag arrangement. The 6 cubic feet will last 2 hours, though by careless working they might be used up in 20 minutes, or even in as many seconds.

"*Lime Balls.*—Though some samples of lime will last one, two, or three exhibitions, as a rule it is so hygroscopic that two must be used during one lecture, and if not kept carefully excluded from air by packing them in close-fitting tubes—and even then I have known them to swell and burst open the receptacle—wrapping them in waxed paper, or covering them with a thin skin of India-rubber by dipping them in a solution of rubber in benzole, they will swell and fall to pieces. To obviate this, magnesia has been proposed as a substitute. I have tried a composition of magnesia and plaster of Paris; but before the mixed gas jet it fused and frothed up, unless mixed with a saturated solution of bi-silicate of potash, which, however, imparted a pink tint to the flame. The same with meerschaum, a silicate of magnesia, producing just the opposite objection I raised to the blue magnesium light; probably pure magnesia, greatly compressed by a powerful hydraulic press, would produce the desired material, but it is difficult to obtain the use of such a costly machine for that purpose. Lastly: we have heard a great deal about the employment, in Paris, of a zirconia cylinder, which is said to be superior, not only as to its incandescent qualities, but as to its indestructible nature—a most important property, as it would save the expense not only of a multiplicity of cylinders, but of the lime clocks we are forced to employ when great pressure is used with the mixed gases, to prevent the cylinders pitting, and so getting out of focus of the optical part of the lantern. As yet I have not been able to obtain a specimen of these zirconia cylinders, or I would have shown their qualities.

"*Oxygen-Generating Apparatus.*—As the lime-light lantern has come into extensive use among amateurs since photography has been employed in the production of slides—many gentlemen taking records of their tours with pocket cameras, and, from the negatives obtained, have transparent positives printed, and then show their friends these reminiscences of travel on a larger scale—it is judicious that the philosophical instrument maker should render the apparatus easy of manipulation, and make every possible provision against accident. To this end I have re-arranged the oxygen-generating apparatus, in such a manner as to provide against various contingencies:—First, I enclose my retort within a light iron jacket furnace, so that I not only prevent a great amount of heat being dissipated, but secure the upper surface of the mixture of chlorate of potash and oxide of maganese being melted as well as the lower portion directly over the charcoal or gas-burner, as I found that there was a great tendency for the light powdered manganese to separate and float upon the surface of the melted chlorate of potash, and

when the oxygen bubbled briskly through the upper and cooler stratum, it carried this damp powder forward, and often choked the delivery tubes. I further got over this source of a blow-off by using coarse-grained oxide of manganese, instead of the powdered, which answered equally well, as the action of the manganese is mechanical, not chemical; for sand, a non-oxygen-yielding body, will answer in its place. In case, however, of the tubes becoming accidently choked, I provide the retort with a metal safety valve, through which the oxygen finds vent. The second source of accident arose if the operator did not disconnect his retort from the wash bottle as soon as all the oxygen was given off from the mixture; for nature, abhorring a vacuum, sucked in the water from the wash bottle upon the red-hot mixture, and, converting it into steam, a blow-up terminated the operation. This arose from the delivery-pipe passing directly into the water, so I dispensed with this kind of action by dividing my wash bottle into two chambers, and arranging my tubes so that the one in connection with the retort did not come in direct communication with the washing water. A shield at the exit pipe prevented the spray being blown into and wetting the gas-bag. Again: the oxygen sometimes came off with a rush, instead of in a quiet, orderly fashion, and would blow off the rubber tubes, if it did no worse. This is provided for by arranging the jacket so that it and its contained retort can be removed from the charcoal pan; or, if gas be used, by simply governing too violent or torpid action by the tap provided.

"*New System of Lantern Apparatus.*—Having given a *resumé* as to what has been done in improving our sources of light since 1863, I may state that with the weaker ones, such as may be classed under the head of 'hydro-carbon lamps,' I found we must also look to our optical appliances to aid us in picking up all the light we could seize on to make the argand lantern what is desired for showing photographic transparencies, and for this purpose I introduced a triple condenser, which, in other words, means one of shorter focus than that in ordinary use, that enables us to get our light closer to it, and consequently to seize upon a greater number of the emitted rays. But this was not all. The sharpness and detail in photographic slides requires an achromatic lens for the necessary definition of the image on the screen; but a photographic portrait lens, or any double combination lens, absorbs too much of the light, which we can ill afford to lose, so I employed a single achromatic power of wide angle, to secure as large a picture as possible at a short distance from the screen, and I thus obtained a really brilliant and well-defined 10-foot picture, though I only aimed at an 8-foot one in the first instance.

"The next point was to arrange all the apparatus in such a way as to bring it within the smallest packing compass, and render the lecturer as independent as possible of the ordinary obstacles that present themselves in a strange place. In the same box with the lantern I packed a cabinet to contain the slides, so contrived that they were always kept in methodical order for use, were never exposed to meddlesome hands, and could be put under lock and key the moment the exhibition was over. Over this cabinet slipped a shell frame, and, when the case was unpacked, all these parts could be clamped one above the other to form a stand for the lantern, which was then raised so as to be exactly central with the screen employed. The screen I use is opaque, white, and seamless, having the appearance of flexible whitewash, and is the finest surface on which to exhibit views to the greatest perfection. This is obliged to be wound on a roller to preserve its face. The packing-case for this, likewise, forms a supporting framework, so that by the above system I am able to place all my apparatus in any position I desire, untrammelled by the presence of furniture or wall pictures, that would, under ordinary circumstances, have to be removed. The apparatus can be arranged in a few minutes and I can pack it all away as quickly, thus giving the exhibitor the greatest amount of independence and the least amount of trouble in arranging his appliances.

"I use a pair of the condensed gas bottles, arranged in connection with a gas dissolver, the invention of Mr. Malden,* but which I have since brought into very compact form, all being worked by a single cock and lever-arm. This arrangement dispenses with the use of the ordinary 'dissolving fans,' and gives the exhibitor far greater power in producing dioramic effects; for, by the old method, the lights in both lanterns were always and unchangeably of equal value, but by adjusting with a lever arm this gas dissolver allows of an exact balance being established between the screen and the superposed 'effect,' while both gases are economised for if 'dissolving' from one scene into another, the oxygen is gradually turned quite off one lantern, and only a small jet of hydrogen is left alight, for obvious requirements.

"I have now ended my survey of the last five years' progress in lantern appliances, and I will proceed to exhibit the series of historical slides. In conclusion, I must say that the honour of introducing this system of instruction into our collegiate establishments and higher branches of education is due to Colonel Tchepelevsky, backed by the Russian Government. Thus, as I have said, in a foreign country he has introduced the thin edge of the wedge, and I will use all my power to hammer it home."

Mr. Highley then exhibited in the magic lantern a series of fifty coloured views and photographs, illustrative of the architecture, art, costumes, and manners of ancient and mediæval times.

* See THE BRITISH JOURNAL OF PHOTOGRAPHY, March 29, 1866.

THE MORALITY OF THE NUDE.

THE question naturally occurs to one—If it be right and proper to exhibit in public the statue of a nude female, on what grounds is it indecent to exhibit a photograph of the same female in a similar state of undress? Since the famous raid on Holywell-street, some years ago, the public has had few opportunities of seeing much of the latter; hence we hear but little about it. The principle which distinguishes between the two has, however, during the past week, been a good deal commented on, in consequence of the Lord Chamberlain having determined to repress the indecent attire recently so commonly to be seen on the stages of some of the metropolitan theatres. The question is raised—What distinction can be made, and where is the line to be drawn, between the Venus de Medici and the extremities of Polly Jones *in puris naturalibus?*

A correspondent of the *Daily Telegraph* writes with much force on the ethics of this delicate subject, and we subjoin such of his remarks as bear upon the question. Referring to the stage costumes which "begin too late and leave off too soon," he says:—

I can quite understand the delicate difficulties of the wonderfully conscientious managers, who will say, "Where are we to draw the line? It is all very well to say, 'Hide, oh! hide those hills of snow!' but how much is to be hidden, how much concealed? Then, as to long and short petticoats—how many inches of skirt will save modesty? Where is the horizontal line on the human leg above which is perdition, below which all is pure? Where, in fact, are we to draw the line?" This wonderful query has done the Devil much good from time immemorial; there is hardly any sin that you cannot so shade off by circumstances as to make it very difficult for the denunciating moralist to "draw the line," and say such an act is always wrong. But, when we come to deal with men and facts, we must be content with what seems to us on the whole expedient, while custom and manners and our own feelings supply us with side lights sufficient for our guidance in the main. We see in our galleries statues and pictures entirely undraped, yet not even the purest maidens hesitate to examine them. We see in the theatre a partially-undressed dancer, and an outcry is raised. But only to the hasty or superficial thinker does any inconsistency appear. The human form in its full beauty is a noble subject of art, and a sculptor or painter who gives us a perfect man or perfect woman in marble or on canvas elevates our thoughts by his skill. But the representation is not any mere representation of nature: it is a reproduction guided by certain rules of art. A white marble statue is no copy: the hue and the hardness of the material prevent that; and, because it *is* no base imitation, because it *does* disdain the attempt at lifelike copying that waxwork makes, statuary gets within its own scope a fuller licence than painting, and the man in marble is, as regards form alone, the man in life. But, if the sculptor deserted this high ground, and painted his statue—hair, eyes, and flesh—exactly an imitation of nature in *all* its details, he would make of his work of art an indecent exhibition. In painting we have a corresponding reserve: an artist paints a naked woman because of the beauty of her body; but in all true art the attitude and the expression in the face are pure. Besides, there is always a certain reserve. No artist worthy of the name has ever painted a naked woman with the unreserved imitation of detail given by the indecent photograph of a naked woman. To paint a woman simply as she is would not be art in any sense; to paint a woman so that no touch of grace, no line of beauty can be lost is art, and very high art indeed.

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The fact is, in this, as in many other matters, the question is the intent. When an actress shortens her petticoats for freedom in dancing, or to "dress" a character in the costume appropriate to time and country, there is no indecency whatever. But when, without this necessity or plea, she adopts a dress that "begins too late and leaves off too soon," then there is indecency. We can illustrate the matter easily in private life. A lady would be shocked if at any time of the day her ordinary dress were so accidentally disordered or unfastened that part of her bust was seen by a stranger; but if you meet that lady the same evening at a ball you would see her whole bust, and the revelation would never excite in her or you a lawless thought—unless, indeed, you happened to be a writer for the *Saturday Review*. In that case, after writing an article on "Anonyma," describing her haunts, her habits, almost her private address, for the guidance of youth, or after reviewing some unspeakably abominable French novel, purposely picked out of the gutter of Gallic literature for the edification of English families, you would then sit down to express pure and virtuous horror at the school girls of eighteen who, with their undraped young shoulders, excite your rage. For it is one thing to advertise "high-class unfortunate females," as Carlyle calls them, or to help the sale of filthy French books, and it is quite another thing to tolerate naked shoulders at an English ball.

It may be said that the Lord Chamberlain's warning, even if it has effect, will work very slight good. We cannot make men or women perfect by restricting the extravagances of evening dress or the display of naked legs. Vice will still have its way, no doubt; but, while we retain anything like control over literature or the drama, we can prevent the association of intellectual amusements with open indecency. The pictures sold in Holywell-street books were only the representa-

tions of a sin we cannot suppress; but at all events we have forced the filth out of the popular literature of the day. We cannot make all the men and women of the present generation pure, but we *can* check impurity in public literature, and thus do something to vindicate the dignity of letters, and to preserve the rising generation from one form in which vice makes its approaches. * * *

Our Editorial Table.

Collodio-Albumen Pictures. By W. D. Sanderson, Manchester.

The name of Mr. Sanderson may not be known to most of our readers, but, judging from the productions of his camera now before us, he is properly entitled to take a very high place among our landscape photographers; for, while the specimens under notice are large in size, they also possess great excellence.

Shepherd's Crag, Derwentwater ($16\frac{1}{2} \times 12$), is a well-selected and harmonious picture, some peculiar and pleasing effects of lighting on the distant trees being apparent. *The Lady Chapel, Fountains Abbey*, is a fine picture of a portion of an ecclesiastical edifice fraught with reminscences of the olden time—the time when the curtal friar of Fountains belaboured Robin Hood and threw him into the Skell. Truly muscular christianity flourished in those days. *Cat Bells, from Derwentwater*, is a work which, without care in its treatment, might have been objectionable from the parallelism of the leading lines of the subject. But here this is provided against by the judicious introduction of a boat, which not only forms an agreeable and suggestive feature in the foreground, but breaks up the straight rigidity of the lake. The large boulders to which the boat is attached also form elements of pictorial beauty in the foreground. Passing by *The Terrace, Haddon Hall*, which is as perfect a photograph as such a subject can make, we come to *Watendlath*, in which we have several of those natural elements which lend a charm to a picture. A thoroughly country bridge, a tiny stream, little cottages devoid of architectural pretensions and protected by dikes and fences of the most unpretending description from the intrusion of the bovine tribe, tall trees, and distant sterile-looking hills—these form the elements out of which Mr. Sanderson has produced an admirable work of art.

Of course the photographs are by the collodio-albumen process. Why "of course?" Simply because that process and Manchester men seem to "take" to each other "so kindly" that in landscape work they are usually found associated. Was Dr. Taupenôt a native of Manchester? Although he was by birth a Frenchman, his spirit has evidently descended in full fruition upon our photographic brethren of the cotton metropolis, who have certainly adhered to the process identified with the name of Taupenôt with a praiseworthy persistency which has brought its practical reward in the form of success.

Views in China. By W. P. Floyd.

We have been favoured by a mercantile friend with an opportunity of examining a number of photographs which we may consider, to some extent, as illustrative of the state of photography in China. As a whole they are sharp, and otherwise excellent as photographs, although in one or two the most effective points of representation have not been selected. In Nos. 1 and 2, for example, which respectively represent *The Clock Tower, Hong Kong*, and *A Waterfall, Hong Kong*, the composition is of too central a character to be pictorial.

In the first, which has been taken from a point within a couple of feet of the centre of the street, the clock tower occupies, with architectural exactitude, the centre of the picture, and is flanked by houses to which so much prominence has been given as to dwarf the principal object. So with the waterfall. It forms a straight vertical strip down the very centre of the picture, with a basin at its foot distressingly central. Seeing that so much has been written in our pages on the subject of pictorial composition as applied to photographs, such infractions of the rules of landscape composition are inexcusable.

Chinese Junks on Shore is an excellent picture in every respect; the composition and general treatment are good, and the subject is both instructive and interesting. To a painter of Chinese views or scenes it would prove invaluable, from the great variety presented—boats of all kinds and in every position, a sea-washed beach, rocks, &c., &c., being included in it. The views of the Chinese *Joss-house*, of *Praya, Hong Kong*, of the *Race Course*, and of the *Public Gardens* are all invested with interest, and to those unacquainted with the subjects their great sharpness is an advantage, enabling details to be examined with care.

By somewhat masking the distances and skies during printing better atmospheric effects may be obtained from the negatives; and, in his next series, we recommend Mr. Floyd to do so, and not to imagine that he is doing violence to the legitimacy of photography by so acting. Thus would the black mass of hill ground at the back of the *Joss-house* be thrown still farther back.

Stereoscopic Views of Canadian Scenery. By R. Stark.

Mr. Stark's views are much in advance of those examples of his work which we noticed on a previous occasion. *Then* the pictures were dark from over-printing with negatives which appeared as if insufficient in density, while those at present before us are much improved in this respect. Were Mr. Stark to employ a stop with larger aperture the pictorial effect would, in most cases, be improved. The negatives are evidently by the wet process, for in one of the pictures the leading object is the easily-recognised photographer's tent. The exposure still seems a little insufficient; with a longer exposure and a more protracted development Mr. Stark will produce much better pictures.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 9th	Society of London (An. Meet.) .	9, Conduit-street.
,, 11th	South London	City of London College.
,, 11th	Manchester	Memorial Hall, Albert-square.
,, 11th	Pho. Sec. Lit. & Ph. Soc. of Man.	Rooms, 36, George-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Society was held at the Free Public Library and Museum, William Brown-street, on Tuesday evening, the 26th ult. The chair was taken in the first instance by the Rev. G. J. Banner.

The minutes of the previous meeting were read and confirmed.

On the motion of Mr. Henderson, seconded by Mr. Green, a vote of thanks was passed to Mr. Lewis Hughes for his temporary attention to the duties of Secretary.

The members unanimously elected Mr. O. R. Green to the office of President, in the place of the Rev. G. J. Banner, who retires.

The Rev. G. J. Banner then gave the following address before vacating the chair:—Looking at the mass of business which lies before us on the occasion of our annual meeting, I feel that I shall best consult your individual wishes, and the convenience of our Society generally, if I allude only briefly to those points to which it becomes my province to ask your attention tonight. My first duty is to thank you all, very cordially, for the kind consideration and ready help which has ever been accorded to me since I had the honour of presiding over our instructive and social gatherings. And I use these epithets advisedly, for to myself, and, I doubt not, to others also, the various papers and discussions following their perusal which have signalised our past and previous years have contributed very largely to the intelligent appreciation of our art, and to a corresponding interest in its success; while the kind and friendly feeling which, from the very commencement of our Society, has ever been manifested amongst its members, fully justifies to my mind that social distinction which I claim for it as the true foundation of its prosperity. In reviewing the events of the past year I would, in the first instance, draw your attention to the various excursions to which the Society as a body has been invited; and while I freely admit the pleasurable enjoyment experienced by myself personally on all these occasions, I may perhaps be permitted to express my very sincere regret that these opportunities of friendly association, interchange of thought, and comparison of results have not been more largely availed of. Whether by the selection of suitable localities, if possible nearer home, or by the appointment of some other day than that usually adopted, this *evil*, if I may so term it, can be remedied I do not know, but it appears to me to be a question well worthy the attention of our members. As to the actual amount of really good work exhibited by the Society during the past twelve months, I may confidently say that we have every reason to be satisfied; indeed it would be an easy and a grateful task to myself to allude specially to some amongst us—ardent, painstaking artists—whose toil has been most richly recompensed to their honour and to our glory. But here, again, I am tempted to remark that the number of our successful members would, I believe, be materially increased were it not for a feeling of timidity in displaying failures, and a hesitation in seeking counsel when difficulties, apparently insuperable, but as often of only trifling moment, seem to obstruct their path. A suggestion, thrown out by one of our body some months ago, that we should provide a box in which any question might be placed anonymously, to be opened and discussed at the succeeding meeting, would, I think, go very far towards removing this difficulty, and at the same time provide

subjects for interesting discussion at times when it has been found impossible to provide the usual monthly paper. Turning now from the past to the present condition of our Society. Everything, I rejoice to say, wears a bright and cheering aspect. Numerically we have not receded, financially we have improved, while the regular attendance of the great majority of our members at each monthly gathering affords ample evidence that our zeal has not yet abated in the earnest prosecution of our aims, and in the desire to achieve success. I hope and believe that this will continue, and that the high position which the Liverpool Amateur Photographic Association has already secured, as containing within its fold the discoverers and perfecters of one of the most successful processes in use at the present day, will be perpetuated and its influence acknowledged. It only remains for me now to thank you once again for your courtesy towards me on every occasion, and to vacate the chair in favour of one far more able to aid your deliberations and guide your work than I could ever hope to be. Under his presidency I feel assured that there is a happy and successful year before the Liverpool Amateur Photographic Association.

On Mr. O. R. Green taking the chair, the undernamed officers were elected in place of those retiring by rotation:—*President:* Mr. O. R. Green.—*Vice-Presidents:* Mr. J. Henderson and Mr. E. Phipps.—*Treasurer:* Mr. Lewis Hughes.—*Hon. Secretary:* Mr. Joseph Guyton.

On the motion of Mr. Henderson, seconded by Mr. Hughes, a vote of thanks was passed to the late President.

On the motion of Mr. Wilson, seconded by Mr. Mawdsley, a vote of thanks was given to Mr. Hughes for having fulfilled the duties of Treasurer.

Mr. Thomas Higgin, Mr. J. W. H. Watling, and Mr. Murray were then elected members of the Council, in the places of Mr. P. Mawdsley and Mr. W. W. Hayes, who retire in rotation, and Mr. Joseph Guyton, who takes the office of Secretary.

On the motion of Mr. Bell, seconded by Mr. A. Cooke, it was resolved that Mr. W. H. Wilson and Mr. W. Atkins be appointed auditors for the ensuing year.

On the motion of the Rev. G. J. Banner, seconded by Mr. W. H. Wilson, it was resolved that Rule VII. of the Association should be so far altered that the members of the Council who retire annually in rotation shall not be eligible for re-election within a period of twelve months.

Mr. Atkins proposed, and Mr. Hubback seconded, a resolution—"That Rule IX. of the Liverpool Amateur Photographic Association be altered so far as relates to the election of president, officers, and members of the council—such election to take place in November instead of in January in each year."

Mr. Henderson proposed, and Mr. Watling seconded, an amendment—"That the Secretary only be appointed in November, so that his name might appear in the lists of officers published in the almanacs for the ensuing year."

The proposed alterations were discussed, but, on putting them to the vote, both were negatived.

The Chairman then made a few remarks in reference to the prizes that had been offered for competition, and Mr. Wilson, Mr. Cook, Sen., and the Rev. G. J. Banner were appointed a jury to decide upon the merits of the pictures brought for competition.

At a later period of the evening the awards of these gentlemen were announced, and the prizes presented as follows:—Mr. Green's prize: Large photograph, 24 × 18, of Pont-y-pair, for the best year's work—to Mr. Lewis Hughes. Mr. Henderson's prize: Twelve stereo. pictures, for the best twelve stereo. or twelve 5 × 4 pictures taken during the year 1868—to Mr. W. Atkins. Mr. L. Hughes's prize: A 12 × 10 print, for the best stereo. or small picture not exceeding thirty-five square inches—to Mr. C. Hubback.

The names of two gentlemen were announced as candidates for membership, to be ballotted for at the next meeting.

A communication was read from the Manchester Photographic Society in reference to their *soirée* and art-union, to be held on the 15th of February next.

A letter, accompanied by four stereos. of Canadian scenery, was read from Mr. Robert Stark, Ontario.

On the motion of Mr. Hubback, seconded by Mr. Murray, it was resolved to have a question box, and the proposer promised to provide one.

The following pictures were upon the tables for exhibition:—

American stereos., including some taken in the Mammoth Cave, Kentucky, by the aid of the magnesium light, shown by Mr. George Henderson.

Twenty-four lantern transparencies, shown by Mr. J. A. Forrest.

Six microphotographs, shown by Mr. L. Hughes, the productions of Mr. A. Briggs.

A number of stereos. of the interior of Westminster Abbey by Mr. Valentine Blanchard, exhibited by Mr. Atkins.

Mr. Skaife, of London (introduced by Mr. Hayes), exhibited his lucella lamp, and illustrated its power by taking, with its aid, a likeness of the Chairman instantaneously. Mr. Skaife also showed his photophon and some enlargements.

Votes of thanks were separately passed to Mr. Stark for his gift, to the exhibitors, and to Mr. Skaife.

Mr. J. Henderson presented six stereos. and five $7\frac{1}{2} \times 5$ prints to the Association. Mr. Watling also presented one of white currants for the album.

The meeting adjourned after a prolonged and highly-interesting evening had been spent.

Correspondence.

Foreign.

Paris, February 2, 1869.

I HAVE had my eye on an article respecting Mr. McLachlan's "discovery" for some time past. It was published in the *Moniteur Scientifique* here last October, and I should, perhaps, have alluded to it earlier had I not thought the discussion upon the subject had died out. But Mr. D. Winstanley, your energetic correspondent, has revived it, and in a way which does him credit, and which leads us to hope that we may, after all, glean some knowledge from the mass of matter given to us by Mr. McLachlan. I therefore give your readers the French view of the question, to show them how our scientific men looked upon it, and what hopes they have of producing valuable results from it. M. Th. Bemfield is the writer of the article I refer to. The name of the writer is very English, is it not? He says:—

"A great deal of talk, of which the history of photography offers few such instances, has, during the past few months, been made respecting an English photographer, till then quite unknown. Open the first photographic journal you meet with, and there you read of the discovery of Mr. McLachlan. But this discovery, which appeared at first sight as if it would revolutionise modern photography, has ended in a vast disillusion. It would not be, however, performing our duty if we did not give a history of this discovery, if it be only to show once more to our *confrères* of the two continents the dangers which exaggerated enthusiasm present in photography as in everything else. Here, then, is the history."

The writer then goes on to show how the "discovery" was announced, how, before it was given to the public, it was submitted to Mr. Le Neve Foster and Mr. J. Spiller, and how those gentlemen announced that they had been able to verify some of the facts brought forward by Mr. McLachlan. He then says that, "strong in this approbation," Mr. McLachlan brought his "discovery" before the London Photographic Society, and "partially lifted the veil which hid his treasures." There was a general disappointment, and so on. Then he relates how a pretty fierce "polemic" was waged till the second communication from Mr. McLachlan appeared, for it was thought, or hoped, that there was still some important secret to be disclosed. The second communication was a disappointment equally great, and the writer concludes his article with the following severe remarks:—

"This history has its moral, and we do not regret it; it will be a lesson to many. How many are there among us who believe every day that we have made discoveries, when we meet with unimportant facts, which our slender scientific knowledge is unable to interpret, and which, nevertheless, we consider it a duty to make public by means of our piteous lucubrations upon them. It will also be a lesson to those who, like Mr. J. Spiller, receive so lightly pretended dicoveries, which their true science and talent should make them eject into the region of fable."

All this is very true, and, under the circumstances, very just. The chief thing that makes one think there must be some hidden truth in Mr. McLachlan's mode of operating and manipulation—a truth probably as unknown to himself as to the rest of us at present—is the fact stated by Mr. Winstanley, that Mr. McLachlan *does* produce negatives of exquisite beauty and perfection, and with ease and certainty. I am prepared to suppose that there are certain steps in the processes or matters connected with Mr. McLachlan's preparation of his chemicals, &c., which he may consider too *unimportant* to refer to, and which, nevertheless, may be the most important points in explaining his uniform success. If experimenters will take the trouble of going over the ground again, step by step, in the manner commenced by Mr. Winstanley, the error will be sifted from the truth, and the latter placed in its correct position.

Again: if Mr. McLachlan would allow some one to work with him for some months, and see all his operations and processes, it might be that the hidden mystery would be brought to light. We must be convinced of this—that if Mr. McLachlan produces perfect and beautiful negatives with ease and certainty, whilst other photographers do not, there must be a *reason* for the success in the former case, and the question is to find out that reason. Mr. McLachlan has attempted to tell us, and unfortunately he has not succeeded. If it is to be found out some one else must discover it, and it is a pity that the two gentlemen who examined the "discovery," before it was given to the public, did not manage to make things plainer, and reduce confusion to order.

Let me ask what soluble cotton does Mr. McLachlan use; if he makes it himself, how does he do it? A great deal of the success of the negative process depends upon the soluble cotton, as has been frequently pointed out. I was talking with a photographer of experience the other day, and he confirmed this fully. Sometimes you can get a cotton which is so soluble that when the picture is fixed it is all dissolved

away. I understand that one difficulty with photographers here is to get softness enough in their pictures, their collodion having a tendency to produce intensity, and their efforts are directed to overcome this. From what Mr. M. Carey Lea says it would appear that in America the contrary is the case, intensity being difficult to obtain. There are several good makers of soluble cotton here for photographic purposes. The difficulty for persons out of France or Paris is to get the soluble cotton which is made here, for the risk of transport is great, and no one likes to undertake all the responsibilities of what might happen if a case of it exploded.

Railway companies and steamers are very shy in taking any inflammable matter, and the other day I knew a case where a steamship company refused to take glycerine, except at a very high rate, from its "dangerous nature." In the chemistry of steamship companies there is no difference between glycerine and nitro-glycerine. It may be remembered that, in the report of the Jury of Class IX. of the Exhibition of 1867, M. Davanne regrets that no specimen of soluble cotton was exhibited in the Russian Department, as some he had had from that country was very good, being in large masses, exempt from all powdery matter, which would show it had not been made from strong acids, and at a high temperature under too energetic action. A photographer told me that he considered that "halation" was due very often to defective soluble cotton.

M. Henri de Parville has been giving the readers of the *Official Journal of the French Empire* a popular article upon the moon, in honour of her eclipse which took place on the 27th January last. The portion most interesting to photographers is that respecting the heat and chemical rays which accompany the lunar light. He states that it would require 800,000 full moons to produce a light equal to that of the sun; hence the luminous influence of the moon's reflected rays are only $\frac{1}{800000}$ of that of the sun. With the luminous rays from the moon are transmitted likewise rays of heat, but a portion of these is lost in the higher regions of our atmosphere, and the experiment of Prof. Piazzi Smyth is quoted in confirmation of this. This gentleman estimated the calorific power of the lunar rays on the summit of the Peak of Teneriffe, and found that it equalled the heat felt from a lighted candle placed at a distance of about sixteen yards! At the surface of the earth the heat received from the moon is really not to be perceived. What, then, is the power which enables the lunar rays to assist vegetation, and to produce photographic action on collodion plates? It is neither the light nor the heat, but the actinism which accompanies both these classes of rays, and which shows itself so much more in excess to the other two forces. These actinic rays assist the decomposition of certain substances, and facilitate the assimilation of the nutritive principles of vegetation; hence their action as just recorded. Gardeners have long stated that seeds sown when the moon is new germinate quicker than when planted at the full; and the reason is this—the seeds sown at new moon have time to come up before the full moon comes round, and under its influence they sprout still more, whilst it is evident that the seeds sown at full moon will not come in for their proper share of lunar actinic influence like the seeds sown at new moon.

Have you noticed the revelations made by the Chancellor of the Exchequer, Mr. Lowe, at the Gloucester banquet? He said that—"If a gentleman on whose birth Venus and the graces have not happily smiled finds in a photograph his features depicted in a manner more truthful than flattering, he writes off to the Chancellor of the Exchequer, and suggests that an adhesive stamp should be applied to photographs."

Have you pictured the result, supposing the Chancellor of the Exchequer should yield, in a moment of weakness, to the suggestion of this unhandsome correspondent—and he might be more easily induced to yield if his own photographer had just sent in a proof of his own portrait "more truthful than flattering?" Imagine a tax on photographs! What a sensation it would make—and how it would diminish business! Let photographers beware, and take warning in time. Never turn out a portrait "more truthful than flattering," or they may bring ruin on the profession. Cultivate more and more the practice of retouching negatives, and "waxing" positives. Despise not the art of our Adam-Salomons; and, above all, never take an unadorned and untouched photograph of a Chancellor of the Exchequer. R. J. FOWLER.

Home.

WHAT IS SCIENCE?

To the EDITORS.

GENTLEMEN,—It may appear, at first thought, that this is an unnecessary question to ask, and, therefore, needless to discuss it; not so, however, when we find such a talented writer as Mr. R. J. Fowler falling into error respecting it.

In THE BRITISH JOURNAL OF PHOTOGRAPHY for Dec. 24th of last year's volume, appeared an article written by me, entitled, *On the Non-Retention and Retention of the Albumen when Albumenised Paper is Floated upon Solutions of Various Salts.* It concluded, at page 616, with the following passage:—

"I believe albumenised paper retains the albumen on its surface as a soluble or insoluble compound, as the case may happen to be, when floated upon solutions of various salts, in obedience to a law which Science knows nothing about, any more than she does of the law in obedience to which the albumen is removed."

In his Paris letter for January 1st of the present year's volume, at page 8, Mr. Fowler made some highly complimentary remarks on this article, and said he had "been made very uncomfortable by reading it." His "chaffing" remarks elicited a reply from me, entitled *Light! More Light!* which appeared in the Journal at page 20. In that letter I wrote:—

"*Why* does the albumen quit the paper and form an albumenate in the bath instead of on the paper? Can Science give us a satisfactory answer? I believe she is entirely ignorant of the matter, and therefore say the albumen is removed in obedience to a law which science knows nothing about. I should, perhaps, have been more correct, strictly speaking, had I said science cannot tell us what that law is."

In his Paris letter for January 22nd, at page 44, Mr. Fowler thus replies to my letter, and it is this reply that necessitates the present communication. He says:—

"What made me uncomfortable was *not* having to give up my former belief, but being told that science knows nothing whatever about the law by which the albumen is removed from the paper. If this were true, I could see no chance of our ever finding out that law—science, *per se*, abstractedly knowing nothing of it. If Mr. Price had said that scientific men were unacquainted with the laws which would account for this removal of the albumen, there would have been a chance that some day or other we might find the explanation of the facts. There are many mysteries which are yet unexplained in all branches of natural philosophy, but which more extended research will probably solve. Possibly Mr. Price will say he agrees with me entirely, and did when he penned the phrase about a law which science knows nothing whatever about, and which warranted my remarks about giving up the hope of seeing the true light any more. ''Twas my humour' to take his remarks as they could be fairly construed, for I believe Science knows everything, whilst her followers do not."

I am truly sorry that I cannot say I agree "entirely" with what this talented writer says above, for I do not like to differ from one whose range of knowledge seems to extend to every branch of science. As he candidly confesses that I have convinced him he was in error when he supposed the albumen was dissolved when removed by floating albumenised paper upon solutions of various salts, let us see whether I cannot convince him that he is also in error when he states that "science knows everything."

Now, what *is* science? It is merely the name, in a single word, by which we express the study of the laws of nature. Philosophers have divided this study into various branches, in order not only to facilitate investigation, but also to be enabled to classify those laws of nature which observation and experiment have made them acquainted with. Each branch of this study has a specific name assigned to it, and it is dignified by being itself called a *science.* Thus we have the science of chemistry, the science of optics, the science of hydrostatics, &c., &c., &c.

What the philosopher terms a "law of nature" is but the expression of a fact. Each separate science is, therefore, but an aggregation of the facts appertaining to itself, taken as a branch of the general study. That which we designate "science" is but the annunciation of those laws of nature which are known to man; therefore, those laws which are unknown to him cannot be considered as belonging to science. These unknown laws are at present beyond the domains of science, and they must be discovered before they can come within them.

Science is often personified; thus we say—"She has much to learn;" that "she is in her infancy;" and, in chap. iv. of *Nitrate of Soda Redivivus,* at page 563 of last year's volume of the Journal, I have said:—"Unfortunately, Science is but a poor, ignorant body with respect to photography, for at present she scarcely knows the A B C of its chemistry."

In my article *On the Non-Retention and Retention of the Albumen,* before alluded to, I have shown that when albumenised paper is floated upon solutions of various salts, the retention of the albumen on the surface of the paper is *not* due to an insoluble compound being formed, as the albumen is retained when the compound is soluble; and I have also shown that its non-retention is not in consequence of the albumen being *dissolved,* as an insoluble compound is formed in the bath.

Having thus proved that we do not know by what law of nature the albumen is forced to quit the surface of the paper when floated upon solutions of particular salts, and also that we do not know by what law of nature the albumen is prevented from being removed when the paper is floated upon solutions of other salts, I have proved that science does not know anything about the matter; for, as I have already said, science is but the annunciation of those laws of nature which are known to man.

The laws of nature in themselves are not science, as it is only our knowledge of them that constitutes them so; therefore, if man be ignorant of any particular law of nature, so also is science, for science is but the exposition of man's knowledge.

When I state that the retention and non-retention of the albumen on the surface of albumenised paper, which is floated upon solutions of various salts, is in obedience to a law which science knows nothing whatever about, I state an undeniable fact, for science is here personi-

fied, and therefore stands as a general term for man's knowledge of the laws of nature.

What, then, does the word "science" mean? It simply means the *study* of the laws of nature; and each branch of this study which is dignified by the name of science is but an annunciation of those laws of nature which are known to man.—I am, yours, &c.,

February 1, 1869. GEORGE PRICE.

FINGER STALLS AND GLOVES—TO AMATEURS GENERALLY.

To the EDITORS.

GENTLEMEN,—Cleanliness in photographic matters is essential if good results are to be obtained, and a really good manipulator is as careful of his fingers as he is of his apparatus. Both should be kept scrupulously clean and in good order at all times, and this should always be the aim of every photographer, be he poor or rich.

Finger stalls have the disadvantage of stagnating the blood in the fingers when used, besides being extremely troublesome to remove separately at the end of every operation. They also make the fingers intensely cold, and in landscape work out of doors, if a plate-holder be not used, much inconvenience would be found on this score.

Gloves, on the other hand, may be obtained of any size from "7" up to "10," at Messrs. P. B. Cow and Co.'s, of Cheapside, E.C., India-rubber merchants, fitted with or without gauntlets—useful alike for ladies or gentlemen, which may be removed readily after development. At all times it is advisable after removing the gloves to wipe the hands, as the confined perspiration is liable to cause stains on the touching of a fresh glass.

In every case of development I would advise the use of a pneumatic holder as being more convenient and a greater preventative of stains than the finger and thumb, especially if work be done out of doors in cold winter weather.—I am, yours, &c., W. HARDING WARNER.

Ross, January 30, 1869.

DISTILLED WATER.

To the EDITORS.

GENTLEMEN,—There has been a great deal said and written on the subject of distilled water—some insisting on its use, others advocating its abandonment. May I offer to communicate the results of my experience?

I have been five years practising photography with Hardwich's *Manual of Photography* as my *vade mecum*. I adhered to one formula and one alone, and nothing would induce me for some time to depart from the rules laid down therein.

I have had my troubles—stains, halos, blurring, &c.—and traced each to its source, viz., the nitrate bath. Distilled water was with me a *sine quâ non;* and when I read in the pages of a contemporary, some months back, a suggestion to use common water, I was thunderstruck. My friends urged me to try it, but I pooh-poohed the idea. At last it struck me that there could be no harm in "taking a little."

Calling out to my bheestie, "Pani rao" (bring water), I weighed out two drachms of nitrate of silver, and on the attendant's return I directed him to fill my graduated measure with the common water. Lo! what a turbidity! But, nothing daunted, I made my solution, and filtered it clear. No alcohol, no acid, but in went a plate, out again, exposed, developed, and obtained a screaming negative! Made next day sixty ounces of solution, and have not had a single failure, fault, or defect since!

The water was shown to a professional photographer, who deemed it "unfit for even developing solutions."

Previous to this I was in the habit of obtaining my distilled (?) water from a medical hall, with which, however, I never succeeded. I use Bolton's bromo-iodised collodion, and the developer is prepared as follows:—

Iron	20 grains.
Glacial acetic acid	30 ,,
Water	1 ounce.

—I am, yours, &c., UNDISTILLED.

British Burmah (East Indies), December 29, 1868.

FOLDING CAMERAS.

To the EDITORS.

GENTLEMEN,—I have an improvement in folding cameras to offer, if you think a description of it worth a space in your valuable Journal. It is simply to enable those who have no swing backs to their cameras to be able to get the same movements by a very little trouble.

The back of the camera usually holds the dark slide, and is screwed down to the base-board by two screws. Now, when these screws are loose the back of the camera can be raised up, the length of the screw of course regulating the height.

Instead of raising this part *incline* it either backwards or forwards, as required, and keep it in its place by means of a wedge of wood, which wedge can be placed either at the front or side.

There is one more movement can be obtained by removing one screw, and the dark slide may be made to move on the other so as to advance one end of the plate or send it back. If the bottom of the back of the camera were made V-shaped it would make the movement very simple. —I am, yours, &c. O. C. SMITH.

Lansdown, Stroud, February 1, 1869.

POWERFUL ARTIFICIAL LIGHT.

To the EDITORS.

GENTLEMEN,—Allow me to add my mite to the discussion on the subject of artificial lighting brought before the Manchester Photographic Society at the last meeting.

To produce in a very simple manner a most intense and powerful light, get some common powdered saltpetre (or nitre) and place a heap of it in a little saucer of metal or earthenware. In the centre of this place a small bit of phosphorus and set fire to it. The light emitted is so intense as to almost blind a person possessing eyesight of the usual strength. This is a very simple experiment, and, in the hands of a sensational experimental lecturer, rarely fails to "bring down the house."

But the fumes—what of them? Convey them, by means of a tube made of brown paper or calico, supported on a spiral column of wire, to the nearest window, and "off they go."—I am, yours, &c.,

February 2, 1869. GEORGE MARKHAM, M.D.

THE OXYHYDROGEN LIGHT.

To the EDITORS.

GENTLEMEN,—Since I addressed my last communication to you relative to the management of the limelight, I have constructed a blowpipe with two nozzles of the small bore kind, which I call the "safety blowpipe." The light seems more than doubled; and I find it impossible to make the flame run back through so small a hole. I can use either one or both by simply turning a tap, which is a great convenience. It might be done by having several holes made in the side of a bit of tube in the form of the letter T, the holes being in the cross-piece, which would be parallel to the lime cylinder. In this case they would have to be used at the same time. It is also questionable whether this form would be as equally efficacious in cooling the flame as a more solid nozzle. The cooling effect in a small bore is very important, although in a large one it is so insufficient.—I am, yours, &c.,

Exeter, February 1, 1869. T. REEVES.

MANY MITES FROM MANY MINDS.*

By EDWARD L. WILSON.

NEVER use anything damp to give the final polish to the plate. Pass a broad camel's-hair brush over the plate just before pouring on the collodion.

If you wish to intensify, first wash off all traces of the developing solution.

After varnishing a plate, keep it horizontal a few seconds before pouring off, to give the varnish time to soak in.

Never feel too wise to learn, and never refuse to communicate when you are applied to for information. What can you possibly gain by withholding from a neighbour in trouble?

"It is good enough" is a bad adage.

If you think you can improve by making a second sitting, by all means do it before your subject leaves your room.

Now, finally, in order that you may know when you are in error, and why; when you fail, and why; when you succeed, and why; to be live; wide-awake; posted in your business; successful and prosperous, subscribe for some live photographic journal devoted to the best interests of your craft. Tell it your troubles; communicate to it what you find out of value; support it and encourage it, and never be without it.

INSTANTANEOUS PHOTOGRAPHY.—We have seen in action and have in these pages described the principle of action of the ingenious lucella of Mr. Skaife, by which he manages to obtain photographs with a degree of rapidity for which the only descriptive nomenclature at our command is "in the twinkling of an eye." From our report of the proceedings of the Liverpool Amateur Photographic Association we find that Mr. Skaife has had a successful "shot" at the chairman on that occasion; we have now before us the portrait of a dog, taken instantaneously by the lucella, a few days afterwards. Mr. Keith, the well-known photographic artist, of Liverpool, who has a proprietory interest in the dog alluded to, has become the sole licensee for the lucella in that important town, and we have no doubt that he will very soon develope its capabilities.

* *Photographic Mosaics.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Some accessories for the studio are offered in exchange for a good *carte-de-visite* lens. Send specimen and particulars to J. Curtis, Grape Cottage, Sleaford.

W. R., 10, York-road, Hammersmith, has a large bellows-bodied camera, suitable for copying, which he will exchange for an electro-magnetic machine, or galvanic medical coil.

Wanted to exchange, about sixty first-class three-inch lantern slides, embracing Scriptural subjects, woodland and lake scenery, statuary, comic slipping slides, &c., &c., for a stereoscopic apparatus, with twin lenses, for views, by any good maker.—Address, George Hanson, Church-street, Hinckley, Leicestershire.

A small portable developing or dark box, suitable for plates up to whole-plate size, landscape backgrounds, &c., will be exchanged for a camera from half-plate size up to $8 \times 5\frac{1}{2}$, bellows body, swing back, and sliding front, focussing from four to about ten inches. Values adjusted.—Address, S. S. Crewdson, Union-street, Ulverston, Lancashire.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

W. R. (Belfast).—The mottled appearance is caused by the silver bath being too weak.

K. Douglas.—Carbonate of soda will prove better than ammonia for neutralising your bath.

A Would-be Member.—The subscription to either the North or South London Photographic Society is half-a-guinea a year.

Oxyhydrogen.—Three parts of chlorate of potash and one part of oxide of manganese makes a sufficiently good mixture for generating oxygen.

Inquirer (Glasgow).—The negative is so imperfectly washed that the fixing solution can even be tasted. This will indicate to you in what direction the remedy is to be sought for.

Geo. Brindley.—Your dirty Daguerreotype can be cleaned by pouring over it some solution of cyanide of potassium; but if it be rubbed out it cannot be restored nor even improved.

H. F. M'George.—The lens is quite worthless as it is; send it to an optician to have a new back lens made for it, for, from your description, the fault appears to lie in that portion of the instrument.

A New Subscriber.—One point of difference between the front lens of a portrait combination and a properly-constructed landscape lens lies in the external shape—the former being nearly plano-convex, whereas the latter is usually a meniscus of more or less depth.

"Fortiter in Re."—We possess no practical acquaintance with the subject; but we have handed your query to an "authority," who says that a good stereotype metal, sufficient for your purpose, can be made by melting together—Lead, nine parts; antimony, two parts; bismuth, one part.

G. T. Roger.—In a short article in the Almanac, page 72, by Mr. G. C. Warren, you will find information of the nature required. After you read it, and try the process, any notes of your experience, if of an adverse kind, will, we have no doubt, receive due attention from the author.

Leominster (Hereford).—If the book in which you wish to paste the photographs be already bound, we not only do not know of anything that will answer better than India-rubber, but we are not aware of anything else that will serve your purpose. Any paste or mountant containing water would be fatal to flatness.

George B——.—You furnish far too little information concerning your bath to enable us to prescribe a remedy. In reply to your other query, an effectual remedy for the blistering of the film in the collodio-albumen process is to give the plate a preliminary coating of exceedingly weak albumen. One part of albumen to twenty of water will answer.

"Orthodox."—1. Mr. Solomon, of Red Lion-square, is the agent for Carrier's paper.—2. Harvey, Reynolds, & Co., of Leeds, were at one time the agents for the paper for the photodiaphanic process. You should write to them.—3. The article on taking portraits in an ordinary room by aid of a mirror appeared in our number for December 27, 1867, page 612.

G. V.—Your pictures are defective from improper lighting. The dark shadows under the eyebrows indicate an excess of top light. Modify this, and by doing so you will proportionately increase the power of the front and side light, and produce a more pleasing and harmonious picture. You will, of course, have to give a much longer exposure; but of what of that when your portraits will be so much better?

"A Lime-Light Man."—Quick lime, caustic lime, stone lime, and burnt lime are all different names for the same thing, which is an oxide of calcium, obtained by exposing limestone or marble to a red heat. When water is sprinkled on this oxide of calcium it converts it into hydrate of lime, or "slaked lime," as it is more commonly designated. To preserve the burnt lime it must be placed in a bottle, and surrounded with powdered lime to preclude the possibility of the moisture of the atmosphere coming into contact with it. Pure lime, if exposed to the air, attracts carbonic acid, and passes into the state of the carbonate or common chalk.

B. J. A. says:—"Please tell me, in next number of your Journal, the best method of treating a Daguerreotype in which the glass has been cracked some years, and caused a broad stain upon the metal plate. Of course it is right across the face."—See reply to "Geo. Brindley;" and we may add to what is there said, that the final washing of a Daguerreotype plate must be performed with distilled water.

Auld Lens.—The mistake has arisen from your own blunder in writing convex for concave. In a matter of that kind it made all the difference in the world, and we could not possibly understand how the alleged effects had been obtained. Undoubtedly you can use the lens for enlargements; although it is not the best form, it will answer very well. A large excess of negative spherical aberration is demanded by the lens you call B; a plano-convex will prove better than the form you have figured as A.

J. Latham.—Get some good Canadian balsam, and, if too thick, add to it a little turpentine or benzole. Place a drop (free from air bubbles) on the centre of the concave surface, and then place upon it the convex lens. Press them gently together until the balsam oozes out all round the edges. Now tie a piece of thread crosswise all over the lenses, so as to prevent them from getting displaced, and place before a fire for a short time until the balsam is dry. If you fail in the first attempt, you may separate the parts by placing the lens in warm water, and the balsam may be effectually removed by means of benzole, ether, or even old collodion.

J. T. L.—We shall defer a reply in connection with the principal topic in your letter till next week, and, meanwhile, we shall have obtained the opinion of the maker. Your other query we answer as follows:—Lime water is neither a solution of the chloride nor the carbonate of lime, but is prepared thus:—Upon half-a-pound of freshly-burnt lime sprinkle a little water to slake it, and then add between ten and twelve pints more water and shake well together for five minutes. Cover it and set it aside for a few hours, then place it in a stoppered bottle and decant the water from off the lime as you require it. When you add more water, shake well up before placing the bottle aside.

J. H. Mann (Gibraltar).—Instead of answering your questions categorically, we shall do so in the form of a running commentary on your letter. The flatness is occasioned by the sun shining on the walk, which radiates so much light as to overpower your top light. The remedy is suggested by the knowledge of the disease. Arrange so as to have less "floor light." It would be better were you to use a lens of shorter focus; but, whether you do so or not, have such an arrangement of dark boards, turf, or *any* dark substance, laid in front of the sitter, so as to prevent the spoiling of your shadows. When you imagine that this is remedied place yourself in the position of the sitter, and ascertain in what direction the light preponderates. We knew an amateur similarly situated who had long been troubled with flat pictures; in his case the bottom light was so strong as to suggest the idea of the shadows being cast upwards, as in the case of bright snow with a gloomy sky. The cure was effected by the expedient, temporarily adopted, of extending a dark background in a sloping direction from the camera downwards to the feet of the sitter. This will indicate to you the direction in which you must seek a remedy. The picture which you wish to borrow shall be sent to you with much pleasure as soon as we can find it. The print you enclosed has been under-exposed.

Received.—G. B. A.; S. Attwood; Geo. Frankland; and others.

In Type.—Communications from M. Carey Lea; G. Rousseau, &c.; also, report of the meeting of the Photographic Society of Marseilles.

☞ Editorial Communications should be addressed to "THE EDITORS,"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York Street, Covent Garden, London, W.C.

LONDON GAZETTE, *Friday, January* 29.

Notice of Sitting for Last Examination.

B. Rangel, Cambridge, assistant to a photographer.—Feb. 25.

METEOROLOGICAL REPORT.

For the Week ending February 3rd, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 10 a.m.

Jan. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
28	29·36	54	38	45	46	SSW	0·49	Dull
29	29 07	53	45	45	46	SSW	0·33	Rain
30	29 55	56	40	41	43	SW	0·04	Dull
Feb.								
1	29·06	54	41	49	52	SSW	0·19	Dull
2	29 56	48	43	43	45	WSW	0·03	Dull
3	29·76	62	37	47	48	SW	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 458. Vol. XVI.—FEBRUARY 12, 1869.

ON THE ZINC LIGHT.

In the paper read by Mr. Barnett, at the last meeting of the North London Photographic Association, he has alluded to the use of zinc for the purpose of obtaining a light of considerable actinic power. As we have already touched upon this subject in a former number, we return to it now simply for the purpose of offering a suggestion to those who might be disposed to take the matter up.

When metallic zinc is digested with iodide of ethyl a volatile liquid is obtained, which takes fire on coming in contact with the air. This zinc ethyl (as the liquid is called) has, therefore, to be distilled in vessels filled with hydrogen gas. When a little of this liquid is poured out into the air it instantly takes fire, and in burning emits a brilliant white light, while at the same time flocks of "philosopher's wool" or oxide of zinc are diffused through the air.

This wasteful and uncontrollable mode of obtaining a zinc light can be greatly improved and made very interesting by adopting another plan. If a little of the zinc ethyl be placed in the bend of a tube, furnished at one extremity with a jet and connected at the other end with a hydrogen apparatus, on now passing a current of the gas over the liquid contained in the tube some of the vapour of the zinc ethyl is taken up by the gas, and as the mixture issues from the jet it ignites spontaneously, and a zinc light of considerable brilliancy is thus easily obtained. This is a very effective and interesting lecture experiment, but we need scarcely say should not be tried by persons unskilled in the more delicate branches of chemical manipulation.

Whether a zinc light be produced by the method we have above described, or be produced by Mr. Barnett's plan, we can only say that it possesses much less actinic power than the magnesium light. In addition to this, the frequent contamination of commercial zinc with arsenic, as already pointed out by Mr. Hart, would render its use for artificial illumination unsafe in small rooms with deficient ventilation.

SOMETHING ABOUT PERSULPHATE OF IRON IN THE DEVELOPER.

We have been much interested during the past few days in thinking over some remarks contained in a letter addressed to a contemporary by a correspondent signing himself "Veritas," and over the observations of the editor of the journal thereupon. As the letter and the editorial rider refer to one of our own articles, which appeared in the last volume of this Journal (page 599), a few words upon the subject will not be out of place at present, more especially if they prevent any of our readers falling into the error in which our contemporary has been so easily entrapped.

We have already said that we were interested in perusing the letter and comments alluded to. We should have added that we were surprised also to find a person or persons sufficiently deficient in ordinary common sense to allow himself or themselves to be so led away by a phantom.

In the article of ours which was impugned, we gave a short account of some experiments relative to the action of silver on persulphate of iron; secondly, we dwelt upon the well-known fact that an old iron developer acts more satisfactorily than a new one, owing to the presence of a small quantity of a persalt of iron; and thirdly, we endeavoured to explain briefly how this persalt of iron acts beneficially in the developer. If we understand our critic's meaning aright, our remarks on the two first points pass unchallenged—no doubt because they contain statements of fact which the merest tyro in photography would be capable of proving to be true. But it is to matters connected with our explanation of the *modus operandi* of traces of persulphate of iron in the developer that exception is taken, and to this subject we now address ourselves.

As a preliminary, we give the following extract from a paper by our esteemed correspondent, Mr. M. Carey Lea, which appeared in our last volume, at page 528. Writing of alkaline development, he says that we must use this mode of development very slowly and carefully if we want to get full detail. "If we hasten it we get a harsher picture, whereas with an iron development precisely the reverse is true. If we develope slowly we tend to get a harsher picture; the greatest stiffness is got by developing rapidly." The keynote to our remarks is found in the foregoing sentences, since our object is to show that the presence of *small quantities* of persulphate of iron in the iron developer tends to produce a condition somewhat intermediate between the alkaline and the plain iron developer.

We must now observe that no article has, probably, yet been written from which certain statements might not be extracted and their meaning ingeniously twisted into most opposite shapes, so materially does the context often modify the sense of the passages. Thus we might make the following extract from our contemporary's own remarks, in which he says:—"A slow developer increases granularity and decreases half-tone; a rapid and energetic developer, on the contrary, tends to the production of detail and little contrast." If we trusted to these words alone, we might say that our critic was utterly ignorant of the nature of the office performed by a restrainer —of the conditions which modify the action of weak or strong developers, &c.; but yet we do not rush to this extreme. Nevertheless, our contemporary, while giving a long extract from our article, has—unwittingly we would hope—omitted the very portions which render our meaning clear, and which show that we are dealing essentially with a question of degree. We must, therefore, supply the omission. The whole of the first of the following paragraphs was left out by our contemporary, and the concluding portions of the succeeding one. The words omitted in the latter case we have placed in italics, not only to mark the fact of their having been omitted, but in order to point out that they have the strongest bearing on the context, since Mr. Carey Lea has fully shown that the stable position of the plate during development has the most material influence upon the result:—

"Our readers well know that a new solution of plain protosulphate of iron would immediately fog an exposed plate over which it might be poured; but when an acid—such as acetic or citric acids—is present, the tendency of the developer to cause the immediate reduction of any silver compounds which may be present is held in check, and the result of this restraining action is the gradual deposition of the metallic particles. Time is thus afforded for a selective action—just as a man before taking an inevitable leap may have time to decide where he

will alight; so the iron developer not only reduces a portion of the silver compound constituting the image on an ordinary bromo-iodised film, but the silver contained in the developer flooding the plate selects these reduced portions of the image for its own attachment.

"With a new and energetic developer, even in presence of a full proportion of restraining acid, the deposition of silver on the lights of the negative takes place very rapidly, thus soon exhausting the silver carried by the plate; while the half-tones, owing to their more feeble definition, have failed to attract the notice of a sufficient quantity of the falling silver. We know that silver, when precipitated with moderate rapidity, always selects the more prominent portions of the image for attachment in preference to the less marked lines or points. *This tendency to disproportionate deposition is increased by the frequent rockings of the plate which some photographers consider necessary during development, for steadiness of the plate lessens the evil.*

"When an old iron developer is employed, instead of the fresh one whose action we have just been considering, the very marked difference is observed which we have frequently drawn attention to in former articles. Now the action takes place regularly: the silver is deposited rather more slowly than by the fresh developer, there is less tendency to granularity, and the half-tones receive their due proportion of the metal. This result can only be attributed to the presence of peroxide of iron in the developer, since the addition of some of the *per*sulphate of iron to a new developer confers the desired properties upon the latter. That the persalt of iron plays the part of a restrainer there can be little doubt; but if we 'restrain' the developer to an equal extent with citric acid we do not succeed in obtaining such soft negatives. It is evident, therefore, that some action must come into effect other than the ordinary influences with which we are acquainted. We have long sought for a satisfactory explanation of this singular phenomenon, and we believe that we can now solve the problem with the aid derived from a very singular experiment, which we shall here describe." * *

In the above statement we look upon the persalt of iron as occupying a subordinate position in the developer, and exercising an influence which is greatly under the control of the *mass* of the powerful reducing agent co-existent with it in the solution. To whatever this modifying influence of the persulphate of iron may be due, our experience of its use in the developer is that, while it diminishes the tendency to fogging, it increases the half-tone of the negative, *unless the persalt be present in excess.* But, if a very little attention be bestowed upon the reading of the last paragraph quoted above, it must be evident that we do not consider this as the result of a restraining action alone; for we say—"If we 'restrain' the developer to an equal extent with citric acid we do not succeed in obtaining such soft negatives." This is sufficient to show that we do not look upon the restraining influence of the persulphate of iron as at all accounting for the facts observed by us, since it is well known that granularity must result from *very* slow deposition; but when the persulphate of iron is present in suitable proportion the action takes place regularly, the silver is deposited rather more slowly, there is less tendency to granularity, and the half-tones receive their due proportion of metal.

These remarks, consequent as they are upon experiments under ordinary working conditions, are obviously not directly comparable with the special experiment referred to in the succeeding paragraph, since the silver was there held in the strong solution of the persalt of iron, and in the almost complete absence of a reducing agent was, therefore, under wholly exceptional conditions; but, even in this extreme case, "when the solution is diluted and placed in contact with a body capable of attracting to itself silver, the metal is then slowly separated from the liquid."

Having written so much upon this subject we shall not now further weary our readers, but finally hand over the matter to our contemporary; and in doing so we hope that he may be able to inspire three or four additional letters and articles from the materials we have now placed in his hands. As for ourselves, we shall look on with feelings of amusement at the efforts made to gain some little notoriety by misinterpreting the plain statement of those who never seek to escape the responsibility which may attach to their words by adopting the doubtful *ruse* of a *nom de plume.*

NATURE OF THE IMAGE FORMED UPON BROMIDE OF SILVER.

MR. SUTTON has lately published a theory of the action of light upon bromide of silver, in which he takes up the opinion that in the combination formed by silver, with the organic material acting as sensitiser, the whole nitrate of silver enters bodily, nitric acid and all, into the compound.

In support of this curious doctrine he has written many pages, but I cannot see that he has made a single experiment. Before insisting upon the presence of nitric acid in the film, it would seem to have been well to endeavour by chemical tests to have proved it.

Some investigations published by me last summer had already disproved Mr. Sutton's theory before it came into existence. I there showed that sensitive plates of bromide of silver could be prepared *direct from metallic silver.* As no nitric acid had been present at all, of course it could not exist in the sensitive compound.

The experiment was as follows:—A film of pure metallic silver was formed upon a surface of ground glass. This, after thorough washing, was converted into bromide of silver by immersion for a length of time in strong aqueous bromine. It was then washed well and tanninised. Exposed to light, it received an image which was developed in the usual way.

This experiment is evidently fatal to Mr. Sutton's theory: it shows that the sensitive combination can be formed in the entire absence of nitrate of silver and of nitric acid in any form, and, therefore, it is altogether impossible that nitric acid should enter into its composition in any way. M. CAREY LEA.

ARTIFICIAL LIGHTING FOR PHOTOGRAPHIC AND ILLUMINATING PURPOSES.

WE supplement the observations by Mr. Barnett, given in another page, by the following remarks on the subject of artificial lighting as adapted for photographic purposes.

The light emitted by the combustion of zinc has been long noted; magnesium, however, undoubtedly occupies the chief position among the light-giving metals. Nothing can as yet compare with it. It is worthy of observation that, in the summer of 1865, M. Le Roux, of Paris, and Mr. Solomon, of London, took out a patent for the use of the light emitted by zinc, tin, and other combustible metals, when burnt along with magnesium. These so-called inferior metals were connected with the magnesium ribbon by means of interlacing, electro-deposition, soldering, or by any other suitable method. The arsenical fumes emitted by the zinc will not, we presume, militate against the adoption of this metal, as no one would think of burning such a metal as magnesium without providing means for the fumes to escape. We might here recommend the flexible chimney which was introduced by Mr. Solomon for this purpose, because we think it cheaper, better, lighter, and more portable than any others known. It simply consists of a long wire coiled as a spiral round a rod of suitable dimensions—say three inches in diameter—and this when pulled out is covered with oiled or varnished calico tightly wrapped round it and pasted on. This closes up in folds like those of a bellows camera. We have not yet seen any contrivance for conveying away the smoke which equalled the flexible tubing here described.

Our friend, Mr. Fowler, has laid us under a debt of gratitude by his description of the arrangement adopted by M. Bourbouze, for rendering a cap of plating gauze luminous by means of the heat engendered by the mixture of common gas and common air. When conversing a few days ago with Mr. Le Neve Foster, Secretary of the Society of Arts, he informed us of a modified form of this light which had been adopted several years ago, and by means of which the lecture-room of the Society of Arts had been lighted during an entire evening. But, first of all let, us state that the first lamp on what we shall call the "Bourbouze" principle we have as yet been made aware of was the invention of Mr. W. Shaw, who, thirteen years ago, obtained a patent for using a cap of perforated or woven wire gauze in connection with a mixture of air and common gas.

The apparatus invented by Mr. Joseph Gillard, C.E. (by whose method the lecture-room of the Society of Arts was illuminated on the occasion referred to), is, in our opinion, a more beautiful and compact one, for in it pure hydrogen is burned, and every tyro in chemistry knows that this gas may be obtained from a small and portable apparatus under a very high degree of pressure. In order, however, that the cost of the light should be reduced to a minimum, Mr. Gillard embodied in his patent, as its chief feature, a mode of preparing hydrogen by the simplest of all methods, viz., the decomposition of water. This gentleman adopted a method which may be briefly described as follows:—Steam from a boiler was carried through pipes, in which it became superheated; it was then carried into iron D retorts, and dispensed over layers of incandescent charcoal, by means of a number of small orifices in tubes running through the length of the retorts. The gas thus obtained, after

being deprived of its carbonic acid, was ready for use, and was passed into the gas holder. For illuminating purposes it was made to pass through a burner somewhat similar in form to the Argand, and this burner was surmounted by a cage, or network, or cap of fine platinum wire, which stood a little above the dull flame of the hydrogen, and which was converted into a cylinder of intense white light. In place of platinum alone, Mr. Gillard found that a mixture of platinum and iridium answered better for the "cage," as it was less liable to become injured by the action of the heat. He also found that, instead of having the wire gauze cap of a cylindrical form, one somewhat conical answered better.

Now, as expense for lantern purposes is not an object of primary consideration, even if it were involved in such a light as that now under notice, we suggest, for the consideration of experimental friends, the adoption of a lamp of this kind for the lantern. The hydrogen would, of course, on the scale proposed here, be generated from ordinary materials, such as zinc and diluted sulphuric acid, the generator being an ordinary self-acting one of a size and form to be placed under or behind the lantern. With a gas generator of that kind any reasonable degree of pressure might be obtained, and, the intensity of the light being dependent upon the pressure, this quality would be quite under control.

As the patent we have alluded to is not now in force, any person is at liberty to experiment with it; and it will afford us pleasure if some reader will so modify and improve upon these hints as to bring out a simple, self-acting, and intense light for the magic lantern, and suitable either for enlarging or exhibition purposes.

We may state that the height of the gauze cap for the flame which Mr. Gillard preferred was about three-quarters of an inch. We have not ourselves yet tried the pure hydrogen; but, from what we have ascertained, it is said to answer better than the mixture of common gas and atmospheric air employed by Mr. Shaw. Here, then, is, if not a *new*, yet a good and feasible old, idea, which may be advantageously utilised in the direction we have now indicated.

THE CLOUD STOP.

Some inquiries having reached us relative to what Mr. M. Carey Lea designates "Mr. Sutton's stop," we are induced to give such a description as will enable any reader to understand its principle.

It consists in placing the stop in front of the lens at such an inclination as to present its aperture more directly to the foreground, its edge being presented towards the sky. By this means a large beam of light is admitted from the foreground, and a more attenuated one from the sky.

This kind of stop was first suggested by the Rev. William Read, of Manchester, and was published in June, 1858, in Mr. Sutton's *Photographic Notes*, from which circumstance Mr. Lea may have become impressed with the belief that the suggestion first emanated from Mr. Sutton. The idea, however, is a good one, by whomsoever originated.

ON THE IMPORTANCE OF A FEW OF THE LEADING PRINCIPLES OF THE ART OF DRAWING, AND THEIR BEARING ON PHOTOGRAPHY.*

PART III.

All kinds of composition are associated with two individual shapes—angular and circular. All forms of a square shape are to be avoided, because right angles are very severe to the eye. Again: the full circle is to be avoided, and more of the ellipse is to be aimed at. It is always to be borne in mind that it is half-right angles or acute angles that are adopted in sliding from one part into another, excepting when, for variety's sake, you wish it rounded, and then you employ more of the oval than the circle. Acute angles are very useful in casting shadows of that form over the bottom corner of the picture, on either side, according to the source of light. There are many ways, which photographers all know, that the light may be so introduced as to cast shadows over certain parts of a print after it has been taken from the negative. With a very little knowledge as to the treatment of these shadows, many ordinary effects, both in landscape and portraiture, might be greatly improved.

In speaking of these forms of composition, I need not use the old adage "that it is the greatest art that conceals art;" nor tell you that while no form of itself must be engaging, yet it must always be agreeable. The great object (as I said before in speaking of the *forte* points) is *variety under an order* or diversity in unity. If a picture be constructed from one corner to the other by a diagonal line, making an angle on each side of it, the one in shade and the other in light, the individual form upon which the structure lies is this diagonal line, and it must be hidden. It is done by a portion of the quality of each angle being thrown into each other, and in so doing intersecting the line.

Diagram No. 6—taken from John Burnet's (the engraver) work on *Light and Shade*—most successfully illustrates how this form of composition may be hidden, and at the same time an agreeable balance secured.

Diagram No. 6.

This kind of composition is a very simple one, embodying much variety, and embracing the principles of almost all kinds of angular composition, together with that of the principles of light and shade. The secret of subduing any pervading form is simply by bringing an opposing line to bear upon it which will counteract it; very soon the eye becomes sensitive to any such want. This part of my subject embraces a large field, wherein I might have given further examples how these principles have been treated by eminent artists, but to do so would entail considerable additional illustration.

I shall now direct your attention to some things in particular concerning forms of effect of light and shade that should be aimed at, and others that are to be avoided. On this part of my subject I will draw largely upon Howard for matter and illustration. Those that can get a reading of Harding's or Burnet's works on this subject would be much benefitted. But their analyses of composition is much too intricate to gather anything for my present purpose, and I am very confident that the things which this paper embraces will be ample for all practical purposes concerning the objects of this Society.

The first thing that I would call your attention to is shapes and lines formed by masses of either light or shade. Light should never cross the middle horizontally, leaving the top and base in equal shade, nor down the picture vertically, leaving the two sides in shade; but should run across the picture diagonally, leaving the opposite corners in shadow. As with light so with shadow: the masses should not pass horizontally nor vertically, but diagonally. Keeping in mind that masses are to be so broken up that the form of the mass should not strike the eye, nor be too much broken up so that the form of the mass could not be discovered. Masses of light or shade should never be square nor a parallelogram, but may more nearly approximate to triangular or circular, or any shade bounded by curves. If points project from the general mass, they should not be equal in length on each side, *i.e.*, rising out of the centre, but shorter on one side than on the other. Nor should they project at right angles from the mass, but so as to form an acute angle on one side and an obtuse angle on the other. If the objects be of a regular form, or appear to produce lines such as stiles, gates, posts, stems of trees, &c., Howard states that great care should be taken that such a view of them be taken as shall lead the lines off the square, carrying out the former rules, and be lying, if possible, diagonally on the same line.

To accomplish this perfectly with the camera may be difficult at all times, especially when such objects are lying near on the foreground. The same principle applies to ground broken up by parallel lines, such as a ploughed field; it ought to be taken with the lines retiring. Angles and curves by undulation are good. Horizontal lines cannot be avoided in the case of clouds or water. They are

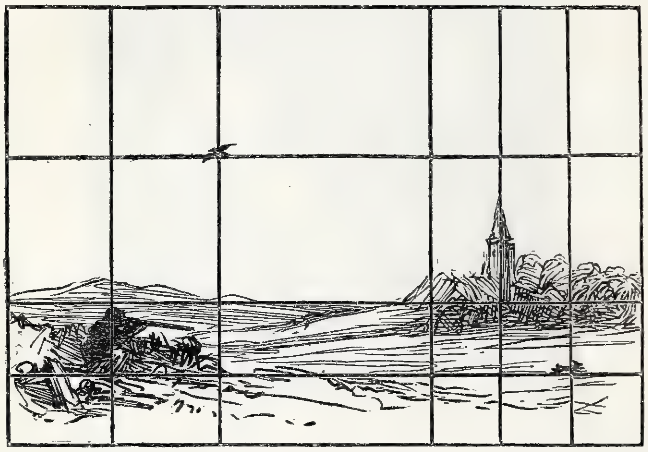
* Concluded from page 63.

often beautiful when properly treated, but care must be taken that they do not strike at objects or lines at right angles to them—that is, vertical lines. Stems of trees being frequently off the perpendicular, the horizon of a sky with sunset clouds often tell beautifully against the stems, and form great varieties of angles.

Having so far called your attention to masses in themselves, I shall now direct you to the arrangement of them.

If the subject be a house, tree, or any object which is to form the principal feature in the picture, it should not be placed in the centre, but at a *forte* point on either side. If an arch or any object forming a focus, treat it in the same way, not in the centre, but at the side, and so on. The principle being, as I have formerly described—the centre being regarded as a weak point, the object of greatest interest is necessarily put on the greatest *forte* point. Being put to the side, of course it must be more or less moderated by a smaller object of interest on the opposing side, and on a *forte* point, rather weaker in influence. The following diagram is a fine example of this:—

DIAGRAM No. 7.



It is first divided into three parts, both vertically and horizontally. The third division vertically to the left is divided into two parts, the right division vertically on the other side is divided into three parts, and the lower division horizontally into two parts. A man shooting is put between the bottom division horizontally, on the left side division vertically (a very strong *forte* point). A hare running is put on the right extreme division, a church and tower on the next division, and a bird started while the gun fired is placed on the third division to the left, so that not one of these *forte* points are the same. This is one of the happiest illustrations of Howard's, most fully carrying out the principle of *variety under an order,* and must commend itself.

On the same principle notice still further the difference between the centre of interest being put in the centre of the plane of view, and in another the centre of view being put to the side, and the art exercised rendering it not visible. If, for instance, an avenue of trees is to be taken, do not place the camera in the centre of the walk, but at the side of the avenue on a likely *forte* point. If the view of some important street, not in the centre, but at the side, choosing one which embraces the finest view of lines, and these lines lying on the *forte* points. If a burn, it should not be made running towards, or from, the centre of the plane of view, but *if* possible across the plane diagonally. The frontispiece in Rowbotham's work is a most beautiful illustration of arrangement and the general treatment of light and shade, showing also the value of forms, either angular or circular. But it is needless for me to enumerate further. I think I have given sufficient to show the value and importance of right composition, the general forms, and the treatment that constitute it.

Having so fully illustrated the principles connected with landscape art, very little is left for me now with regard to portraiture, for what governs the one is very applicable to the government of the other. However, in case you may not be able fully to see this application, as there are some things in particular not common to the one which is essential to the other, I shall bring before your notice some of these, and those only that are practicable to the photographer.

The first thing, then, that I would bring before you is the different sizes of portraits recognised by painters. They are seven in number. 1. The size called the English head size, 20 × 25 inches. 2. The common head or three-quarter size, 25 × 30 inches. 3. The kit-cat size (the name being derived from the size of portraits adopted by a society of British essayists in the days of Johnson, Reynolds, and others) 28 × 36 inches. I most frequently use 30 × 36 inches, giving a little more accommodation. 4. The small half-length size, 36 × 44 inches. 5. The ordinary half-length size, 40 × 50 inches. 6. The Bishop's half-length size, 44 × 56; and, lastly, the whole-length size, 7 feet 10 inches × 4 feet 10 inches. Two of these are not much used. The small half-length and the Bishop's half-length are only adopted in cases of large subjects and under large treatment.

I wish you now to notice particularly the distance of each respective size from the head, measured by certain proportions of the face, not including the hair or scalp. By a little attention to this rule you can very easily place the head in the same relation to every size, the object being to have the head always as near as possible on a *forte* point. The following diagram illustrates it:—

DIAGRAM No. 8.

The distance, then, of the head from the top of the hair to the top boundary line of an English head-size is one-quarter of the face; a common head size one-half of the face; a kit-cat size three-quarters of the face; a half-length, one face, and a whole length, three-quarters of a head from boundary line at base of picture to the toes of feet—the head, of course, taking its place from the top according to the size of subject.

Some may regard these regulations as merely conventional, but any one who gives them the least study will very soon feel the force of the relative bearing of principal objects to the boundaries, and I must say that in no department of art do we see such want of knowledge of this as in the department of photographic portraiture. The great tendency of the inexperienced is to keep the head as near as possible to the centre, consequently dwarfing the character, calling for a ticket to be placed above as so much room to let. Size is important, but one should never pay for mere size; unless the subject in its necessary treatment calls for such accommodation, it should never be tolerated. There is nothing like having space well occupied; at the same time, in filling it up, it should only be with that which essentially gives effect and value to the portrait.

As that of producing variety agreeably is the most difficult element in the composition of landscape, it is all the more felt in portraiture, because all natural action becoming it is very limited. This, of course, makes the rules for directing it comparatively very few.

One particular thing to be observed in the arrangement of the sitter is never to have the head and body upon the same plane. If the head be looking out of the picture, the body should be more or less facing the spectator, and that just according to the degree that the head is looking away. If the head be in profile, the body should be seen three-quarters. If the head be seen three-quarters, and looking into the picture, the body should be sympathising with it, and more or less turned to the spectator. If the head be seen either partially full or quite full, the body should be slightly three-quarters to either side. When the head is looking out of the picture, the face should be looking towards the greatest amount of field, *i.e.*, the back of the head a little nearer to that side of the picture than the one to which the subject is facing. At all times observe that the face is looking to the amplest field, in order to assist the feeling of looking into space. Whenever the legs are introduced into view, if the body be seen in full front, then they should be crossed or opened, or one leg in and the other out, the object being to produce lines different from

the body. In regard to the hands: if separate, they should be decidedly separate—one at the one side and the other at a different point from it. If not quite remote from one another they should not be at the distance of a foot from one another, but decidedley together, some way or other—the object being to avoid weakness of expression which the apparent indecision creates. Again: the elbows should never be compressed, but taking, as it is styled, "plenty of elbow room," even although the boundary lines should cut through either of the arms. The body, also, in respect to feeling, should never be too erect; the weight of the body should be more or less apparent by slightly bending the back.

What I said before on toning or throwing in portions of shadow over the foregrounds of landscapes can be done with great advantage in the case of portraiture. This operation, by way of toning down what is too conspicuous, might be used with considerable effect when properly directed. I think the method much easier than that of attempting to throw the shadow on the subject itself.

I have already enforced the desirableness of taking very small negatives, *i.e.*, at a long range, for the purpose of enlargement. It is much to be regretted that perfect proportion and absence of all exaggeration is not more carefully considered in portraiture; and never will the prejudices against photographs by those who are familiar with good drawing be removed until the principles of art be more recognised and carried into practice by every photographer.

Had I thought it necessary, I might have said something regarding the treatment of light and shade in portraiture. As far as the principle of relief is concerned, diagram No. 6 is the key to the general construction of it, the consideration of which will well repay the student.

What is felt to a very lamentable extent in photography—perhaps not so much now as formerly—is what I have already adverted to, viz., the source of light not being apparent enough on the subject; the light by diffusion that glass houses render is not only tame and insipid in effect, but positively tortuous when called upon to reproduce it in painting. But I am not without hope that such an appliance as a reflector over and above diffused light, as I suggested lately when the subject of glass houses was before us, would, by proper adjustment and careful trial, produce marvellous results.

This brings me to a close. I humbly trust that what I have brought before you in these papers may have awakened some to the importance and advantages of possessing a knowledge of the principles of art employed in drawing. If I have been but partially understood on any department that I have touched, I need not say to the members of this Society that nothing will afford me greater pleasure at any time than to give further explanation if desired.

Norman Macbeth.

ARTIFICIAL LIGHT AND PRINTING BY DEVELOPMENT.*

In December last a friend forwarded to me a box of photographic sundries, amongst which there were some half-dozen porcelain dishes. The summer had been so hot, and my time so occupied, that I had given up photography, which had become to me a thing of the past; but the sight of so many useful things raised an ardent desire to do something. The difficulty was how to employ them, when, to solve the difficulty, a periodical fell into my hands with this startling announcement, *Rapid Development Process Used for Multiplying Maps in the Belgian War Office.*

This decided me, and the necessary chemicals at once procured, I floated thin Saxe paper on a solution containing chloride of ammonium and citrate of soda; sensitised with a weak nitrate of silver bath; exposed ten to twenty minutes, using a weak negative and oxyhydrogen lime light; developed with acetate of lead and gallic acid; and although I tried this many times, I never obtained even the trace of a picture.

In using the lime light, I use common coal gas through the open end of a quarter-inch tube, and the oxygen plays through the flame in the manner of a blowpipe. I never mix the gases now, having had one explosion, which was more than sufficient to satisfy me that fearful danger lurked in the practice.

Seeing that no good was likely to accrue from this first process, I wandered to another—whose author was Dr. Liesegang—which for distinction I would name the "tapioca process," that substance being used with chloride and iodide of potassium and lemon juice for the iodising, a tolerably strong nitrate bath, and a gallic acid developer; and although it was described as a highly-sensitive process for enlargements, I must confess in my hands it was very slow. I certainly obtained a picture; but it was covered with little red patches, which, from subsequent experiments, I think were due more to the paper used than to the process.

I now wandered back to the old processes—simple salting, Talbot and Taupenôt—but in all these very long exposure was necessary to obtain any result, and the numerous washings and floatings and dryings took up too much time, and I began to think of giving up, when it occurred to me—Why not endeavour to prepare a paper as much like a collodion plate as possible? The idea appeared so feasible that I at once floated thin Saxe paper on iodide of potassium, and, without any washing, sensitised it when dry on a thirty-five grain nitrate bath. With a ten minutes' exposure I obtained my first picture, the worst feature in which is that it is *in* the paper, not *on* it. I now added albumen in the proportion of one to ten of water, and at last of one to four, which, with the addition of bromide of ammonium, has given me the best results I have to show you.

The formulæ stand thus:—

Iodide of potassium	12 grains.
Bromide of ammonium	5 ,,
Albumen	2 drachms.
Water	1 ounce.

Bath.

Nitrate of silver	35 grains.
Water	1 ounce.

Acidulated with glacial acetic acid.

Developer.

Gallic acid (saturated solution)	1 ounce.
Water	1 ,,
Glacial acetic acid	20 drops.

For a short time this process worked very cleanly and well, but lately I have not been able to obtain other than dirty brown or red-brown pictures. The addition of silver to sixty grains per ounce does not seem to have any effect, and I am quite at a loss to account for the failures. I have tried developing with pyrogallic acid; this brings out the picture at once—in fact, so quickly that there is scarcely time to float it before it must be immersed in plain water to stop its action. The prints are very gritty in the shadows, and the high lights become discoloured; besides which, when using pyro., the prints cannot be immersed, which I think a great drawback, as one cannot see how the picture is progressing. I hope to have your opinions on this subject.

From the short experience I have had I find it very unwise to use other than photographic paper for photographic purposes. I was induced to try a very hard post paper made by Towgood, of St. Neot's Mill, and the result, both with the tapioca process and that with which I have been most successful, is very remarkable. The paper becomes of a dark red, or, rather, dirty red. This did not arise in merely one instance, but in all that I tried both by artificial light and daylight.

In examining the results of my labours I trust you will not be too severe in your criticisms. Remember that I am only an amateur, and that I bring the prints before you with all their faults, hoping to profit by the hints which I know so many present are able to give me.

Before closing this short paper, I wish to call your attention to the subject of artificial illumination. So much has lately been printed on the subject that I scarcely like to attempt to lead you into a discussion on the matter; but any new method of obtaining an actinic light cannot but be a source of interest to us all.

I would call your attention to some small prints on the table, which are very unsightly, very imperfect, it is true, but which were produced by simply burning some zinc shavings in a small jet of common gas. I must acknowledge that I was truly surprised at the powerfully actinic light produced by this means. The excess of exposure is one minute—some half-a-minute, the paper being the same as the enlargements, used dry, under the same negatives. The zinc used is that generally known as "rolled sheet," one-eighth of an inch thick, the shavings being turned off in a lathe. The same unpleasant dry fumes arise during combustion as from magnesium. I shall be glad to learn something of their nature, and if detrimental to life or health. I believe Solomon's lamp confines them to the chimney, or some other dark abode where they do not trouble us, so I presume that difficulty could be overcome with zinc. Its price would place it in the hands of all, being infinitesimal in cost compared with magnesium.

These are matters I must leave to those who are better able to discuss them than I am, and from whose remarks I feel confident good results must necessarily follow. John Barnett.

* Read at a meeting of the North London Photographic Association, February 3, 1869.

IMPROVED ALBUMEN PROCESS FOR OPALOTYPES.*

Some months ago you published my process for making *permanent* porcelain pictures. I have since modified it so as to make it more certain and satisfactory, and now think it is all one could desire. Take of—

Albumen	2 ounces.
Water	1 ounce.
Chloride of ammonium	6 grains.

Dissolve the chloride in the water, add it to the albumen, beat them to a stiff froth, and let settle.

Silver Solution.

Nitrate of silver	1 ounce.
Water	$1\frac{1}{2}$,,
Alcohol	12 ounces.

Dissolve the silver in the water, pour out one-third, and add ammonia until the precipitate is barely redissolved; then add it to the other two-thirds. Clear it again with nitric acid, and then add it to the alcohol; shake well, and filter.

To use the above proceed as follows:—Coat the porcelain plate with the settled albumen, using heat from an alcohol lamp or stove. Prepare a number at one time, as they keep well. Make the plate warm, flow it with the silver solution (the same as you would flow a developer over a plate), keeping it on for one minute. Drain and wash off the excess of silver with alcohol. Dry and fume five minutes. Print and tone with any good formula for toning albumen prints. Fix in hypo., one ounce to ten ounces of water. Wash for four hours at least. Caution: have the plates *well warmed* before flowing with the silver solution, or, on drying, they will dry dead, and appear like ground glass. William Bell.

NEGLECTED ART SUBJECTS FOR PHOTOGRAPHERS.†

PART II.

A few years ago I had the honour of reading a paper before you on the same subject as the present, and I then said that photographers had a tendency to run in grooves. I own that we have seen some improvement in this respect, and the tendency is not so general; although now there seems to be an attempt, with more or less success, to follow the style of M. Adam-Salomon's matchless work—difficult as indeed the attempt is without M. Salomon's artistic knowledge, though I willingly admit that Mr. H. P. Robinson, in his portrait of Mr. Hain Friswell, treads closely on M. Salomon's heels.

The camera, as we all know, is a splendid copyist. Some would liken it to the painter's brush; but this, from the nature of the instrument, it cannot be, and we deceive ourselves when we attempt to do too much with it.

Very great advance has been made in architectural photography by Mr. Francis Bedford, Mr. Frank Good, and Mr. Collings. The success of the first is, as might be expected, due to his love of the subject and thorough reverence for the past, in addition to his architectural and archæological knowledge, and the two others from following in his steps; but Mr. Bedford has, indeed, kept in the van.

Much has been done in architectural detail, as the *West Front of Lincoln Cathedral*, by Mr. Bedford, and the photograph of Salisbury and other cathedrals which Mr. Collings has kindly lent to me. The importance of this advantage cannot be overrated, for details are valuable to the architect, and full of interest to those who study the life and manners of our forefathers.

If you look at the details of *Salisbury Chapter House* you will see how the sculptor gave life and even humour to his work, combined with greater knowledge of Holy Writ than we are accustomed to believe. The truth is the worker loved his work, and thus it became a success, and not a mere lifeless study.

These remarks refer to our cathedrals, which have received a large share of attention; but what shall we say of the small country churches, so numerous that we may agree with the idea of J. H. Newman, D.D., as expressed in the following lines:—

> "Where'er I roam in this fair English land
> The vision of a temple meets my eyes;
> Modest without—within all glorious rise
> Its love-enclustered columns, and expand their slender arms."

In many instances these "modest" edifices offer remarkable peculiarities of art and architecture, having, through their apparent insignificance, escaped the axe and hammer of the destroyer. Hallowed by the prayers of centuries, and imparting a feeling which no modern building produces, they are, however, open to danger. Mistaken but well-intentioned zeal is frequently real destruction. And here I do not allude to such acts as those of a Lincolnshire rector, who, in denuding his church of everything to the eye mediæval and Christian, boasted that he had purified the building, and made it truly Protestant, as if this heartless irreverence could have had anything whatever to do with religion of any sort.

Ancient art is to us a precious legacy, although some of its productions may not be quite in accordance with our modern ideas. Some architects have taken photographs of a building previous to its restoration or destruction. I need not say how much this is to be desired in every case, and how valuable the camera then becomes in producing a historical record.

I fortunately visited the curious church of St. Margaret, at Darenth, Kent, before its very careful restoration at the hands of a most accomplished architect and archæologist, Mr. William Burges. Looking at the photographs you will see what valuable records they form of the additions which disfigured the building in the last and preceding centuries—how it appeared when the internal fittings were removed, and how when somewhat restored to its ancient beauty.

Mr. John Henry Parker, F.S.A., who has made so much use of the camera at Rome, strongly urges that photographs should be taken of every country church, and that the various local archæological societies should make exchanges, so that comparisons might be made of the buildings in their respective counties. This suggestion is most valuable. We know that some of our churches, such as Bishopston, Wilts, &c., exhibit traces of foreign work or design. Canterbury cathedral will at once occur to your mind as showing the handiwork of William de Sens. How much one desires to see photographs of Sens' cathedral and compare them with those of our metropolitan church! But, going from the greater to the lesser, we might, by the means of the photographs aforesaid, trace the hand of the same architect in various counties.

Mr. G. E. Street, R.A., considers, and not without reason, that some of the exquisite work of Stone Church, near Dartford, is a production of the thirteenth-century architect of Westminster Abbey. But, apart from these considerations, where do we find photographs of the curious seat in the church of Lenham, Kent? or the stone screen of Westwell, in the same county? of the beautiful chancel of Eastwell, recently judiciously restored by Lord Winchelsea? or the singular ritual arrangement at Smarden, and other peculiarities which I need not mention here? Such things as these photographers generally pass by, because, from their not studying the subject, they cannot appreciate its interest or its beauties.

I think I have now said sufficient on the architectural branch of the subject, and will pass on to another point—Botany.

When we have such gardens as Kew, where the officials treat with great courtesy and attention every photographer who visits them—as I can with much pleasure testify—it is strange that our art has not done more to illustrate the treasures which these gardens exhibit. But then, again, what do some of our photographers know of botany? We must reply, very little, otherwise they would have produced some subjects of a size sufficient for scientific use, and not have contented themselves with stereoscopic subjects—beautiful, indeed, but utterly unsuited for the purposes of study. I need scarcely say how much more a good photograph of a tree conveys to the mind than a drawing, however carefully made or coloured, as in that of the *Areca Bauerii*—which I now lay before you, and which was taken for the purpose of showing the position of the flowers—and the *Pandanus odoratissimus*, showing the large roots proceeding from the branches.

Another division of this subject I now propose to treat of—that is, representations of what are called ancestral trees.

I have been told that the well-known Burnham Beeches are yearly decreasing in number. We may be thankful that they have so often been photographed; but are there not in other parts of England trees not only remarkable for their size, but also for their antiquity or the scenes of history with which they are identified—giving them an interest which they would not otherwise possess, disfigured as their trunks may be by the "snobs" who cut their names on the bark, and who are thereby guilty of such barbarism that we might even possibly secure the autograph of some notorious evil doer?

Before leaving this part of my subject, I must allude to an idea which struck me as being well worthy of imitation, though it is not original, for the same plan has been followed in John Evelyn's *Sylva*, where the celebrated Cowthorpe is represented as it appeared in summer and winter. Some photographer has sent to the Kew museum a photograph of the *Friar's Oak*, at Clayton, Sussex—one in summer, with its luxuriant foliage, the other in winter, from precisely the same point of view, showing every branch. The advantage of this idea in botanical study is obvious. We Englishmen are rightly proud of our "patrician trees"—would that they, individually, more often received the notice of the photographer!

Next I must point out how much ferns offer as incentives to the

* *Phil. Phot.*

† Read at a meeting of the North London Photographic Association, Feb. 3, 1869.

photographer. Their exquisite outlines are attractive to every one, and their somewhat sombre hue makes them particularly fit subjects for the camera, added to their strongly-marked individuality.

Next: Geology.—We are all familiar with our late Vice-President's (Mr. J. J. Cole) good work in this direction; but much remains to be done. The camera there does its work well. All the strata and contortions of the rocks or their formation are clearly seen, and the photograph possesses more than mere local interest.

One branch of this subject has been overlooked, viz., that of Palæontology. When we know that the lion, the tiger, the elephant, and the rhinoceros inhabited the county we now call Kent some ages ago, as shown by the brick earth in the pits at Crayford, we must acknowledge that the subject is one of great interest. In passing, I may, with respect to these, remark that the remains show distinct variations from those discovered in other counties. We may then ask—Why is not some attention paid to this department of science by the photographer? The question of comparison again comes before us, and none can doubt its importance. Mr. J. Davies Burton has given us fine stereoscopic slides from some of the palæontological subjects in the British Museum. Beautiful these indeed are, but, again, not sufficiently large for the scientific man; not that I wish to throw any slight on stereoscopic slides—enjoying them as I do, and, as I trust, duly appreciating their beauties.

As to photographs of animals: we here have little record of progress. True, Mr. R. Faulkner has given us some exquisite photographs of dogs; but what else has been done of late? We can answer simply—nothing. Surely, in this respect, photographers ought to get out of the groove, for the field is inexhaustible and always attractive.

Then, as to what are called "bits" of scenery. I have the pleasure of laying before you some exquisite subjects by Mr. Bedford; and we all know what Mr. R. Manners Gordon has done in this respect. They require, in order to be duly appreciated, to be seen by an artistic eye; but how refreshing their accurate representation is to the educated mind!

I must now treat of a portion of my subject nearly the last but not least, and that on the representation of archæological subjects. We are all aware how the purchase of the Blacas collection was so ably achieved by Mr. Disraeli, to whom on that occasion all who were interested in art, whatever political opinions they might hold, gave due credit. When we see the superb head of Æsculapius we wish for some record of the adoring look which even the Pagan Greek knew well how to represent. But I might allude not only to these but to others in that treasure storehouse, the British Museum, so ill appreciated by the British public, who need something to take them out of the everyday race for wealth. Next to religion, art and science alone can afford relief from the constant strain on the mind of those who live at the present time; and if "a thing of beauty is a joy for ever," surely a representation of that joy must be pleasing to the over-tasked mind and brain.

In conclusion: there is really a need for photographers to be better instructed in other matters than art, on which we have had most admirable papers in the photographic journals. But I do especially urge on all photographers that they require some knowledge of the subject they copy, otherwise its peculiarity or its beauty may soon escape them. I do not mean to imply that there is any royal road to learning; but I do say that some knowledge of botany may, without very much difficulty, be acquired by the photographer—some acquaintance with art by any man who has the least pretension to taste—some knowledge of architecture and archæology by any one who has any time to spare—and I say the same of geology. Any or all of these add interest to every country ramble, and all are attractive to those who reverence—and what right mind does not reverence?—the past, knowing that from it they may guide their steps for the future. Labour to acquire knowledge is necessary, but in all labour there is profit. Yes, and we may add—*Labor ipse voluptas.*

W. Warwick King.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 17th	Edinburgh....................	Hall, 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

The annual meeting of this Society was held on Tuesday evening last, the 9th inst.,—James Glaisher, Esq., F.R.S., in the chair.

Mr. Henry Goodman was admitted a member.

The Treasurer's report having been read, the Chairman then read the report of the Council, which included a rapid sketch of all that had transpired during the past year in connection with the Society. Both these documents we shall next week give either *in extenso* or in abstract.

Mr. Eliot moved and Mr. Belton seconded the adoption of the report.

The Chairman directed special attention to the retirement of Sir Frederick Pollock, their President. When they considered that he was eighty-six years of age, that he had attended their meetings whenever he could, and that he still had their interests at heart, he knew they would give him, on retiring from the office he had so long held, a vote of thanks by acclamation. He would also ask for the thanks of the members to Dr. Diamond, who had for so many years been their Secretary and the editor of their journal, and to Mr. Robinson, to whom they were indebted for a beautiful presentation print, as well as to Mr. Henry Claudet, who had presented a portrait of his father. The several votes of thanks were passed with acclamation.

The following gentlemen were then declared elected as the officers and council for the ensuing year:—*President:* Professor James Glaisher, F.R.S., F.R.A.S., &c.—*Vice-Presidents:* Rev. J. B. Reade, F.R.S., H. W. Diamond, M.D., F.S.A., the Earl of Caithness.—*Council:* John Anthony, M.D., Valentine Blanchard, Henry Claudet, J. H. Dallmeyer, T. Sebastian Davis, Joseph Durham, A.R.A., W. England, A. Farre, M.D., F.R.S., R. Manners Gordon, Jabez Hughes, J. E. Mayall, Wm. Mayland, Dr. Mann, H. P. Robinson, G. W. Simpson, Josiah Spode, Professor Sir Charles Wheatstone, F.R.S., Matthew Whiting, Jun.—*Treasurer:* H. White.—*Hon. Secretary:* John Spiller, F.C.S.

The newly-elected President (Mr. Glaisher) said that, having been so long amongst them, they would not consider him as a stranger. He wished them to understand that he was somewhat of a reformer, and he considered that the balance sheet submitted by the Treasurer was by no means satisfactory—the balance was clearly against them. The present temper of the Council was to grapple at the difficulties by which they were surrounded and to overcome them; and, as the Society had upwards of 200 members, he had no doubt that they should soon show the balance to be on the other side. To enable the Council to bring about such a state of matters, the members should make a point of paying their subscriptions as soon as they fell due. All societies had their ups and downs, and they, too, had had theirs. When the Society was first formed photography was very fashionable. Notwithstanding that it was not so much so at the present time, he felt that by the active cooperation of the members, the Council might yet place the Society in a prosperous condition. Their journal, too, they would endeavour to get into a better position, and, instead of its continuing to be a quoting journal, they would try to make it one to be quoted from. Entertaining no feeling of rivalry towards the other journals connected with photography, they should feel glad either to beat them or to be beaten by them, so long as a knowledge of the art was spread abroad. For his own part, he would show neither favour nor affection, but would hold the scales with impartiality; and he trusted that they would, in future, do more for photographic science than they were doing at present. They were in debt, and he did not like it; but the Council were trustworthy men, and he expected that the Society's financial condition would soon be improved. He himself had been much benefitted by photography, for he could now sleep all night instead of being compelled to be up every two hours taking observations—those being now effected by photographic agency. When he considered what photography had done and was doing, he saw that a great future lay before them.

Mr. Bing then read a paper *On Actinometry*, in which he described the principle and mode of action of his new actinometer. We shall give the paper in our next number. The actinometer exhibited was an ingeniously-constructed instrument, which, so far as we could see of it by a hasty glance, will prove exceedingly useful in the operating room of the photographer.

The President, in conveying the thanks of the meeting to Mr. Bing, said that anything which aided the practical photographer was of importance. They had all felt the necessity of having some instrument that would tell them the exact state of the sky or sun when they were taking photographs. Their lenses frequently deceived them in this respect, so that when they imagined the light was of one intensity it might really be of another. By means of an instrument of the kind before them much greater certainty in this respect would be obtained than by the rule-of-thumb method now adopted by photographers. It was very simple and very excellent, and would give uniform results under the same circumstances, thus proving very useful.

Mr. T. Sebastian Davis remarked that the subject of actinometry was of so much importance, both in regard to scientific and photographic considerations, they could but welcome the introduction of any instrument likely to facilitate its study. The ingenious apparatus introduced to their attention acted on the principle of giving a relative rather than an absolute indication of the actinic force. But the point to which he would direct attention in immediate connection with the instrument was the application of the principle of the decrease of the intensity of light in an inverse ratio to the distance from its source. This principle was applicable to sound, heat, electricity, and other forces radiating from

a central point. It depended upon the mathematical fact that the areas of rings or cubical contents of spheres are to each other as the squares of their diameters or radii, and, therefore, the forces of sound, heat, actinism, &c., were attenuated in the same proportion. The same ratio was found to exist in the intensity of diffused light entering a cylinder from its open end. That appeared to him, as far as the photographic action was concerned, to be applicable to sensitive surfaces placed at right angles to the sides of the cylinder, and that, if these were so placed, the intensity of light would then be in the inverse ratio of the square of their distances from the outer edge. The same rule would not, he thought, exactly apply to the amount of light falling on an extended surface parallel with the sides, as in the instrument exhibited. In conclusion, he desired to impress upon those interested in actinometry the great desirability of devising a unit standard of actinic intensity. If such a standard were designed and adopted, most valuable aid would be rendered to every section of scientific and practical photography.

Mr. F. W. Hart said that Mr. Bing did not appear to have taken precautions for keeping the paper in an exact hygroscopic condition, for during one portion of the day paper printed more rapidly than another. He spoke of the necessity for having an absolutely certain, stable paper, and suggested the placing of the paper under an air pump and making it quite dry just before placing it on the cylinder of the actinometer.

Mr. Davis observed that Professor Roscoe had found great uniformity in the paper he had prepared for actinometric purposes.

Mr. P. Le Neve Foster said that, if he recollected aright, Mr. Bing had read a paper before the last meeting of the British Association, in which he had demonstrated by experiments that the intensity of the light varied inversely as the square of the distance from the aperture in the tube, and this, he thought, was a confirmation of that which would theoretically be arrived at, and convince his friend Mr. Davis that such was the case.

After a suggestion by Mr. Glaisher that an uniform hygrometric condition of the paper could be practically secured by placing a cylinder of glass over the paper, and a reply by Mr. Bing, the meeting was adjourned.

The next meeting will be held on March 9th, when Mr. Woodbury will demonstrate the method of printing by his patent photo.-relievo process.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held on the 3rd inst.,—Mr. A. Goslett, Vice-President, in the chair.

Mr. W. Warwick King read a paper entitled *Neglected Art Subjects for Photography.* [See page 76.] In illustration of the paper there were exhibited a number of finely-executed photographs by Mr. Bedford and Mr. Collings. With reference to some of the latter,

Mr. Dawson said that three crypts among them had required very long exposures, one of them having been exposed three and a-half hours. The collodion used by Mr. Collings on that occasion had been old, and the bath was the ordinary thirty-grain one.

Mr. Hooper (with reference to a statement in the paper concerning the quality of some pictures of dogs by Mr. Faulkner), considered that Mr. King had made a mistake in overlooking the pictures of animals by Mr. Frank Haes and others.

Mr. King explained that his remarks had reference to a certain period of time merely. He further explained that the pictures on the table had been selected by him on account of the great amount of detail in the buildings, and were therefore valuable on that account. Some pictures by himself taken at Kew were by the tannin process. He had found a long exposure necessary. To one he had given an hour and three-quarters, to another an hour and a-half, and to a third two hours and three-quarters. The lens employed was a 10 × 8 view lens with half-inch stop. The developer was the ordinary, not the alkaline, one, for when employing the latter he never succeeded.

Mr. Hooper spoke of a method adopted by Mr. Victor Prout, who, when he had to photograph on plates of large size in very dark interiors, such as some of those in Westminster Abbey, did so by the wet collodion process, and removed the plate from the holder, immersed it in the bath, and afterwards continued the exposure after he had got the plate again placed in the exact position in which it previously was, which he was enabled to do by a mode of registration similar to that adopted by Mr. Cherrill.

The thanks of the meeting were unanimously voted to Mr. King.

Mr. Barnett then read a paper on *Artificial Light and Printing by Development.* [See page 75.]

Mr. Hart said that the burning of zinc gave rise to arsenical fumes, for it was rare to find zinc free from arsenic. The getting rid of this metal caused the price of zinc to be raised from fourpence to half-a-crown. In purifying zinc it had to be fused in layers with nitrate of potash, which oxidised the arsenic and carried it off, the zinc coming down pure. The fumes of the zinc, when burning it, might be got rid of by carrying them into the chimney, in the same manner as was done with those of magnesium.

After a vote of thanks to Mr. Barnett, it was intimated that at the April meeting there would be a *soirée* and exhibition of photographs. The meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 6th ult.,—M. Teisseire in the chair.

After the minutes of the previous meeting had been read,

M. Arthur Taylor said he wished to make a slight correction in the report relative to his actinometer, the yellow glass of which served not only to produce an effect of micro-chromatisation, but admitted of observations being made with the fullest light without the tints obtained in the actinometer undergoing any change.

The Secretary read a letter from Herr Liesegang, accompanied by a sample of papyroxyline for superseding soluble cotton in the manufacture of collodion, and for the preparation of collodion without clouds or streaks and of good consistency. Herr Liesegang, in his letter, promised to forward a pamphlet on the preparation and the properties of the product, and to place at the disposal of the Society, if necessary, a larger quantity of the papyroxyline.

The examination of this product would be looked forward to with great interest so soon as the pamphlet should be received.

M. Meynier laid before the meeting a series of positive proofs obtained upon paper sensitised with carbonate of silver by MM. Schaeffner and Mohr. The results of his experiments had been very satisfactory generally, only he believed the inventors of the process would have to improve its manufacture with the view of securing greater regularity. Many sheets, treated in precisely the same manner, had given him different results in the different sheets, though the results were identical in different pieces of the same sheet. This inconvenience, which certainly was not a very serious affair, and which MM. Schaeffner and Mohr would be able to prevent, should not be overlooked, as, in photographic printing, it was desirable to have results that could be relied upon as perfectly regular. He (M. Meynier) also exhibited some enlargements on plain paper from the same house. He expressed himself in favour of a process which enabled him to have always at hand sensitised paper capable of being preserved white; but he regretted that he was obliged to have recourse to the practice of impregnating the cushions with ammoniacal vapour in order to obtain an impression of the image. He did not say this by way of undue criticism on the paper, but from a desire to see MM. Schaeffner and Mohr bring it to that state of perfection which would furnish proofs directly, and without the intervention of any developer.

The Chairman said he considered it right to call the attention of his colleagues to a paper said to be rendered impermeable, which he had seen mentioned in a photographic publication *(le rayon bleu)*. This paper, when rendered impermeable by a process for that purpose, enabled them to obtain an image absolutely on the surface, without the sensitive salt penetrating in any degree into the body of the paper.

M. Taylor said he thought that that effect could be produced by saturating paper, in the first instance, with gum lac, and then covering it with chlorided albumen; and it was evident that there would be a greater degree of softness and half-tints in proportion as the image was more superficial.

The Secretary said he thought an experiment with the paper indicated in the periodical in question might afford some interest, and with that view he intended to apply to the author for a sample of it.

M. Taylor presented a plate of brass on which he had engraved with aquafortis, the drawing having been traced in the first instance by means of a photographic process. The varnish preserver was sensitised with phosphate of silver; then, upon the image obtained through exposure across a negative and fixed, he made the drawing by means of a steel point, and corroded the same, as is done in the engraving processes, with aquafortis. This proof, several copies of which had been printed, was examined with much interest. M. Taylor said he would be happy to render any assistance to those of his colleagues who might feel desirous of making a trial of this kind, so as to facilitate them in the practical means of arriving at the desired result.

The Chairman thanked M. Taylor, and invited him to continue in a course so practical.

The meeting then separated.

Correspondence.

Foreign.

Philadelphia, January 19, 1869.

It is remarkable how little care is often taken with the backs of dark slides, even when made by intelligent makers. The hard mahogany is planed to a smooth surface and then coated with some sort of black coating, which probably looks well enough until closely scrutinised, and then is found to have a bright surface, and to be capable of sending back a considerable quantity of white light. I do not doubt that part of what is set down to reflection from the back surface of the glass is really ascribable to this cause. Of course, blurring does most frequently arise from reflection from the glass, but the back of the slide is also quite competent to produce this effect, and ought in all cases to be examined.

After the fault is detected, the next point is the cure.

The following is a mixture I have devised for this purpose, and found useful:—

Powdered gum arabic	2 parts.
Brown sugar	1 part.
Fine lampblack	5 parts.

The parts are by weight, of course. It is not altogether easy to get the best proportions. The above is as nearly as I can indicate them, but much will depend upon the lampblack, of which the coarser sorts will not answer at all. The best way is, after mixing, to rub some on with a flannel rag; let it dry and examine it. If it show a bright reflection in any light, the proportion of lampblack was not large enough. If when thoroughly dry the finger be rubbed on it and any come off upon the skin, the proportion of lampblack was too large; and in this case there is danger of the black pigment coming off and so making a black dust in the slide, thence getting upon the plate and giving rise to pinholes.

Often the slides as received from the maker have their backs painted over with black varnish. They should be sent back to the maker, with directions to return them with a perfectly dead surface. Or, if this be not practicable, and the photographer find himself obliged to put them in order himself, it will not be proper to apply the mixture just mentioned directly upon the varnish. It will probably not give a smooth coat, and, if it do, there will be danger of its peeling and cracking off.

To avoid this, take a flannel bag or a piece of buckskin and moisten it thoroughly with a mixture of alcohol and ether, and rub the varnish surface well with this, until the wood shows pretty well through. Rub dry with a clean rag or soft paper, and then apply the gum, lampblack, and sugar. The object of the sugar is to check the tendency of the gum to crack.

If those who read these lines, and have not given the subject attention previously, will overhaul their dark slides, they will probably be surprised to find how many of them need attention in this respect.

Some time since a good deal of attention was attracted to substitutes for ground glass—surfaces that would replace ground glass for focussing upon in the camera. As it is becoming more and more easy to get perfectly well-ground, or rather greyed, glass, the subject has scarcely the same interest; it may be worth while, however, to mention the following, which gives the most perfect surface of anything that I have ever seen:—*Bromide of aluminium* is very soluble in alcohol. If a little of this solution be added to plain collodion, and then a few drops of concentrated liquid ammonia, no effect is visible at first, but in twenty-four hours the liquid becomes opalescent. In this condition it is to be extended over glass, and, when set, washed under the tap and dried. Whilst wet the plate looks like clean glass, but, on drying, the alumina gives a beautifully smooth, opalescent surface, more or less transparent according as the quantity of plain collodion is varied. It will not, of course, bear varnishing, which would render it perfectly transparent.

When one reads the details of Mr. Graves's suits for piracy, one is surprised that the pirates, instead of attacking new and copyright prints, do not rather reproduce the magnificent old engravings, of which there are so many in collections, not always inaccessible, and of which the reproduction, instead of being censurable, would be a public benefit. Braun's reproductions are very interesting, but a large proportion of them are valuable to artists only. Among the carbon prints his reproductions are better than his Swiss views, which are mostly too heavy and black, and which occasionally show indications that the light has changed during the exposure. This is indicated by vertical parallel spaces of different depth of colour, and, in catching his magnificent cloud effects, the foreground has been often under-exposed.

I was shown a few days since, by the inventor, a singularly-ingenious contrivance for exposing a succession of dry plates. The plates were placed in a box on the top of the camera; they were not supported at the bottom, but were held in their places by the pressure of a spring at the side. By a simple and efficient contrivance the upper box was slid along till the next plate was exactly over a groove in the top of the camera. By loosening the spring it fell into its place and was exposed, and was then brought back to its original position and secured there. The arrangement for focussing was excellent, and, to replace a swing back, the front slid in a groove on the arc of a circle. This, of course, is very far from new. The ingenuity lay in combining it with the rest. Eighteen stereo. plates could be exposed in succession.

But such an arrangement is necessarily heavy, and it does not seem worth while to go through all the trouble of preparing plates, and to carry round a large camera, merely for the purpose of making little stereoscopic slides. It seems to me that the only argument that can be advanced in favour of these small pictures is, that the camera may be very small, the tripod light, and the whole come within the limits of comfortable portableness to a pedestrian. If a photographer can drive, or be willing to carry a heavy load, is it not better for him to take larger pictures with all the advantages of character and expression that they possess? It is scarcely any more trouble to prepare a $6\frac{1}{2} \times 8\frac{1}{2}$ dry plate than a stereo. size. The trouble of exposing, developing, washing, varnishing, and printing is scarcely noticeably more in the one case than the other, and certainly the difference in the value of the result is very great. So that, for the stereo. to be made at all it should be easily made, and without heavy objects to carry. And even then, I think, on striking the balance of advantages it will be found greatly on the side of the larger pictures. M. Carey Lea.

Paris, February 9, 1869.

The zirconia light has now been tried on a pretty extensive scale, for I find that MM. Tessie du Mothay and Maréchal have at last illuminated the Court of the Tuilleries with the oxyhydrogen light. I have not been able to get down to see the effect myself, and so I borrow a few particulars from the well-informed periodical *Les Mondes*. The success is said to be complete, the difficulties have been great, and the preliminary trials numerous. Those of your readers who have worked this light for the magic lantern know the desirability of obtaining a light free from all "flicker." This "flicker," objectionable as it is on a small scale, would be insupportable on a large scale, such as any plan for lighting town with the oxyhydrogen light; and so one great source of trouble in this illumination of the Court of the Tuilleries was to overcome the flickering of the light. The cause of this defect is found in the unequal and insufficient pressure on the gases, and the remedy is easily surmised, although to put it in practice may sometimes be difficult. For instance: at the Tuilleries the oxygen was managed without trouble, being brought to the spot in large metal gasometers, into which it was forced under considerable pressure; but with the common coal gas the case was different. This had to be taken from the main supplying the palace, and in which the pressure varied very frequently. The engineers managed, however, to overcome this difficulty by an "arrangement of floaters set in action by a current of water." The lighting of the Court is perfect, the brightness is much superior to the light of the moon, and one is struck by its absolute uniformity. "The luminous intensity of the ground and the atmosphere is quite uniform, without alternating lights and shadows, and without possibility of dazzling the horses" which cross the Court from the Rue de Rivoli to the quays. The length of this square is about 550 yards, and the lighting is managed by means of three ranges of zirconian jets superimposed and placed at distances of about 275, 140, and 55 yards. Their rays are thrown out and diffused by means of lenses of foci more or less long, and of ground glass more or less obscured. "Two jets, situated at the right and left of the Pavillon d'Horloge, project on the Arc de Carrousel their very intense parallel rays, and light it up as if in full daylight." Little zirconian jets are left here and there without any addition of lenses or ground glass—naked, so to speak—and are frequently placed alongside of the larger jets. Their effect is very agreeable, and they give a "particular gaiety" to the whole lighting up. At least so says the Emperor, who takes great interest in this kind of experiment.

The light of the zirconia jets is described as "so calm and so steady," and as being fourteen times greater than ordinary jets. The number of jets employed in this illumination at the Tuilleries is fifty-one. The same mode of lighting is being introduced at New York, and I hope some of our friends there will favour us with a description of it. Wherever reservoirs of the condensed gases can be placed this light can be used with economy, if the oxygen be made by the cheap process of MM. Tessie du Mothay and Maréchal. I am afraid that for the small uses of magic lanterns, &c., we shall not be able to profit much either from the cheap oxygen or the zirconia cylinders. I hope I may be mistaken, but the intention of the Oxyhydrogen Company, to whom the patents belong for making both the gas and the cylinders, aim at introducing the light for lighting cities, buildings, &c., and cannot be troubled with the smaller wants of the amateurs, of magic lanterns, chemical laboratories, &c. This is what I gathered from a conversation I had some time since with one of the company. There is no reason why persons who wish to make the zirconia cylinders for their own use should not do so by following the instructions given in the patent.

Mr. S. Highley appears to have been trying experiments upon magnesia cylinders, which, after the zirconia, give the best light, and he does not seem to have been encouraged with his trials. I think, from his account of the matter, that he has not tried according to the directions of M. Caron, who first proposed these cylinders of magnesia, and whose process I described fully in one of my letters last year. I have not the numbers of The British Journal of Photography for 1868 at hand, or I would refer Mr. Highley to the page, and suggest his repeating his experiments. The remarks of Mr. Highley respecting keeping up the pressure in order to avoid explosions are very true, and were confirmed to me in a conversation I had with a maker of "safety jets" and oxyhydrogen apparatus of all kinds, only last week, before Mr. Highley's article appeared. He said—"Get the gas through quickly, and keep up the pressure," adding that "water bottles, gauze in the jets, and all such contrivances are worthless." I have been in a room where there was an exhibition of the oxyhydrogen blowpipe by means of a "safety gauze jet." Well, the bag blew up in spite of the "safety gauze jet;" all the panes of glass in the room were broken, the gaslights put out, and, for a few moments, none of us knew exactly whether we were there or elsewhere or——where. No one was injured, however.

I had the opportunity of seeing the platina gauze lamp in operation again last week, and of comparing it with the oxyhydrogen lime light. For brilliancy and intensity the latter was far superior, and the maker made the best of the former by saying the light was more diffused.

MM. Schaeffner and Mohr have just published a little more on their carbonate of silver paper. They say that it has been very favourably received, and that its good qualities have been justified both by theory and practice. The paper, as I thought, *does not contain a trace of soluble silver salts*, and the consequence of this is, that there is no reaction between the organic matter of the paper and the free nitrate of silver, even in the printing, as there is with the other papers. They say, also, that "a picture from such paper [carbonate of silver paper] is only formed of metallic silver which is interposed between the molecules of the albumen or other sizing matter, which everyone knows is not the case with pictures formed from nitrated paper." "The excess of nitrate of silver acts energetically on the paper, which it destroys, and, what is more, it is never completely eliminated by the washings before or after the toning of the picture; and this nitrate imparts sulphuretting agencies to the fixing bath, for it as well as the chloride of silver decomposes hyposulphite of soda in solution." MM. Schaeffner and Mohr still recommend the sulphocyanide of ammonium bath for toning. They state that it keeps well, and that the necessary quantity of chloride of gold can be added according to the rapidity, &c., with which the toning is required to be performed. This toning bath is better after having been used a little. The first effect of this bath is to yellow the picture, and make it as if it were going to disappear; but little by little it recovers itself, and the tone passes through the whole gamut of colours. It should be withdrawn from the bath before it is quite finished, because it *deepens in tone in the fixing bath.* Should the colour of the print when fixed not please, it can be retoned without injury. Other toning solutions may be used with the carbonate of silver paper, but they should be used freshly prepared. R. J. Fowler.

Home.

ON PNEUMATIC HOLDERS, AND DEVELOPMENTS GENERALLY, AS APPLIED TO LANDSCAPE PHOTOGRAPHY.

To the Editors.

Gentlemen,—I am glad to see a "desire" or "wish" in the letters of many of your correspondents to afford information on points of practical detail and value, either in formulæ, apparatus, or mode of working, as also in composition, without which latter very few pictures are worth looking at. In adding my mite to such, as the experience of many years, I wish it to be understood that I do not state impracticable things; each one has been carried into practice by me, and it is only with a desire to assist those in need that I write. I have no secret "dodges," as they are termed.

Last week I mentioned pneumatic holders, and advocated their use. Many professional photographers avoid these, being in dread of their giving way; but this need rarely happen if they be properly looked after.

There are two kinds at present in vogue—one acting with a lever or catch that pulls down, and slides or fixes into a notch in the side of the holder; the other, which acts by air, and has a large India-rubber ball at its base as a holder. The former are thought the most of, I believe, because, perhaps, they cost more, more easily get out of order, do not act at all in cold weather, and often split after being for some time in use in developing from the action of the water over and down their sides.

To those who possess this kind I would say—After each operation carefully wipe them, and, once or twice a week at least, take them to pieces, thoroughly cleanse and screw them up again. Keep them, when not in use, face down on a plate of glass. The latter kind, having but little wood about it, better withstands the action of water, may be readily taken to pieces without trouble, can be used with or without a long handle, may be packed away in a box for the winter, and, if slightly warmed by putting in the pocket before use, will always act satisfactorily.

Either of these, with a gauntlet on the left hand, will keep the hand of either lady or gentleman quite free from stains during development, on which I beg to say a few words as being *apropos* to the subject.

This portion of our operations may be considered one of the most important, but it is not my intention just now to fully enter into details; all I desire to draw attention to is the mode of operation, so as to avoid stains. Some advise "dashing the solution over the plate at one sweep, draining off the surplus at the lower end, them moving it backwards and forwards to equalise its action." Now this I hold to be a mistake, such a method always tending to haste and untidiness in the operation, and furthering the very thing we are so anxious to get rid of.

Having carefully noted your exposure, proceed most leisurely to make yourself comfortable in your tent; then putting on the glove take the holder in the right hand, and, opening the slide, remove the blotting-paper at the back, affix the holder, raise the plate, and with the left hand remove the slide; then passing the plate into the left hand, carefully flow over your developer, keeping the plate quite steady. After a few moments (if your exposure has been well timed) you will see your picture appear gradually growing in beauty, softness, and harmony, according to the amount expressed in the subject. Now proceed without washing to an intensification, if necessary, and to the finishing of your picture. But more anon on this interesting subject.—I am, yours, &c., W. Harding Warner.

Ross, Feb. 6, 1869.

INDIA-RUBBER GLOVES.

To the Editors.

Gentlemen,—Opinions differ. India-rubber gloves, like skates, make one feel awkward at first, but it can be got over, I know. The only objections I have to them are their dearness and the impossibility of getting them mended. They wear out very soon, the useful thumb going first. Having had this experience, I use them only in the act of developing; I even unfasten the back of the carrier before I put them on.

As to size, I have the largest, for then I can pull them off and on easily.

I place my gloved hand on the back of the plate, and turn the carrier like a pancake, and then place one corner of the plate at the root of the thumb, spreading the fingers fanlike under the plate; so the thumb stands free—looking on.

Using gloves in developing saves me putting gloves on when I dine.—I am, yours, &c., O. G. Rejlander.

February 8, 1869.

M. CARRIER'S PAPER.

To the Editors.

Gentlemen,—I can cordially commend the "Carrier" paper for the use of amateurs. Many may prefer to sensitise their favourite paper in their own way (I mean as to strength of bath, &c.) for printing, but whether at home or abroad, for the purpose of seeing quickly how the negatives will print, and how repairing and touching up, clouds, and dodging will answer, this paper is most handy—even without toning and fixing.

As, however, I wish success to the inventor and profit to the agent, so do I beg for your influence with Mr. Solomon to persuade him not to allow the "Carrier" paper to be unrolled in daylight and handled and sent out open at the ends as if it were ordinary albumenised paper. It is sensitive, but not so *sensible* as to darken *only* under a negative.—I am, yours, &c., J. J.

City, February 9, 1869.

NEW DIAPHRAGMS.

To the Editors.

Gentlemen,—The article by Mr. M. Carey Lea *On New Diaphragms*, in your last number, is one possessing singular interest for all who, like myself, are devoted to landscape photography, and especially on large-sized plates.

I have always felt it to be the greatest reproach to photography that it is almost impossible to obtain natural skies in combination with *fully-exposed* landscape views, especially where there is any amount of breadth of shadow in the masses of foliage. When small-sized pictures are taken with short-focussed lenses, a careful choice of subject free from deep shadows or non-actinic masses of colour, it may be possible to obtain fair representation of natural clouds; but the case is totally altered when the size of plate extends to 12 × 10 inches and upwards. The great focal length of the lens, and often small size of the stop requisite to secure good definition in the corners of the plate, put natural clouds quite out of the question; and my principle of action has always been to ignore the sky altogether, and to show as little of it as possible by cutting up the sky space with trees or anything available, and then, by giving a full exposure to the plate, to get *as thin a deposit* on the sky portion as possible, and after the negative is finished and varnished to put in such an artificial sky *on the back* of the plate as taste and the nature of the subject suggest. This is at best but a poor apology for a sky, as it must be entirely of the light fleecy kind of cloud, but still is better than a plain flat expanse of tint, such as the thin sky film will allow to print through.

To be able to secure natural clouds as a certainty in every picture by such an arrangement as Mr. Carey Lea suggests, would add a hundred-fold to the interest both of the pictures and the practice of photography, and I trust you will not let the matter rest now until it has been brought to a successful issue. And surely the importance of the subject is such in itself that our eminent opticians, Ross and Dallmeyer, will not be slow to take the matter up in a practical way, and give us from their great experience some arrangement of diaphragms which can be *varied in shape* to suit every form of sky outline likely to be commonly met with. The present form of sky shade attached to lenses is of but little use, as it casts so great a shadow.

Mr. Lea's temporary experimental paper diaphragm pasted on the lens would not do for general use, as every change of subject would require a tedious change of paper screen, which would be simply unbearable when the light is good and the day calm and favourable for securing negatives; but a set of thin blackened brass Waterhouse plates

to slide into the lens tube, or fit into a ring on the front of it, would be easily changed and very handy.

Will you favour your readers with an article upon the subject, treated optically, so that those, like myself, who are not well up in the mechanical portion of the subject may have a clearer idea of *where* such diaphragms should be placed in the various classes of lenses—doublets, Petzval, or meniscus?

Mr. Lea's description of the "Sutton" diaphragm is not quite clear to me without the aid of a diagram. Could you add that to your article on the subject?

If this should meet the eye of Mr. W. D. Howard, who, in 1866, produced some exquisite views of the Tyrol, most of which had natural skies, and some of them very beautiful representations of "cloudland," perhaps he might be induced to give us his experience and method of obtaining them (as the subjects generally were such as to require a rather lengthy exposure for the foregrounds), and excuse a brother amateur for endeavouring to drag him into print for the benefit of the photographic public.

Your early attention to this subject will be esteemed a favour by your always interested reader, LUX.

Leicester, February 6, 1869.

[In another page will be found a brief description of "the Sutton" diaphragm. We may, however, state here that it consists in placing the diaphragm in a slanting direction instead of its being at a right angle to the axis of the lens.—EDS.]

WHAT IS SCIENCE?

To the EDITORS.

GENTLEMEN,—Mr. George Price, in his letter last week, says of the word "science" that "it simply means the *study* of the laws of nature," &c. He admits its connection with knowledge, but still would impress upon us that it is merely the *study* of nature's laws.

Query:—Is not the correct meaning of *science* "classified knowledge," or "systematically-arranged knowledge"—knowledge which is built upon general principles, constant laws or modes of operation, and is put together in strict accordance with the relative value of its parts; being so far complete as to enable us to ascertain precisely the fundamental principles—the foundation-stones, so to speak—upon which any individual fact in the edifice actually rests, and upon which it depends for its position?

Chemistry was as attentively, as earnestly, and as sincerely *studied* before Dalton's time as since; yet, before his time it was no "science" to us. There were abundant facts known; there was manipulative skill of a high order; but there lacked those fundamental principles, with their numerical value, upon which the edifice rests. There lacked the knowledge of the relative value of the various known parts. There was an absence amongst us of those parts of knowledge which would render the mass coherent, and, in spite of the *study* of hundreds of years, chemistry was not a "science" amongst men.

Neither is "science" a human "institution." The knowledge of all things possessed by "the Great Spirit of the universe" must necessarily be classified, arranged, and valued to the utmost and most absolute perfection, and this knowledge must be all science—science of that purity towards which we may approach, but near to which we can never attain—science which comprehends the wild passions of the human soul, which figures out the destiny of empires, and placidly anticipates such "calamities" as result in "the wreck of matter and the crush of worlds."—I am, yours, &c., DIOGENES.

February 8, 1869.

A WORD OF CAUTION.

To the EDITORS.

GENTLEMEN,—Seeing a communication in last week's Journal from Dr. G. Markham respecting a method of producing a powerful artificial light, I thought I would try it, having to give a lesson upon the properties of oxygen the next day.

I crushed up a little chlorate of potash, and added to it a little peroxide of manganese, thinking it would be an improvement. I placed the mixture (about a drachm) in a shallow metal cavity, and put in it a piece of phosphorus carefully dried (about the size of a split pea), and moved it about in the mixture. Next, I touched the mixture with a red-hot wire, and the result was totally unlooked for, viz., a sudden deafening explosion, which rung in my ears for a considerable time afterwards.

I should have said that I had tried the experiment twice previously and obtained a splendid and brilliant light, but I did not try again after the explosion.

In conclusion: I have only to add that I have every reason for believing the manganese to be quite pure.—I am yours, &c.,

Landsdown, Stroud, Feb. 8, 1869. PAUL L. SMITH.

[Our friend will see that Dr. Markham's suggestion was to use the *nitrate*, not the *chlorate*, of potash. Still, the result is well worthy of being recorded.—EDS.]

Miscellanea.

LIME FOR THE OXYHYDROGEN LIGHT.—In a letter from Mr. Wyles, of Bourn, on this subject, he informs us that he uses lime composed of burnt marble roughly shaped. He finds that it is hard and otherwise good. In like manner we have tried, with good effect, a piece of lithographic stone.

HINTS.—Relief from the immediate annoyance of bad and dirty plates, when good ones are not at hand, may be had by rubbing them over with a small quantity of pure beeswax dissolved in ether.——If blinds are occasionally wetted by a light jet of water, when the sun is upon them, it will be found that the thermometer will indicate from eight to twelve degrees less of heat beneath the under surface.—*Phil. Phot.*

CONDENSERS.—During the course of a conversation with Mr. Grubb, when he was in London a few days ago, we obtained from him a drawing of an achromatic condenser belonging to his lantern which receives and transmits an angle of light of ninety degrees. As it is constructed on proper optical principles and performs admirably, we are happy in being able to promise a more detailed account of it on an early occasion.

AMERICAN NATIONAL EXHIBITION.—The Executive Committee of the National Photographic Association of the United States announce that, in connection with the first annual meeting of the Association to be held in June next, there will be an exhibition of the productions of photography in all its varied branches, and also of instruments, apparatus, accessories, chemicals, and materials of all kinds in any way connected with, useful or necessary in, the art. They invite specimens from all photographers in their own and foreign countries, and from the manufacturers of all articles pertaining to the uses and advancement of photography. Foreign contributors will receive full particulars by letter, upon informing the Secretary of the Association (Mr. E. L. Wilson, editor of the *Philadelphia Photographer*), of their intention to exhibit specimens of their work, &c.

IMPROVEMENT IN MOUNTING TRANSPARENCIES.—The other day Mr. Pumphrey, of Birmingham, showed us some lantern transparencies, in which he has adopted a very useful, although simple, "dodge" in their mounting, and one which will conduce to the certainty and ease with which the photographs are placed right side out in the lantern. It is merely this:—The paper mat which is inserted between the photograph and the glass plate by which it is protected has a white side and a black one. Now, if the mat be properly placed when mounting the picture, the exhibitor will know that if the white side be always kept next to the light when inserting the picture, the picture will be certain to be always right on the screen. This is one of those little things that are of more importance than many would suppose. For want of it we have seen St. Paul's transferred to the south side of the Thames, and Edinburgh Castle shown to be on the north side of Prince's-street. Mr. Pumphrey's ingenious contrivance will in future obviate such blunders.

TINTED PAPERS.—We are glad to perceive that Messrs. Bovey and Rivot are introducing both plain salted and albumenised papers in a great variety of pleasing tints, including various shades of drab and pink. Their object in introducing these tinted papers is the praiseworthy one of drawing photographic printing out of the deeply-worn "ruts" of white paper. Tinted papers, we are well aware, have been prepared before the present time, but we have never previously seen the same range of tones. Conferring upon the artistic photographer a new power, papers of a delicate drab cannot fail to be very useful indeed for many purposes. In the specimen we have tried the tint of the paper has not been removed or influenced by the various operations required in the production of the picture, which on the toned paper is undoubtedly more effective than a print from the same negative on plain paper. A sample of paper for development printing received from the same makers we have not yet tried, but hope to have an opportunity of doing so during the ensuing week.

PHOTOGRAPHY IN AUSTRALIA.—Photography has been put to various strange uses, but nothing ever heard of before exceeds in queerness the fact that we are about to mention. In the course of a dispute in Australia about a mining claim, known as that of the New York Clunes Company, a certain gentleman named Black went with a surveyor to examine the place. He was in the act of marking off a portion of the ground when a lot of roughs—supposed to be in the employment of the company—seized him, stripped him naked, and smeared his body with hot tar. They had no feathers, but they collected a quantity of straw, wool, and other rubbish, and with this proceeded to decorate the unfortunate Mr. Black. At length he made his escape, but instead of going and washing himself he went to have his photograph taken, so that he might have the clearest evidence to submit to a court of law of the brutal behaviour of his assailants. Armed with this extraordinary piece of testimony he instructed his solicitor to take legal proceedings against the mining company, laying the damages at £2000. This hint might be accommodated to our own social circumstances. We have no cases of tar-and-feathering in England, but we have wife-beaters and other ruffians, whose victims might have their black eyes and bruises faithfully copied and permanently preserved on a *carte*.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A camera stand for the studio, cost 25s., will be exchanged for any other article of use in photography.—Address, H. J. G., 74, High-street, Hastings.

Scott's novels and other books will be given in exchange for a good *carte-de-visite* lens or washing machine.—Address, W. H. C., 43, Wellington-road, Toxteth-park, Liverpool.

A. C. B., 109, Regent-street, W., offers a magnificent ivory carved English concertina, the finest in the world, of splendid tone, concert pitch, as good as new, cost £23, and about £8 worth of music, the greater part nicely bound, for a good glass house, not less than twenty feet long.

For a No. 1 Dallmeyer's triplet with rack-and-pinion, or sliding tube, or for a No. 1 wide-angle view lens by same maker, I will give in exchange a pocket camera (by Lancaster and Son, Birmingham), with three double backs, for plates 4¼ and 3¼, rackwork lens, and walking-stick tripod, all quite new (specimens sent), or a portable dark tent for plates up to half-size, with stand, &c.—Address, W. J. A. Grant, at Rev. Dr. Butler's, Harrow.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Young Artist.—The best colour for the interior of your studio is a pale blue.

George.—Paint your cloth a white colour, and then face it with fine white paper.

Sigma (Birkenhead).—A shilling advertisement will probably get for you the article you require.

J. T.—A portion of your letter appears not to have been sent; at any rate, we shall write you privately before our next publication.

A Suburban Reader.—A member's annual subscription to the Society of Arts is two guineas. There is no entrance fee. Apply to the Secretary.

Wm. Mackay (Moulmein).—We have not received the communication and enclosures referred to, but shall make inquiry concerning them. Almanac sent as requested.

W. B.—The lens you describe was made many years ago by Chevaller, of Paris; but no optician would now think of constructing it, the Petzval form being so much better.

J. T. L.—It appears that with the particular kind of paper you are using you must print in the shade in order to prevent bronzing of the shadows. Your negatives are presumed to be very transparent.

One Who is Interested.—We are aware of bellows cameras having been in use for sixteen years. How long previous to that time they may have been in existence we are not aware.

Crayon (Birmingham).—While there is nothing absolutely untrue in the picture, the point of sight has been so close that the perspective is too violent, and to an ordinary observer does not convey an accurate idea of the subject.

Tripod.—Manx law is so different from that in England we cannot answer your question at present. Any advocate in the island will be able to give you the required information. We shall, however, make inquiry and let you know as soon as we can.

Nit. Sil.—Ammonia, carbonate of soda, and carbonate of ammonia produce with bichloride a precipitate. That obtained from either ammonia or its carbonate is yellow; with the carbonate of soda it is brownish yellow, and is only formed after a prolonged boiling.

"No. 827."—That you find your glacial acetic acid "frozen" is merely a demonstration that it *is* glacial. Apply a little warmth, and it will liquefy. This correspondent says that he tried finger-stalls, but, finding them to be troublesome and to cause pain in the fingers, he has given them up.

Amicus Certus.—Your idea is a most ingenious one, but we are afraid that it will not work, owing to the fact that the carbon only gives completely out its thirty-five volumes of absorbed oxygen in a vacuum; if heated up to the point at which it would evolve the gas combustion would take place. We shall bear your suggestion in mind, however, and will inform you if anything should become known which would render your idea feasible.

T. Attwood.—The addition of a little tincture of iodine will probably confer on the new iodising solution both the colour and the qualities of the old sample of iodiser. You may mix your collodion as soon as you find that it has settled. According to the alkalinity or acidity of the solvent, so will be the behaviour of your collodion after being mixed. We are unacquainted with the pyroxyline to which you refer. It doubtless exercises an important influence on the collodion. However, try the effect of adding tincture of iodine.

A. H. Kirkby (Leeds).—1. Do you mean what is known as the "hot-water process?" We ask this, because Dr. Ryley used other processes. The one mentioned is really good and reliable.—2. A peroxidised solution containing a little of a solution of gelatine in acetic acid will give clean pictures, even when the exposure has been rather more than it should have been.—3. "Instantaneous" views may be taken with an ordinary view lens, but the subject must be brightly lighted and the stop very large.—4. We have not seen any lenses of the optician you name; but they may be excellent for all that.

John Birkett.—"Opaque lanterns," or those associated with Chadburn's name, require a very powerful light. Four Argand paraffine lamps failed in our hands to give such a light as would have sufficed for even moderate enlargement. Two lime-lights work well; two magnesium ribbons also answer. The other articles inquired about are, we believe, trade names for modified forms of the opaque lantern, and we are unable to give you the details of construction sought for. Some respectable toy dealer or optician in your locality will, probably, be able to let you examine one or both of them.

Syntax.—We took occasion to call upon the maker of your lamps and ascertained the capabilities of similar ones. As they are the best of the kind, we can offer you no aid—at any rate not much. Increased intensity of flame may frequently be obtained by reducing the aperture in the solar cap. In this way, by using the cap of an inch burner for another of an inch and a-half diameter, we have obtained a most powerful light, but one which was still not to be compared with oxycalcium. If you confine your disc to within about five feet you will obtain a fair light even from the fountain Argand lamp. In the meantime, you may console yourself with the reflection that your lamps are the best that can be obtained—at least in London.

B. Wyles.—Either there is a leakage about the burners or the blowpipe orifices are by far too large. By your method of dissolving there is practically only the consumption of a single burner, and from three and a-half to four feet of oxygen should yield you a good light during the time mentioned, and there should then be a little oxygen left over. Reduce the orifice to less than half its present size, and your three-feet bag will answer quite well. In the mixed gas system, if you use the common gas direct from the main, see that the capacity of the burner be tolerably large, otherwise the flame may prove unsteady; this, however, will depend upon the equality of the hydrogen pressure. When using the gases in this way, the best burner or jet for yielding a steady light that we have tried was made of a piece of brass gas tube, about two and a-half inches long, and of the internal diameter of a common lead pencil. This was suddenly contracted at the point. It is the only burner for mixed gases we possess in which we can use the hydrogen direct from the main. We get with it a light well suited for lecturing purposes, the consumption of oxygen being about three feet per hour. The oxycalcium and the "blow-through" burners are about equal in power. The best light is obtained from the mixed gases. The form of oxyhydrogen burner you propose is not so good as that figured in our Almanac, nor can it be so easily made. The "oxygen dissolver" is a convenient method for turning the oxygen from one bag into two lanterns alternately.

Received.—"Alligator" (Rangoon); D. Winstanley, &c. In our next.

☞ Editorial Communications should be addressed to "THE EDITORS;"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York Street, Covent Garden, London, W.C.

APPLICATION FOR NEW PATENT.

February 3rd, 1869.—"Manufacture or Production of Photographic Pictures. No. 336."—John Robert Johnson.

LONDON GAZETTE, *Tuesday, February* 9.

Notice of Sitting for Last Examination.

C. A. Booty, Oxford, photographer.—March 11.

METEOROLOGICAL REPORT.

For the Week ending February 10th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 10 a.m.

Feb. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
4	30·13	57	47	51	53	WSW	—	Dull
5	30 23	60	46	45	48	SSW	—	Dull
6	30·11	54	45	46	47	SSW	—	Fine
7								
8	29·71	56	46	51	53	SW	0·01	Dull
9	29 61	53	48	45	49	W	0·12	Fine
10	29 94	55	44	47	50	WSW	—	Fine

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 459. Vol. XVI.—FEBRUARY 19, 1869.

BLACKENING THE INTERIORS OF CAMERAS AND DARK SLIDES.

In the last number of this Journal our readers will find some remarks upon the subject of blackening the interiors of dark slides, so as to produce a dead black non-reflecting surface. It will be seen that our valued transatlantic correspondent, Mr. M. Carey Lea, has touched upon this subject in his letter which we published last week, and we may at the same time give the results of our own experience, more especially since the plan which we adopt in producing a good non-reflecting surface upon woodwork is both extremely simple and very satisfactory.

Few of our readers will be disposed to admit that the light reflected from a carrier back will do much or any mischief to a sensitive plate; and, while we are rather sceptical as to the amount of injury which a wet plate may sustain, owing to the comparatively small translucency of the film, yet when we have to deal with dry plates it may easily be admitted that a blackened but reflecting carrier back is very likely to produce a certain amount of blurring—one of the nuisances of dry-plate work. But when employing either a wet or dry process, our plates can sustain injury from another and often an unsuspected source. When the illumination of our landscape is very bright, much diffused light may be irregularly reflected from the sides of the camera itself, owing to insufficient precautions having been taken to render the interior of the camera walls as little reflecting as possible.

It will be recollected that for the production of a black coating for woodwork we must obtain a dead surface, but without any tendency to rub off on moderate friction. The usual mode of obtaining such a surface is to make a very weak solution of gelatine, and, while hot, to add to this very fine lampblack, and rub to a smooth paste. The mixture is then applied to the wood with a fine brush, and allowed to dry. On closely examining a surface obtained in this way, it will be easily seen that a comparatively large amount of light is reflected from it, and when the proportion of lampblack in the mixture is sufficiently increased to prevent this reflection, the colouring matter is liable to come off in fine dust on slight friction. It is scarcely necessary to mention that the use of a varnish as a vehicle for the lampblack is to be avoided, since a certain amount of gloss invariably results from its employment. Instead of covering the wood with a coating of lampblack, as just mentioned, some manufacturers simply stain the wood, by first saturating the surface with a decoction of gall nuts and then applying solution of green vitriol or protosulphate of iron. The result is the production of a black compound similar to ordinary writing ink. One objection to such a mode of blackening the interior of a camera is that, though the wood is dyed black, its reflecting surface is not destroyed or deadened.

Putting aside the ordinary modes of blackening wood, Mr. Carey Lea adopts another plan, which he has found to give good results. A mixture is made of powdered gum arabic, brown sugar, and lampblack in the proportions stated in our correspondent's letter; after thorough mingling of the ingredients a rag is well moistened with water, a little of the powder is made to adhere, and this well rubbed over the dead surface of the woodwork to be blackened. By this means a good, even, and dead coating can be obtained, which, on drying, has no tendency to crack off. We should here note that our correspondent has, in stating his plan, evidently inadvertently omitted to direct that the rag used for laying on the powder should be moistened with water; it will be seen that we have here supplied the omission.

We have tried Mr. Lea's plan, and find it to give a good surface when sufficient attention has been paid to the quality and proportion of lampblack employed; but we have arranged a mode of blackening wood which also gives a good dead surface on woodwork with very little trouble, and with perfect certainty. Our plan is simply to make an emulsion of *gum ammoniacum*, and to use this as the material to bind together the particles of lampblack. Our mode of operating is to break up a few tears of the gum in a mortar, each tear being about the size of a good pea, and, without reducing them to a very fine powder, to crush them; then add a few drops of spirit of wine, rub the gum with this, and, while stirring with the pestle, add gradually about an ounce of cold water; stir well until a good milky liquid is obtained, and it is then ready for use. Dip a rag in this emulsion and then apply it to some fine lampblack, and rub on the woodwork until an even coating is secured, applying more of the emulsion and of the lampblack as may be required. On drying, a good, hard, non-reflecting surface is obtained without the slightest tendency to chip off or the colouring matter to smear.

We have tested the above plan against the blackening mixture of Mr. Carey Lea, and find that *at least* equally good results can be obtained by our method with greater rapidity and convenience; we can, therefore, recommend it to our readers for use when occasion may require, since gum ammoniacum can be obtained at any druggist's without the least trouble.

Having said so much about the blackening, we may now say a few words about the adhesive agent which we employ in our process, since gum ammoniacum has not previously, we believe, been pressed into our service, and it possesses some properties worth noticing in this place. The gum ammoniacum of the ancients was obtained from one of the *Ferulæ* growing in Morocco; that which is now employed in commerce is brought from Persia and the Punjab. The plant from which this body is obtained abounds in milky juice, which exudes from its broken branches just as our common lettuce yields a milky fluid on fracturing the stem. It is stated that the plant is very liable to the attacks of a peculiar kind of beetle, which perforates the stem and so permits the escape of the juice through the perforations; the fluid slowly flows out through these holes, and as this takes place during the hot summer months the juice quickly concretes, forming tears of greater or less size. These tears or roundish masses are collected when dry, and exported from Persia into India, whence the gum finds its way into our markets. This body is not a true gum, but belongs to the class of substances termed gum resins, being a mixture of three-fourths of the weight of the whole of a peculiar resin and one-fourth of gum. In water ammoniacum is only very partially soluble, the resinous portions, of course, not dissolving in the liquid; but though the resin does not dissolve it forms an emulsion, the milky appearance of which is due

to the presence of very finely-divided resinous particles. On evaporating some of this emulsion, a *dead* retentive surface is obtained; hence the suitability of this emulsion for use as the adhesive material for the mode of blackening wood referred to in the foregoing.

ZIRCONIA LIGHT.

We are glad to find, in the account of MM. Tessie du Mothay and Maréchal's zirconia light given by Mr. Fowler this week, conclusive testimony as to the value of this much-talked-of mode of artificial illumination. We hope that the operations of the Zirconia Light Company will extend to our side of the channel shortly, and thus afford us an opportunity of obtaining a more than usually steady and powerful light for producing enlargements, and for use in other photographic operations.

We believe the design of the Company is to bring the light into use for the illumination of large towns; they are, therefore, not likely to trouble themselves much about the requirements of photographers. We must, consequently, take the matter up for ourselves, and seek to take advantage of the new light as far as we reasonably can. However, though there is every reason to believe that the zirconia or some similar light will ultimately be employed in all large cities, that time seems as yet far distant, since the cost of obtaining oxygen on a large scale is still rather too great.

We are disposed to think that the ambitious projects of the Zirconia Light Company would be rather aided in their accomplishment than interfered with if they devoted a little attention to the economical production of a good light for photographic, mining, and lighthouse illumination, and for other similar purposes, instead of seeking to accomplish too much at the outset. If they first endeavoured to enlist an army of experimentalists in their cause, we should think that they would reap the advantage ultimately by the improvement of the details of their plan, and the discovery of more economical modes of preparing the materials which they employ.

PHOTOGRAPHS ON TONED PAPER.

On reading the small paragraph in the Journal of the 12th inst. relative to the toned paper introduced by Messrs. Bovey and Rivot, I was forcibly impressed with the soundness of the old schoolboy adage, " Procrastination is the thief of time."

For more than two months I have been intending to send you some notes on this subject, but presuming that you had a plethora of matter during the period in which the meetings of the societies are held, I abstained from intruding upon your space.

Of late I have been trying the effect of aniline dyes to impart a tone to my prints, and have succeeded in a manner which, in my own opinion, is highly successful, but which you can estimate according to its true worth from the specimens which accompany this communication.

The method I employed in their production was to dilute some of the aniline colours (those supplied in small bottles for dyeing purposes answer well) with methylated spirit, the strength depending upon taste and the requirement of the special subject. On a bath of this kind I floated the paper for about a minute, and on its becoming dry I again floated it if I found the tone not sufficiently deep. Of course, this toning may be produced at any stage of the printing operation; those sent, however, were toned previous to the paper being sensitised.

It must not be supposed that the floating upon the bath would, by removing the albumen, render the prints tame and flat, even if there were some water added to it. Such is not the case, for the alcohol present in the aniline solution probably serves so to modify the surface as to prevent the removal of the albumen. At any rate, be the cause what it may, the result is that the floating of the paper upon the dye does not at all affect the brilliance of the finished picture.

Instead of floating the *face* of the paper on the solution, I have varied my method of proceeding by applying the dye to the back of the paper. With a large proportion of alcohol in the bath the penetrative action is very rapid and decided, and the colorific effects thus obtained are sufficiently good to render the practice desirable for those whose dread of injuring their bath may be in advance of their knowledge of the real results.

Speaking on the subject generally, I do not see why photographers should always be confined to the white paper medium hitherto employed. There are many subjects which, when printed on toned paper of a warm cream colour, have a charm quite different from what would be presented by the same print on a cold white ground; and, in portraits, I find that the warmth of tone referred to confers advantages which could scarcely have been anticipated, for the shadows are modified, not merely by contrast, but by the ground on which the silver is reduced.

I am glad to perceive that the subject is being taken up by practical and professional men, in whose hands it will, without doubt, conduce largely, as you say, to draw photographers out of the "rut" in which they have for so long a time been plodding.

John Homersham.

ON ACTINOMETRY.*

In introducing to you this evening the subject of actinometry, I would ask your kind indulgence as to any erroneous expressions I may make use of, as I am not perfectly acquainted with the English language.

Having carried on a series of experiments, by means of tubes of various magnitudes, and with mica actinometers which were inserted at the bases of tubes, the following results became apparent:—

1. That diffused light, on entering a tube at one end, varies in intensity within the tube inversely as the squares of the distances from the aperture where the light enters.

2. That any number of tubes, whatever their magnitudes, contain the same intensity of light, if the ratios of their diameters to their length are equal, and if we absorb the light that may be reflected from their sides.

As a corollary, it may be added here—

That light varies in intensity within a tube inversely as the squares of the semidiameters of the tube.

3. The same variations in the intensities of light also take place upon the sides of tubes, although the intensity of light at any given point *on the side* of a tube, is not equal to the intensity at the same point *within* the tube.

4. The above theorems govern also the variations of the *actinic powers* of light within tubes, and on the sides of tubes.

Let me now draw your attention to an instrument which I have constructed upon these principles, and which I name the "tube actinometer."

It consists of a rectangular box, to one side of which a square tube is applied. At the aperture of the tube there is a slide with a rectangular opening, by moving which you can either admit light into, or exclude it from, the tube. One side of the tube is made of yellow non-actinic glass, and the opposite or interior side is of white glass. By looking through the yellow glass you can watch the action of light in the tube by simple inspection. A scale is marked on the strip of white glass by means of a standard tint. The side of the box to which the tube is fixed is made to take off, and is held in its place by means of four little springs, like the back of a dark slide. A cylinder is placed within the box, against which the white glass of the tube is pressed, and which is surrounded with sensitive paper. The top of the box, where you see a milled head, is also made to take off. This milled head is fixed to a rod which passes through the cylinder, and by means of which you are enabled to turn the cylinder *either* way. By unscrewing this little top piece you can remove the milled head, and then the top of the box. Now you can also lift the cylinder out of the box for the purpose of charging it with sensitive paper. This is done once, in the morning, for the work of the whole day. After inserting the cylinder you replace the top of the box, the milled head, and its little screw. Fix the side with the tube, and you have only for every fresh exposure to give a slight turn to the cylinder, by means of the milled head, in order to bring a fresh part of the paper forward, at the back of the white glass.

The standard tint with which the divisions of the scale are marked is not a necessity; it is simply a matter of great convenience, because you are enabled thereby to make use of a comparatively short tube for very long exposures. It might be compared to the use of cwts. upon a weighing scale, instead of using only qrs. of cwts., for example. The scale presents a series of little spots which appear dark by contrast with the white paper. As the action of light proceeds downwards within the tube, one spot after another will appear white by contrast with the sensitised paper which has become darkened. The distances between the ten divisions of the scale have been so calculated that not only do they form a harmonic progression, but also, when any given spot appears white, the next following will still appear dark by contrast. A few exposures for various periods of time may be seen on the instrument.

* Read at a meeting of the London Photographic Society, Feb. 9, 1869.

The capacity of the screw to turn *either* way is an especial point which I aimed at in the construction of this instrument. The human eye can only judge reliably of tints by comparison; but even there it is apt to err. In comparing, however, a whole series of tints with one another, the possibility of error is reduced to a minimum. By turning the screw slightly back, you can at any time bring your last exposure side by side for comparison with your present exposure at the back of the white glass, and you can judge with the greatest exactness, by simple inspection, if the two series of visible tints are alike or not.

We have now arrived at the object of this instrument. It is, to print all photographs by its aid.

The actinometer is intended to remain stationary at the place where you expose your negatives. Ascertain, by inspection of your first positive, what degree of exposure you require for the negative, exposing, during the same period of time, the instrument, by opening the slide. Mark now upon the negative the number which you observe in the instrument. On printing your second positive you wait for the approximate appearance of the number, which you can observe through the yellow glass. Then, grasping the milled head, you turn the cylinder slightly back in order to compare your second exposure with the first, and thus continue from time to time to turn the screw until you find the two series of tints exactly alike. The second positive will now have the same tint as the first. Thus continuing you gain the important advantage of printing all your positives of *exactly the same tint*, which it is scarcely possible to accomplish by the method of printing by inspection now in common use; on the other hand, *over* or *under*-exposed pictures are here only possible through the most wilful carelessness. In fact you produce superior work, and avoid losses. If you wish to gain (I would almost say) perfection in the equality of the tints of your positives, remove the actinometer from time to time to some obscurely-lighted place, take off the front, and then compare the tints which you see on the sensitive paper. This occupies no more time than examining a print in the frame.

Allow me to express the opinion that by introducing this novel feature in the production of photographic pictures, the patrons of photography may be disposed to pay better prices, and the profession might get rid of the injurious depression which exists at the present time.

I must, however, state now that this instrument is not constructed for exposure to the direct rays of the sun. The direct rays must be screened by means of a blind made of tissue paper or fine linen, both from the negatives and the actinometer, in order to enable you to print by their action; or ground glass may be used instead, in order to render the parallel rays of the sun diffused. The screen or ground glass should be fixed at some distance from the negatives and instrument.

I venture to recommend photographers never to print in the direct rays of the sun at all. It is well known that a positive which is printed in diffused light has more depth in the shadows and more brilliancy in the high lights. When printing in diffused light, the photographic action starts, as it were, from all sides, and encircles every particle composing the negative, which does not take place with the rapidly-piercing parallel rays of the sun, and which may be the cause of the superiority of positives printed in diffused light; also the brown tone, which seldom leaves the sun-printed positives during the processes of toning and fixing, even if not objected to, gives a certain flatness of appearance to the positives, in consequence of a want of depth in the darkest shades.

A much smaller instrument than that now exhibited will be manufactured for the purposes of the field, applicable, for instance, to the timing of the exposure of dry plates.

For scientific measurement of the actinic power of light, a wider tube is used. The more exact and minute you wish to make your calculations, the wider the tube must be, because the divisions of the scale can then be greatly augmented.

By applying clockwork to the screw at the base of the cylinder for the purpose of giving the latter a slight turn at any chosen division of time, the actinic power of light at any given locality is registered for the whole day. No assistant is required. The instrument is charged once in the morning, and in the evening you remove the sensitive paper with all the changes of light that may have taken place during the day registered thereon.

For measuring the actinic power of the direct rays of the sun, a convex mirror is applied to the aperture of the tube. The tube is inclined at a right angle to the rays of the sun, and the mirror is so applied that it reflects the rays of the sun in divergent directions into the tube. In order to make these measurements continuous and correct, the whole apparatus must be placed in connection with a heliostat.

In concluding this subject, permit me once more to refer to the principles enumerated at the beginning of this paper. I would observe that by their application you can calculate the exact quantities of light that are admitted into any photographic studio, or that fall upon any particular spot therein. If you want to increase the power of light in any of your studios, the most efficacious means to accomplish this would be to cut down the sides, to lower the roof—in fact, to dwarf them; a much greater quantity of light would then be admitted through the skylights.

In the erection of all kinds of buildings, architects could calculate the exact quantities of light which are admitted into rooms of various dimensions, and they could thus avoid a deficiency of daylight illumination in large meeting-halls, workshops, or offices, whereby a saving of artificial lighting might often be effected. LOUIS BING.

SUGGESTIONS FOR WORK DURING NEXT SEASON.*

I HAVE long thought that we ought, as a Society, to organise our working and experimentalising in such a way that, were each member to confine his attention to one section of our art, and each to work according to a specified plan, at the end of the year there would be much more tangible results in every direction than there can be at present. In all societies there must necessarily be a great deal of misdirected effort; much straining after things impossible of attainment—after matters which may be well known, or which need only to be mentioned to be made known—or after matters which may not be worth the time spent in the search, and which, through the agency of the Society, might be put right at once.

In order to give form, as it were, to this idea, I have in this short paper incorporated one or two suggestions as to work for the next season, which, if carried out, cannot fail to be productive of great good to the Society.

The first is that, at the end of this session, we should have a public exhibition of the works of the members, and invite contributions from various quarters in order to have as full an exposition of the present state of the art as possible, the belief being that this would create a stimulus and be a new point from which to date progress.

We need not anticipate this being a paying speculation in the ordinary sense, for photographic exhibitions never pay—at least here; but it will do good to the art, and if it cause the members and others to make strong, steady, persistent effort to provide only first-class pictures for it, that alone will accomplish much good. It can, however, be done only by being aware of such exhibition early in the season, and working up for it.

Should this course be determined upon, or even should we consider it to be a desirable thing to do, it would become a matter for the Council to resolve whether they should undertake it by themselves, or whether they should not invite the co-operation of the Photographic Society of Scotland, which has always hitherto been one of the foremost in the country in this good work. By this co-operation an exhibition might be organised which would do credit to the art and to Edinburgh.

This hint is thrown out *now* in order to obviate the difficulty of getting specimens ready in the dull months of winter, and to prevent the possibility of trusting to chance for a few good pictures out of a season's work.

Of the use and value of an exhibition to compare progress and stimulate effort I do not mean now to say a single word further than this—that the progress of all the arts has been found to be bound up with full and free comparison of the works of different artists; and by no means can this be effected so well as by public exhibitions and public criticism. If this be true of all the other arts it must be true of ours. Whether there might be medals or other recognitions of merit for specially good or specially new applications of our art, may be worthy your consideration as a Society; but this matter does not call for immediate determination, and may be safely left over for future thought.

Another idea has been suggested, and, as it involves our prestige, it demands your most serious attention. The Popular Meetings of our Society have always, since their establishment, been a great feature in our proceedings, familiarising the public as they do with a taste for photographic work to an extent that no other agency could effect. This Society may take considerable credit in connection with these meetings, as they have hitherto been not only popular but deservedly so. They have been, on the whole, excellently managed. Still it may be questioned whether we could not do something still better were a larger number of members to take an active interest in the preparation of pictures for this purpose; and to this end it has

* Read at a meeting of the Edinburgh Photographic Society, February 3, 1869.

been thought desirable to interest, if possible, a greater number of the members in the production of pictures suitable for the lantern.

There are many subjects by and many ways in which this could be effected. One of them, and, perhaps, the most promising, is to select a subject in the early part of the year—*now, in fact;* say such as a connected series of pictures or subjects illustrative of some poem, or story, or history. There are hundreds of such in our national literature, which would well repay the trouble by the pleasure alone of doing them. Or take the series of places and objects connected with some historic character, and work it out thoroughly. Depend upon it the pleasure of carrying out this object would repay the trouble, beside adding to the knowledge and contributing to the pleasures of others, as well as spreading the fame of the Society.

The Society's outdoor trips and the various journeys of the members to more distant places will always supply a large amount of *matériel* for the popular evenings, and, therefore, little need be said about these; but there are certain trips and certain hobbies which, if taken or ridden with a purpose, might be made the medium of great enjoyment, and even of educational power, to the Society. Such, for instance, are the illustrations which such a science as geology affords. The same remark applies to botany, where the trees and plants—their growth, habitat, and appearance—could be made subservient to very enjoyable lectures and exhibitions. Microscopists, of whom we have several among our members, have not yet taken advantage of our popular evenings to the extent they ought to do by bringing out their *spécialités* for the benefit of the Society; indeed, the same may be said in connection with all the special tendencies of our members who make photography minister to their studies or their desires.

I might run through nearly all the physical sciences in a similar way, pointing out the vast field which has been permitted to remain as yet quite untouched; but I refrain from going into so vast a subject, trusting that among the many suggestive ideas now thrown out we may calculate on getting at least a part of them carried into practice, beside the many more which may be also suggested by the members present. Thus the Society will be in any case benefitted.

I have left myself very little time to show how the summer trips of the Society could easily be made subservient to this work; but I know that, having alluded to the matter, I leave it in good hands when I leave it in yours for consideration, which I now do.

W. H. Davies.

DESCRIPTION OF A SELF-ADJUSTING CARRIER FOR LANTERN PICTURES.

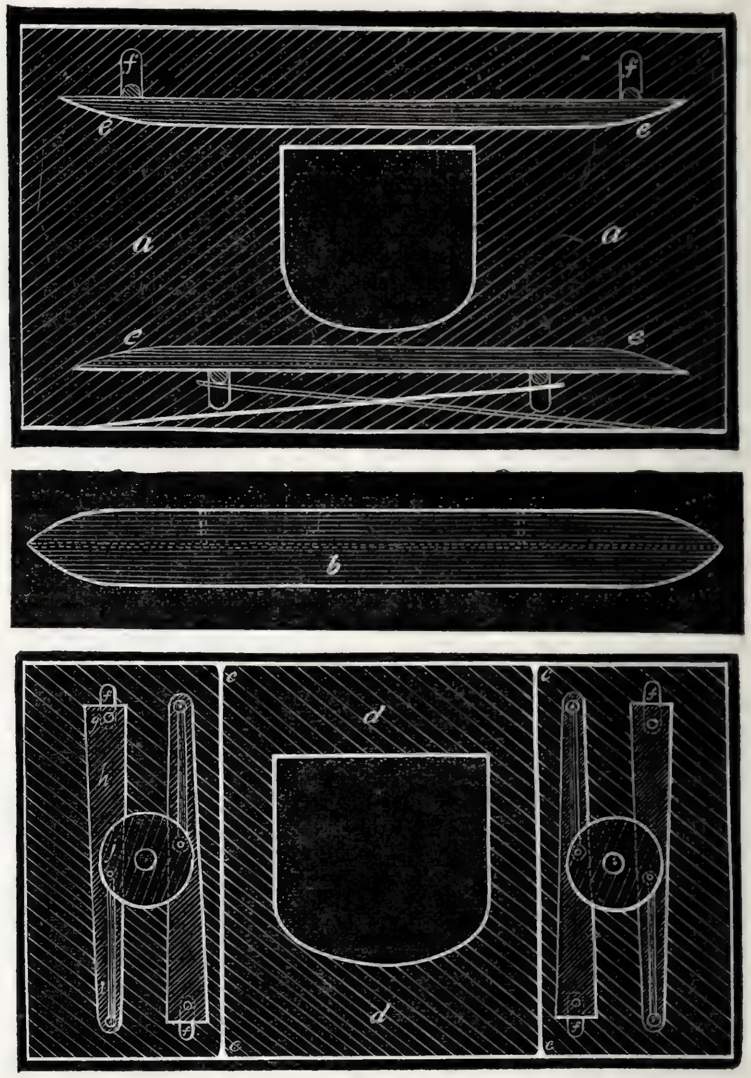
Nearly the whole of the carrier is made of ordinary tin plate. Being of metal throughout, it will not alter in form by moisture or dryness. The size of the one here described measures about $8 \times 4\frac{1}{2} \times \frac{3}{4}$ inches, and the weight is under nine ounces.

The main body of the carrier consists of a central plate the size mentioned above, with a longitudinal flange at top and bottom. On one side or face are two transverse flanges dividing that face into three recesses, and stiffening the whole. Through the centre of the central plate a hole is cut $2\frac{1}{2} \times 2\frac{1}{2}$ inches, dome shape; there are also four small slots made. By making the dome-shaped hole larger and square, a loose mat of any desired shape could be easily applied instead, or a coloured glass plate. The central plate divides the carrier into a front and a back face, one of them being furnished with two loose longitudinal grooves to hold the picture. These loose grooves take a broader or narrower gauge as required, the lower one being pressed up to its work by two springs underneath; the upper groove has the same amount of motion, but always in a contrary direction to the lower one. This motion is obtained from the other side of the carrier.

At distances governed by the small slots cut in the central plate four small brass pins are soldered, two to each loose groove. These pins make the connection between the loose grooves on one side of the central plate and the machinery on the other. The two outside recesses contain the machinery for regulating the traverse of the two loose grooves. Being in duplicate, a description of one set will answer for both.

The end of each brass pin projecting through the central plate to the other side passes through a narrow strip of metal near one end of it, and is soldered fast, so that whatever motion the end of the loose groove may have, the same will be communicated to the narrow strip. This narrow strip, being fixed at right angles, forms a "steadyment" to the end of the loose groove. The other end of the narrow strip is jointed to a short brass connecting rod, extending to the centre line of the carrier, the free end being jointed to a stud in a circular brass disc. This disc turns on a pin soldered into the central plate of the carrier, forming an equal-armed lever, there being another stud diametrically opposite and at an equal distance from the centre of the circular brass disc. Then to this second stud another short connecting rod is jointed as before; but the motion is carried by another strip, &c., to the end of the opposite loose groove.

An inspection of the diagram with the aid of the letters of reference—or, better still, of the carrier itself—will give a readier insight



a a Central plate, one side. *b* One longitudinal flange. *c c c c* Transverse flanges. *d d* Central plate opposite side to *a a*. *e e* Loose grooves. *f f f f* Slots cut in the central plate. *g* Short brass pin. *h* Narrow strip of metal. *i* Connecting rod. *j* Circular brass disc.

into its construction and capabilities than the imperfect and apparently complicated description attempted above.

The circular discs, connecting rods, &c., are partially covered by a plate (not shown), making the carrier better to handle. The longitudinal flanges are pointed, which facilitates the insertion of the carrier into the lantern.

M. Noton.

ON ALBUMENISING PAPER:

Its "Dodges" or *Ficelles du Metier.*

A large number of little imperceptible means or contrivances to bring out effect and quality in every art and trade products, and which are resorted to by practical, experienced hands, are named by the English "dodges," and by the French "*les ficelles du metier*" (the "strings of trade," in workroom phraseology). This last definition is an allusion to the innumerable strings, pullies, broad paintings, and bold perspectives which, on the stage, unseen and unaccounted for, concur to effect those wondrous displays of scenery which startle us all.

I do not mean to imply that the albumenising of paper trade has devised for its help many of these very valuable *ficelles du metier;* but, perhaps a sufficiently clear, detailed description of the manipulations in albumenising has not yet been given. I have the pleasure, therefore, to present the following sketch of manipulations in my

workrooms, which, I trust, will interest many of the numerous readers of The British Journal of Photography.

First: I will admit the truth of the old adage that there is "nothing new under the sun," and that the same identical good results may be obtained through many ways—the only consideration being to find, out of these various ways, the best, the easiest, and the most economical.

I do not claim for my method of albumenising paper superiority, or even novelty, over the processes of other albumenisers. Far from it. I merely wish to describe how I do the work, with the idea that it may prove useful to some amateur or otherwise albumenisers.

The Plain Paper.—No firm or individual person, whether wealthy or otherwise, has the power of choice amongst the plain papers used in photography for its albumenising manufacture. The manufacturers who supply these articles to the trade are MM. Blanchet and Kleber, of Rives and Paris, and Herr Steinbach, of Malmedy, in Prussia—both very wealthy, and perfectly beyond the reach of observations of a derogatory kind. These papers can be bought from agents in London, or, as many prefer, direct from the manufacturers. The albumeniser has no control over the quality of plain paper, of which, accidentally, much is very defective, possessing looseness and unevenness of texture, and also metallic spots.

The paper must be treated, to prepare it to receive the albumen effectually, as follows:—It must be kept, previously to albumenising, during a couple of days under the influence of a temperature dry in winter and cool in summer, in order to prevent the too rapid absorption or too much repelling of the albumen when floated over it.

The Albumen.—Two or three extensive egg merchants in London sell albumen (white of eggs), and it is, therefore, useless to say anything about the breaking of eggs, and the careful separation of the white from the yellow. The albumen is to be beaten, to break and separate the cells from it; but until this operation be commenced it must be kept in a fresh place, and, after it has been beaten, left to subside in a rather warm temperature. I beat the albumen twice to a thick froth before using it. I salt it generally with seven grains of chloride of ammonium to the ounce, the quantity of salt for one gallon being dissolved in ten ounces of water. Occasionally, but very seldom, however, I salt with five grains of chloride of ammonium and three grains of barium.

I have tried, experimentally, salting with different salts, used alone and mixed in various proportions. I have printed carefully with papers prepared in these different ways, and, as the result of my experience, I have come to this conclusion—that the salting with chloride of ammonium answers best for most general purposes, and that paper prepared with albumen so salted preserves its freshness longer.

The reason for beating the albumen twice is to make the bath very fluid, and so to cause an even adhesion to and flowing off the paper.

To albumenise, I use habitually two china trays, sometimes four, 24 × 19 inches, in each of which I filter two gallons of prepared albumen, which I leave during twenty-four hours, to form an equilibrium between its temperature and that of the room.

The Albumenising Room.—Mine is an ordinary room 15 × 17 feet, warmed by means of a stove and heating pipes running along the wall, eight feet from the floor and on three sides of the room. If albumenising has been interrupted for a period, I am in the habit, when cold or wet weather prevails, of warming the room during two days before using it again.

The tables supporting the trays which hold the albumen are placed on the side of the room which is lighted by the windows, and where there are no heating pipes. Each tray is provided with upright supports fixed on the table to bear a movable round stick one inch in diameter, and four inches longer than the paper, ready to receive the sheet of paper albumenised when the operator lifts it from the bath. Two rows, superposed, of movable sticks, inserted perpendicularly to the wall, with the help of proper contrivances, run round the three sides of the room heated with pipes.

This working albumenising room is completed by sets of small dishes placed under the first row of sticks to receive the dripping of albumen, and tables to receive the paper removed from the sticks. The paper is allowed to dry and harden thoroughly before being taken to another room, where it is examined, flattened, and pressed.

The Process of Albumenising.—Females are generally employed to do this work. It requires per ream two full-grown girls and a little girl as assistant to albumenise, dry, and flatten it in ten hours. The first care of the albumenising girl is to ascertain the right side of the paper—the one which has not touched the form; then she holds one sheet by two corners upright over the albumen bath, and at about the middle of its surface. She allows the lower edge of the paper to meet, and adhere to, the albumen, and gradually and slowly lays down on the surface of the bath the sheet of paper, held tight, and pushing it at the same time gently towards the end of the tray.

It must be observed that this laying down of the paper on the surface of the albumen is very important. It must be conducted cautiously and gradually in order to cause the albumen to adhere all over the width of the paper simultaneously as it is lowered down, or many accidents, in the shape of bubbles, streaks, unevenness, curling up, &c., may happen, which are never properly remedied by lifting the corners of the lying sheet and blowing them off. Except in consequence of some accident, the paper must not be left floating more than half-a-minute on the albumen, and, as a rule, as soon as it lies flat it can be lifted. The girl attending to it takes hold of the two corners of the sheet nearest to her, and lifts it without stoppage, to deposit it, albumen side upwards, on the round stick placed at the end of the tray, in such a way that the sheet, supported on its centre, hangs half on each side of this stick.

The dishes placed under these sticks receive the excess of albumen, which flows abundantly in waves at the first; and it is the duty of the young assistant girl to facilitate this flowing by scraping with a wooden knife the edges of the hanging sheet of paper where it accumulates. This scraping must be done in half-a-minute, at the longest, after the hanging, as accumulation and stoppage of the albumen at the edges of the paper causes streaks.

The young assistant, having completed this operation, removes the sheet with its stick from near the tray to the lower row of fittings for sticks above described; there she continues to scrape each sheet again till no more albumen accumulates at the edges. When this first lower row of sticks is filled up she successively, proceeding with the first sheets operated upon, passes them on to the upper row, in a warmer temperature, to finish the drying of them. The girls intrusted with the laying of the paper replace with another the stick removed with the paper, and go on laying as before, supplying their assistant with work. To three experienced and careful working girls the work is most easy, and the results always perfect.

The list of accidents is as follows:—Dead surfaces, streaks, unevenness, bubbles, sandy surfaces, scummy spots, bad colour of surface, blistering propensity, &c. Without pointing out the cause and the remedy for each of these evils, I will merely say that they can all be avoided by careful management of the work, which I define:—Double thorough beating of the albumen to hard froth, and careful filtering of it; the albumen, paper, and room to be kept in a warm, balanced temperature, but exaggeration of heat to be avoided; scraping of the edges of the paper when it hangs, and the flowing down of the albumen, to be attended to most carefully; ability and carefulness of the girls in doing their duty of laying evenly the sheets; the adding of some fresh albumen every day to the albumenising bath, and beating with one-fifth their bulk of water the drippings of albumen resulting from the day's work before filtering them back into the bath, and so restoring to them their proper quantity of water and their fluidity; and, finally, when the work is over, the allowing of a double current of air to pass through the room during the night to prevent fermentation.

I will add that the paper most subject to blister is that which is prepared when the albumen is not properly kept fresh and fluid by addition of new albumen and some water, and when the plain paper and the room are in a too warm, dry condition. The blistering annoyance may be easily avoided by the photographic printer by dissolving in the hypo. fixing bath a drachm of gelatine per each pint.

Now, to end this description of my albumenising system, it only remains to say that the paper albumenised during the day is allowed to remain during the night in the warm room; that the following day it is transferred to the flattening room, where it remains twelve hours under a very high pressure, after which operation it is ready for use. I greatly prefer the high pressure to the rolling over metallic plates of either the base or noble metals. The pressure with clean glazed boards intermixed with the paper always returns the paper white and fresh. The rolling on plates of any metal generally leaves on the paper traces of oxidation, or of the polishing which has removed this oxidation.

G. Rousseau.

SPIRIT OF THE AMERICAN JOURNALS.

We may commence by observing that *Humphrey's Journal* (published in New York) is now coming out monthly instead of semi-monthly as heretofore.

The *Philadelphia Photographer* has some suggestive articles, which we shall condense so as to present the salient points at a glance.

New Adjustable Diaphragm.—At the January meeting of the Philadelphia Photographic Society, Mr. Zentmayer exhibited an adjust-

able diaphragm of a very ingenious construction, which we shall endeavour to describe. There are two rollers geared together, and on each, in a plane perpendicular to the axis, is cut a tapering semicircular groove, the corresponding part of each groove being opposite. By revolving the rollers the circular opening formed by the contact of the two grooves gradually enlarges or contracts, depending upon the direction in which the rollers are turned. No light can pass between the rollers except through the diaphragm. It is, in short, an ordinary wire rolling mill, with a tapering instead of a straight groove. We very much admire the ingenuity displayed; but, for reasons which would take up too much space to give here, we still prefer the revolving table with its limited number of perforations, or even the Waterhouse system, both of "home" invention. We hope, however, that this statement will not lead to a declaration of war.

Photography after Dark.—Mr. Proctor, of Salem, Massachusetts, has in full operation a method of taking negatives by means of magnesium. Now, in this country photographers appear to have lost sight of the fact that the actinic intensity of magnesium in combustion is quite sufficient to permit negatives to be taken direct from the sitter, although its use in photography seems to be mainly confined to the production of enlargements. It is only requisite that the combustion of the metal shall take place behind a large screen of roughly-ground glass to secure a powerful and well-diffused light which will cast no heavy shadows, but act rather in the manner of a large, bright cloud. With Mr. Proctor's method of illumination we are, as yet, unacquainted; but it consists of a room, in which the sitter is placed, and of such a form that all the rays of the magnesium light shall subserve the one great object, viz., the illumination of the sitter. The configuration of the room is an elongated oval form, with an interior curved surface, so that when the sitter is posed in one place, and the lamp is "located" in another, the whole of the rays will be utilised on the sitter, either in the form of direct effulgence or by radiation and reflection. In an aperture in the curved end of this room the camera is placed. With this general description we allow matters of detail to be supplied from our contemporary:—

"The apparatus consists of a room for photographing purposes, of such a form that the rays of magnesium light placed within it will be reflected and concentrated upon the person or object to be photographed, so that photographing may be successfully performed at night by artificial light, or other than that of the sun.

"The room or apartment is of oval form, and elongated, so as to have an internal curved surface, which will reflect the rays of light from a lamp or other luminary, in proper place, upon the subject.

"It is made of oak bows bent into proper shape, and covered with paper cloth, which, by large eyelets in the edges, is hung on hooks inside the bows. It stands about 6 feet high, 5 feet wide, 6½ feet long, and weighs about 35 pounds.

"An opening is made in the curved end of the room or apartment for the end of the camera (which is adjusted by the operator outside) to pass through, and the other end of the room or apartment is open to admit of the ordinary background for the picture, to be placed in proper position relatively with the person or object to be photographed."

The most important part of Mr. Proctor's *day's* work is done at *night.* Here is an idea for our photographers at home who desire to combine business with sensationalism. Moule's patent photogen was very troublesome and expensive; it is now a thing of the past. Magnesium is cheap, elegant, and effective.

Enlarging and Copying by the Magnesium Light.—Mr. John Carbutt contributes of his experience in this direction. He uses only one strand of ribbon, and the condensers of his lantern are the same as we have on several occasions recommended and figured, viz., a double convex in conjunction with a meniscus. These, in the opinion of Mr. Carbutt, constitute the best form of condenser that can be used with the magnesium light:—

"In front of and close to the lantern box I place a small camera, from which the lens tube is removed and a carrier for the negative substituted. The lens is adjusted on the back of the camera where the ground glass is usually placed; both camera and lamp box are temporarily fastened to the table or bench. A piece of flexible tubing is slipped over the lamp chimney, and the other end of the tube passed out of the window or into a flue, to carry off the fumes from the burning magnesium. The lamp being now ready, light the wire with a small spirit flame, and quickly adjust the focus on a piece of plain white paper. Having done so stop the clockwork of the lamp, and proceed to sensitise the paper and place it in position on the board (it is scarcely necessary to add that the room in which this is being done must be excluded of white light). Place in front of the enlarging lens a piece of yellow glass, then light the metal ribbon in the lamp, at the same time starting the clockwork. If the enlargement is to be a vignette, use a piece of cardboard about 13 × 16 inches in size, having a hole about the shape and size of an egg in its centre, holding this between the enlarging lens and the sensitive sheet. Remove the yellow glass and allow the light to act from one to three minutes, according to the size of the enlargement and the intensity of the negative. Place the cap on the tube and examine the sensitive paper by the aid of the spirit lamp. If the shadows or dark parts of the image are visible, the exposure is sufficient; if not, allow the light to act till they can be seen, then take down the print and apply the developer, wash, fix, &c. * * *

"I prefer to have some chloride present in the iodising, and have found the following to be a very sensitive formula:—

Serum of milk	1 ounce.
Iodide of potassium	8 grains.
Bromide of sodium	3 ,,
Chloride of sodium	2 ,,

Sensitised with—

Silver	40 grains.
Water	1 ounce.
Glacial acetic acid	10 drops.

Both solutions are spread on the paper with Canton flannel.

"But the greatest benefit I have derived this winter from the magnesium light is in the making of copies, ranging in size from the *carte de visite* to 14 × 17. The following from my memorandum book will explain:—'Enlarging from a thin card negative to a six-inch head on a 14 × 17 porcelain plate, wet collodion process; exposure, forty-five seconds; weak iron developer, quite acid; perfectly satisfactory result.' 'Enlarging from a one-ninth ferrotype about five diameters; distance from the front lens to the ground glass, thirty-six inches; exposure, two minutes; negative every way satisfactory.' 'Enlarging from a one-sixth Daguerreotype to a ⅘ vignette head, a little over two diameters; exposure, forty-five seconds; resulting negative I could not possibly improve by sunlight.' 'Enlarging from a one-sixth Daguerreotype to a 14 × 17 negative for a vignette head; exposure, three minutes; a little under-exposed.' 'A transparency from a card negative enlarged one diameter; exposure, forty seconds; fully timed. An enlarged negative from the above transparency, on an 11 × 14 plate; time of exposure, three minutes; too much time; had to redevelope the high lights a little to get roundness.'

"I have made quite a number of the ordinary card size, the exposure averaging about thirty seconds, using a No. 1 Dallmeyer triplet open lens. For copying a card photograph the same size I prefer the magnesium to sunlight, as it secures a much smoother copy. Not the least important part of using this light for copying is the way in which the light is directed on the picture to be copied.

"The mode I have found best I will now endeavour to explain. Set up the picture to be copied before the camera, get the size and focus adjusted. If you are working at night a large kerosene lamp will do to get the size and focus by. Then place in the camera the sensitive plate, and draw the slide; now take the lamp and box having the condenser in front, light the lamp, and direct the light on to your picture in such a way that a circle of light about two or two and a-half inches is on the picture; then, by giving a slight motion to the lamp, the light can be made to cover the whole surface of a card or other small picture.

"It is important, whenever the picture is small enough to admit of it, to use the circle of light formed *inside* the cone of rays from the condenser before it diverges, for at that point the light is perceptibly more powerful than when used after passing the focus of the condenser. I have, on several occasions, finished printing a collodio-chloride print on porcelain after daylight had ceased to act. Wednesday before New Year's Day I had four enlargements still to make and finish. I made the four within an hour, and, with the last and most important, my wire gave out, but, luckily, the exposure had been sufficient. The portrait was finished in time, for which I feel inspired to say—*Vive! la magnesium!*"

Albert's Prints in Fatty Inks.—Dr. Vogel, the German correspondent of the *Philadelphia Photographer*, contrasts Woodbury's process with that of Herr Albert, of Munich:—

"Many persons have, for years, on this as well as on the other side of the Atlantic, devoted their means, their time, and their energy to the solution of a problem—the production of photographs in half-tone by means of printing in a press. You are acquainted with the efforts in photolithography, in photographic copper and steel plate printing; much has been accomplished in the reproduction of line engravings, but, in half-tones, the very best of samples left much to be desired, and the conclusion was finally reached, that with fatty inks no good half-tones could be reproduced, and gelatine inks were substituted, *i.e.*, the Woodbury process.

"The hope was expressed that this process would solve the difficult problem, and the public were waiting patiently for its practical introduction; but, while the profession was arguing for and against its merits, suddenly appears Herr Albert, of Munich, one of the best photographers of Germany, and presents a whole album full of photographic prints, executed with fatty inks, in which the half-tones are of such exquisite beauty that all our photographers, photolithographers, photoxylographers, and ferrographers stand dumbfounded, and ask—'How is such a thing possible?'

"These new prints are by no means small specimens, like the samples of so many other processes; but, amongst them are proofs of a size of twenty inches, not only on paper but on silk also, and, so perfectly beautiful in the half-tones, that they much resemble photographs on plain paper. The method of their production is still a secret, but a sample you will receive very soon. I have found out, however, that Albert employs a plan similar to the one of Tessie du Mothay, in France; like him, he prints very likely from a layer of chromo-gelatine, taking for a foundation, however, not metal, but glass; and this is probably the cause of the wonderful homogeneousness of the surface (which cannot be produced with metal or stone), and that perfect absence of "grain" which is necessary for the reproduction of photographic half-tones. Another important point is this—that while M. Tessie could only take seventy-six impressions at the most, Herr Albert can take 1,300 prints from his plate, and the expense of making a picture, sixteen by twenty inches, is about ten groschen (thirty-three cents currency), and the process will pay even for a dozen pictures.

"He requires reversed negatives for his process; the copies from ordinary negatives have the right and left reversed. This circmmstance, however, is no drawback, for either the negative can be removed by employing 'leather collodion' as you have described in your columns, or reversed negatives are produced directly from nature. The latter can be accomplished in a twofold manner:—First, by reversing the sensitive plate in the plate-holder; in this instance we have to contend with the errors caused by the inequalities in the glass. Secondly, by means of a mirror; and here the time of exposure has to be increased, as the mirror absorbs a considerable quantity of light. Albert employs a prism in front of the object-lens; the back of the prism is silvered, and absorbs so little light that the time of exposure is lengthened only by one-tenth.

"In copying from these negatives on the sensitive layer of chromo-gelatine, which forms the mould from which the prints are taken, he tells me that he employs my photometer for determining the proper length of time.

"At present he is engaged in soliciting the patent rights from different countries; when these are secured, he will sell his process."

Toning Transparencies.—Dr. Vogel also gives the formula employed by Herr Grüne for toning transparencies. It consists in mixing together the following solutions:—

A.—Nitrate of uranium	1	part.
Water	100	parts.
B.—Red prussiate of potash	1	part.
Water	100	parts.

Filter each before mixing.

This toning fluid must be placed in a dish, and, the transparency or negative being immersed, the tone will become of a fine brown. When a darker or blackish tone is desired, Herr Grüne recommends a previous immersion in a solution of platina, followed by the immersion in the bath described above.

Substitute for a Swing Back.—An "original and most capital" camera was exhibited at the Photographic Section of the American Institute. This was designed and invented by Mr. Flamming:—

"The object of the invention is to overcome the necessity of the cumbersome and not altogether satisfactory 'swing backs,' by having the lens more vertically and laterally, as may be required, to bring near objects situated in the foreground, or upon one side, equally in focus with those in the distance, by so changing the position of the lens relatively to the ground glass or sensitised plate as to effect this end.

"Upon the camera box is placed a half-circular front, outside and over which moves the board, to which the lens is attached, up or down, or vertically, thus giving that motion; this is fastened to the camera box by a pivot hinge at its vertical centre, thus giving the side or lateral motion, the whole being so contrived as to exclude every particle of light.

"It is claimed by the inventor, and was conceded by the gentlemen present, that every advantage of the swing back camera boxes are, in this simple and ingenious apparatus, combined, and that it can be attached to any box and used for any sized lens."

A word in reference to the foregoing. If our friend Flamming have facilities for referring to pages 60 and 66 of THE BRITISH JOURNAL OF PHOTOGRAPHY for February 15, 1864, he will there find that his "invention" is not so "original" as he imagines.

Head, Body, and Arm Rest.—At the meeting above-mentioned Mr. Krüger exhibited a series of photographs of his new rest:—

"It is not a head rest, but rather a combined head, arm, and body rest, of ingenious construction, and invaluable to all in our art who make fancy or unusual positions. By its use some most astonishing work was produced—as men exercising with swords, both arms extended and elevated; a newsboy running and holding a paper out at arm's length, seeking a customer; and very many more of the same character of difficult positions, and all perfectly sharp and natural. It is a sort of tripod, from the top of which rise three rods with arms attached, all being provided with several sections or parts and universal joints, held by set or thumb screws, so that they can be bent in any direction to suit the bend of the arms or inclination of the head. The tripod or stand portion of the apparatus is so constructed, by having the legs in two parts working in a slot held by a screw, that either leg may be made longer or shorter as desired, and are so placed as to be hidden from sight by those of the person whose picture is being made. At the next meeting a completed rest will be exhibited."

Tinting Photographs.—"It never rains but it pours." Last week we devoted a paragraph to describing some effects on toned paper prepared by Messrs. Bovey and Rivot; in the present number are some observations on the same subject by Mr. Homersham; and here we extract from our Philadelphia contemporary an article on the same subject, from the introduction to which we learn that the secret of the "new style" is being sold for fifty dollars:—

"The beauty of the results is dependent upon the taste and judgment of the manipulator, the same as in toning, &c., and the most desirable tints will be readily discovered by a little careful experiment. Again: the process is only applicable to vignettes or plain pictures with a white border. After they are tinted, the effect is greatly heightened by a skilful and tasteful touching up of the white draperies and high-lights in a picture with white paint, which also requires taste and skill. Where there is lacework in the picture, the effect is very striking and pretty. And now to the process:—

"Almost any of the dyestuffs will produce effects as varied as the colours themselves, but the most desirable are a delicate straw tint and a roseate or madder tint. Mr. Bell's process produces the former very readily, and they may also be produced as follows. Make two solutions—

"No. 1.—Madder	100	grains.
Powdered alum	50	,,
Water	32	ounces.

Boil fifteen minutes, and strain, or filter through paper.

"No. 2.—Bismarck brown (aniline)	8	grains.
Warm water	32	ounces.

Dilute to suit the taste.

"A concentrated solution may be made of each, and barely warmed, when about to use them.

"Pass the prints through No. 1, wash, and then pass them through No. 2. The tints will vary according to the time they are allowed to remain in the solution. It is best to tint the prints as soon as they are taken from the wash-water, and before drying.

"Another process produces very rich tints, viz.:—

Garancine	60	grains.
Alum (powdered)	30	,,
Whiting	10	,,

"Boil together ten or fifteen minutes, filter, and use warm, varying the immersion of the prints to suit your taste; the longer they are in the solution, of course, the deeper the tint. Still more rich and pleasing tints, to our taste, may be secured if trouble be no objection, by first treating them according to Mr. Bell's formula, and then passing them through the garancine solution. The same garancine may be used over and over again, and more colour extracted by adding more water and boiling again. The solution may be used until all the colour is taken up by the prints.

"An endless number of tints may be produced by mixing or using, separately, the aniline colours of Dr. Jacobsen, advertised in our columns. Aniline blue, mixed with alcohol, diluted, say (if 95° alcohol is used) one-half water, also gives very pleasing results for the skies in landscapes, &c., and some like it for portraits. Tinctures of aurine, turmeric, and annotta, also give pretty tints, a drop or two of ammonia being usually added to create alkalinity. As we have said, an endless variety of tints may be secured by using varied colours—the aniline colours being the richest and best. The fugitive ones are secured by passing the prints through a slightly warm solution of boiled ground coffee, strained and clear.

"Garancine is the extract of the colouring matter of French madder, mixed with the carbonised residue resulting from the action of the oil of vitriol on the woody fibre and other constituents of madder. It may be had through your stockdealer, or, perhaps, of druggists or dealers in dyes. It is not expensive, and goes a great way, so large quantities need not be purchased at a time.

"Some of the most beautiful examples we have seen of this kind are from Messrs. Wenderoth, Taylor and Brown, Philadelphia—Mr. Taylor being the first to make them, we believe, but by no means the gentleman who offers to speculate on his discovery. Mr. William Kurtz, New York, makes them, and prints his plain pictures with a white border around, got in the usual way by pasting a mask on the negative, and then tints them. The effect is very rich and fine. Mr. Bell has also shown us some very fine ones, and is doing a good business in them. Mr. Gutekunst, of our city, is also making them large and largely. They are known here as 'crayons' and '*aux deux crayons.*'"

The following is the formula, by Mr. Bell, referred to:—

"'*Aux Deux Crayons,' or Tinted Photographs.*—The following wil l

be found a durable process for securing the tinted pictures now becoming fashionable, and dubbed as above. Make two solutions, viz.:—

No. 1.

Aloes, powdered	1 ounce.
Alcohol	12 ounces.

No. 2.

Water	12 ounces.
Liq. ammonia	15 drops.

"Immerse the albumen prints in solution No. 1, until they take a bright lemon colour; then wash them well, and put them in solution No. 2. Let them remain until they take a warm orange colour, and again wash them. Mount and touch up the whites with Chinese or any good white, and the blacks with India ink. After touching up the whites and blacks, coat the pictures with the following:—

Plain collodion	6 ounces.
Castor oil	12 drops.

"The deeper the tint required, the longer the prints must remain in the aloes solution. Too long immersion in the ammonia solution will reduce the tint."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Feb. 23rd	Liverpool Amateur	Free Public Library and Museum.
„ 25th	Oldham	Hare & Hounds Inn, Yorkshire-st.

LONDON PHOTOGRAPHIC SOCIETY.

As promised last week, we now give the Report of the Council of this Society for 1868, to which we append the Treasurer's balance sheet for the same year:—

REPORT.

The annual period which has just expired will not be remarkable as an epoch of grand discoveries, but will, nevertheless, present evidence of general progress made in several departments of the photographic art, and betoken a wider appreciation of its scope and results. In portraiture, the beautiful specimens of M. Adam-Salomon, which were shown in the Paris Exhibition and universally admired, may be said to have borne fruit in the magnificent results of a similar character lately displayed at the Society's Exhibition. With improved optical appliances, further aided by the adoption of the principles of combination printing, a greater area of definition and wider distribution of focus in groups and landscapes may now be secured, whilst the means of multiplication by photo.-relief, lithographic, and engraved plates have been making steady progress during the past year. The photolithographic process of Mr. Griggs has been described and practically demonstrated in the room; and, thanks to Dr. Forbes Watson and the authorities of the India Office, the members of the Society have been favoured with presentation copies of two specimens of Indian fabrics, plain and coloured, executed by Mr. Griggs. We are about to have a practical illustration of the capabilities of the photo.-relief process invented by Mr. Woodbury; we have recently seen specimens of Mr. Swan's carbon printing and reproductions, also the carbon prints by single transfer of Mr. Blair; and the reports from Germany speak in high terms of praise of the rival processes of Professor Husnik and Herr Albert, of Munich.

Amongst other novelties shown at the Society's Exhibition in November last may be enumerated—the photo.-enamels of Mr. Henderson, Mr. Barnes, and others, in which a considerable improvement upon former results was apparent; specimens of the emolliotype, eburneum, and collodio-chloride processes; some admirable examples of dry-plate photography, by Mr. R. Manners Gordon and by Mr. England, and illustrations of Mr. Piercy's method of artistic printing. We had likewise shown, for the first time, a complete series of the photographs taken by the Royal Engineers in Abyssinia.

Great progress has been made during the past year in researches appertaining to the physical constitution of the sun, the polarised condition of the light of the sky; and the spectroscope has been widely and usefully applied. Several expeditions were equipped last summer for the purpose of securing unerring photographic records of the phenomena accompanying the total phase of the solar eclipse of August 18th. Observations were made independently by British and foreign investigators posted at various Asiatic stations under the path of the eclipse; and the pictures obtained all agree in indicating the existence at that time of a mighty horn or prominence, larger and quite distinct in character from the "boomerang" seen protruding from the limb of the sun in Mr. De la Rue's photographs of 1860. Photography has, during the same period, been continuously applied to the registration of magnetic and magneto-earth currents, and to the recording of meteorological results.

Referring specifically to the indications of progress made within our own Society, it may be mentioned that the financial statement, which has just now been submitted to you by the Treasurer, shows upon the whole an improving state of affairs. The number of members now constituting our body amounts to upwards of 220; and the Council propose shortly reprinting a corrected list to replace that which was prepared three years ago.

The following papers have been read at the meetings of the Society during the past session:—

Mr. J. R. Johnson, *On a New Method of Treating an Old Bath.* The nstructions given by the author have reference to the employment of permanganate of potash for the purpose of removing the impurities (especially those of organic origin) which, gradually accumulating in the nitrate bath, have a tendency to induce a fogged condition of development. Mr. Johnson's recommendation has been thoroughly tested and pretty generally adopted.

Dr. Mann favoured the Society with two communications. The first was entitled *Photographic Difficulties of an Amateur in South Africa*, and recounted the expedients resorted to under exceptional conditions of temperature and solar activity whilst working amongst the native tribes bordering on the British settlement of Natal, also the difficulties met and overcome in the way of apparatus, scarcity of water, and other embarrassing circumstances. At the June meeting Dr. Mann gave an interesting account of Professor Piazzi Smyth's photographic operations in Egypt, and described his so-called "Great Pyramid bath," which accommodates a collodion plate of the standard size of a microscopical slide (3 inches by 1). A series of enlarged transparencies of negatives taken within the Pyramids by the aid of the magnesium light were exhibited.

We have already taken occasion to refer to the very important subject brought under the notice of the Society by Mr. Griggs, and to the fact of specimens of his work being distributed to the members. In another branch of the Government service the operations of the staff of photographers attached to the Royal Engineers were described by Mr. H. Baden Pritchard in a paper entitled *Photography in Connection with the Abyssinian Expedition*, and we had brought before us the distinct applications of photography to the reproduction of maps and delineation of the geographical features of that hitherto unexplored country. Our recent Exhibition was made the occasion of publicly displaying these photographs for the first time; they certainly constituted an attractive feature, and were eagerly examined. The May meeting was devoted to the discussion of some proposed modifications of the "wet process," brought forward by Mr. McLachlan, of Manchester, who claimed to have worked out an infallible system of collodion photography. Great expectations were excited by the mode in which the author preferred to bring his discovery under the notice of photographers; there was an unusually large attendance at the meeting, and the subject was fully discussed. Much indirect benefit has resulted from Mr. McLachlan's communication to the Society, although his views do not appear to have been widely indorsed by practical photographers. Mr. Dunmore described his "truck tent," a convenient form of portable apparatus, serving the purpose of a dark chamber, and mounted upon a pair of wheels. Lastly, the members are indebted to Mr. Nelson K. Cherrill for a complete exposition of the system of "Combination Printing;" and a noteworthy feature in connection with this event was the collecting together for the first time the several examples of this character produced by Mr. Robinson, Mr. Rejlander, and by the author. The mode of production of the Society's last presentation print, *Watching the Lark*, was explained, and in each instance the peculiar features and *modus operandi* of the earlier illustrations.

We shall hear to-night a scientific account of the principles and practice of "Actinometry" from a gentleman who has devoted himself specially to this study.

Besides the presentation print of Messrs. Robinson and Cherrill, just now referred to, and the pair of photolithographs from Mr. Griggs, the Council have been honoured with similar offers on the part of Mr. Mayall, Mr. England, and Mr. Henri Claudet, the last being now to hand. Some, if not all, of these will, it is believed, be ready for distribution at an early date.

We consider that a vote of thanks from the Annual General Meeting is due to Messrs. Robinson and Cherrill for the admirable example of art-photography, entitled *Watching the Lark*, which they have recently presented to the Society, and also to Mr. Henri Claudet for a portrait of the late Mr. Claudet, produced by his topaz lens. Owing to the unfortunate fire which destroyed his studio, the original negative was destroyed, and the present print is a reproduction from a copy belonging to the Rev. J. B Reade.

The Council record with regret the retirement of Sir Frederick Pollock from the office of President of the Society, which he has held with so much benefit to the Society for thirteen years, and a vote of thanks to the Ex-Lord Chief Baron is now proposed; and they have also to record with regret the retirement of Dr. Diamond from the office of Secretary and Editor of the Journal, which offices he has ably discharged for eleven years, and is now proposed as Vice-President. The appointment of Mr. John Spiller in succession to Dr. Diamond has been already announced.

Since the date of the last anniversary the Society has to deplore the death of two distinguished members, Sir William J. Newton and Dr. H. G. Wright, both of whom filled the office of Vice-President, and remained for long periods connected with the Society. They died within a few days of each other, in January last.

Sir William Newton was very active at the original formation of the Society, and moved the resolution proposing its establishment, on the 30th of January, 1853. Five years later he was mainly instrumental in procuring an allowance from the Royal fund, or "Queen's Bounty," for the benefit of the widow of Mr. Scott Archer, the inventor of the collodion process. At the early photographic exhibitions Sir William Newton's calotypes were always to be seen; and he preferred printing his negatives by the development process. Sir William's communications to the Society were mostly of a practical character; but, as an artist, he frequently took occasion to urge the dependence of photography upon the older systems of fine art. He died in the eighty-fourth year of his age.

Dr. Henry G. Wright was elected a member at the anniversary meeting of 1859, and served on the Council, afterwards becoming a Vice-President. His papers *On the Medical Uses of Photography*, the last of which was read two years ago, display an amount of enthusiasm in the study and exercise of his profession, which fully warrants the high encomiums passed upon him by the writer of an obituary notice in the *Athenæum*. Dr. Wright was indebted for his first instruction in photography to our late Secretary, Dr. Diamond, and he highly appreciated the facilities for exact delineation which the camera placed within his reach. At the International Exhibition of 1862 he showed a portable form of camera and apparatus adapted for use in hospitals, and afterwards turned them to good account in taking a series of malformations and surgical subjects, which are preserved in the album of the Medico-Chirurgical Society. He has passed from us at the early age of forty-one years.

ACCOUNTS OF THE PHOTOGRAPHIC SOCIETY FOR THE YEAR ENDING 31st DECEMBER, 1868.

CASH ACCOUNT.

1868. Jan. 1. Receipts.	£	s.	d.
Balance at Bankers	22	17	8
„ of petty cash	1	1	6
Dec. 31.	23	19	2
Entrance Fees and Subscriptions received during the year	225	14	6
	£249	13	8

1868. Dec. 31. Payments.	£	s.	d.
General Expenses	117	15	4
Paid on Journal Account	38	19	3
	156	14	7
Balance at Bankers.. £87 19 1			
„ Petty Cash 5 0 0	92	19	1
	£249	13	8

BALANCE SHEET OF ASSETS AND LIABILITIES ON 31st DEC., 1868.

1868. Dec. 31. Assets.	£	s.	d.
Entrance Fees and Subscriptions in arrears £228 7 6			
Bad and doubtful.. 100 0 0	128	7	6
Advertisements in Journal, amount due £108 4 0			
Less 20 per cent. Commission 21 12 8	86	11	4
Journal Stock, &c., estimated at	100	0	0
Balance at Bankers	87	19	1
„ Petty Cash........	5	0	0
	£407	17	11

1868. Dec. 31. Liabilities.	£	s.	d.
General Expenses:—			
Sundry Accounts	56	10	3
Journal:—			
Taylor and Francis......	222	19	2
Editor..................	112	10	0
Balance	15	18	6
	£407	17	11

We have examined the above account with the vouchers, and find the same to be correct,

(Signed) G. BISHOP, H. BADEN PRITCHARD, } Auditors.

February 5th, 1869.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The last meeting of this Society (on the 11th inst.) was devoted to a magic lantern exhibition of photographs, by Mr. How. Everything passed off most successfully, and a pleasant evening was spent.

The Chairman (the Rev. F. F. Statham, F.G.S.), at the close, thanked Mr. How, and urged upon the members the importance of having a series of classified transparencies, illustrative of definite subjects, such as architecture, zoology, &c.

EDINBURGH PHOTOGRAPHIC SOCIETY.

This Society met on the evening of the 3rd instant, in the Hall, 5, St. Andrew-square,—Mr. George Slight, V.P., in the chair.

The minutes of the previous meeting having been read and approved of, the following new members were ballotted for and admitted:—Mr. James Rhind Carphin, C.A., Mr. William Hunter, and Mr. Powell.

A paper was then read by the Secretary (Mr. W. H. Davies), entitled *Suggestions for Work During Next Season.* [See page 85.] On the conclusion of the reading of the paper,

The Chairman said that he was sure many of the suggestions made by the Secretary were well worthy of attention, more especially that relating to an exhibition, as they all knew that very much of the advance made by the sister arts, painting and sculpture, was due to their periodical exhibitions.

Mr. Nicol observed that, while the question of an exhibition should not be lost sight of, he thought the best hit in the paper was that relating to the preparation for popular evenings. Every member present, as well as those not present, should make it a point to fix on some one subject at the commencement of the season for the next season's popular evenings, and they should work up to that idea during the whole session. That would really do practical good, and would be carrying out Mr. Davies's suggestion.

Mr. William Neilson said that it was not every member who could devote time to getting up pictures for a whole evening—say from forty to fifty pictures; but each member could produce a few, and so, by arrangement, much could thus be done.

Mr. Macbeth thought they should not lose sight of the use which might be made of their summer trips, and by dividing and organising a series of subjects nearly all the pictures taken could be utilised, every negative being different from the others.

After a few more remarks from Messrs. Campbell, Ross, Macbeth, and other members, the discussion was brought to a close.

Mr. Nicol then described and exhibited a very neat pocket camera, by Negretti and Zambra, which was much admired.

The latter portion of the proceedings was devoted to a practical demonstration of the working of Solomon's magnesium lamp with Sanford's lantern apparatus for enlargements, positive or negative, by Mr. Alex Asher. He arranged the apparatus—which was a camera reversed—with the prepared glass or paper in the dark slide, and, after sufficient exposure had been given, developed an enlarged positive and negative from *cartes* negative and positive, in a very roomy and convenient tent, which was also exhibited. The results were perfectly satisfactory and were highly applauded.

The meeting was then adjourned.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society took place on the 7th ult.,—Dr. H. Vogel in the chair.

The Chairman handed in a letter from Herr Husnik, of Tabor, in which that gentleman offered his printing process for sale to the Society. The principal recommendation in this process, as put forward by Herr Husnik himself, was the fact that it could be worked with the common printing-press. He had not sent to the Society a negative by which prints could be produced by the printer's press, in order to show what it was capable of, but had offered himself to show its operation practically to anyone who might feel interested therein.

Herr Friedlander (present as a visitor) remarked that it was true it could be worked with the printer's press—in a lithographic manner, however. In other words, it was not a mechanical printing process like typographic printing, but a chemical application; also, a process by which the negative must become moistened before every print. Lastly, he said, there had been many kinds of lithographic printing with the printers' press, though always with the aid of a water cylinder.

The Chairman stated that the price asked by Herr Husnik was 6,000 gulden (£600 sterling); but, after a short discussion, the purchase was declined. He (the Chairman) then laid before the meeting a proof by the Dallas photelectric process, being a portrait of M. Adam-Salomon, taken from The British Journal Photographic Almanac. He then proceeded to read a letter from Herr Wilhelm Grüne (then in London), according to which people in England were all alive with new photographic printing processes, which had given rise to the formation of a company styled the "Autotype Printing Company," which worked by Swan's carbon process, particularly in the reproduction of works of art; also, a "Photo.-Relief Printing Company," which cultivated the Woodbury process, and produced prints 11 × 9 inches, not only on paper but also on glass.

Herr Bette laid before the meeting a collection of remarkably-fine architectural photographs and interiors, taken at Constantinople and elsewhere in Turkey. The size of the pictures was 13 × 10½ inches. He (Herr Bette) also exhibited a photographic panorama of Constantinople, over five and a-half yards long, which gave an interesting survey of the Golden Horn, the Dardanelles, the Bosphorus, Pera, Broussa, and Constantinople, with all its mosques and minarets, and which appeared to be most successful in regard to the great technical difficulties presented in such photographs.

After reading a letter from the Secretary of the Hamburg Photographic Society, which was only of interest to members of the Berlin Society,

The Chairman showed a large quantity of English apparatus, the construction of which he explained to the meeting. Amongst the apparatus was Meagher's camera, which was examined with much interest.

The meeting was shortly afterwards adjourned.

ROYAL MICROSCOPICAL SOCIETY.

The annual meeting of this Society was held on the 10th inst.,—James Glaisher, Esq., F.R.S., President, in the chair. After some routine business and the election of officers, Mr. Glaisher vacated the chair, and formally installed the Rev. J. B. Reade, F.R.S., as his successor.

Mr. Reade, the new President, said:—I cannot take the chair without assuring you of my most cordial thanks for the honour you have conferred upon me. You are aware that for many years my professional life has been connected with clerical duties; but it is not inconsistent with my position as a priest in the temple of religion to be also a priest in the temple of science, and in being now called upon to preside over your deliberations I seem to receive my scientific commission from your hands. I am thus more immediately led to peruse the two great books —both of Divine origin—the book of revelation and the book of nature, the latter of which it is our duty, as a body, reverently and laboriously to study; and the value and variety of your own communications to our Society and the journal are a sufficient proof of your earnest diligence. It happened that yesterday evening I was present at the meeting of the Photographic Society, when our friend, Mr. Glaisher, put on his new coat as President, and today, as I told him, I should put on his old coat here. It is owing to your kindness that his mantle has fallen upon me. But can you take another step? Can you inspire me with his zeal? At all events, if I may answer for myself, it is my honest desire to be animated by his spirit and to tread in his steps; and, when I see the body of able men before me and around me, I am persuaded that his best anticipations will be realised, and that the motto of our Society will be—"Excelsior!"

A Portrait in the Witness Box.—At Salford, on Thursday, the 11th inst., Mr. Langley, an artist, sued Mr. Cohen, jeweller, for the sum of three guineas, the price of a portrait of Mrs. Cohen. That lady's husband declined to pay, on the ground that it was not at all a likeness of his *cara sposa*. The question, then, for the jury to decide was that of the portrait being a likeness or not. Accordingly, they had both the portrait and the lady placed before them, and thus arrived at a decision in favour of the artist, and of course against the husband, who must now try to discover some points of likeness not previously apparent to him.

Correspondence.

Foreign.

Paris, February 15, 1869.

On Saturday evening I had the pleasure of seeing the experiment of lighting, by means of the oxyhydrogen light, as applied to towns, &c. It was the third time I had been to the Tuilleries in order to see this illumination so that I could report to your readers, and I am able to report most favourably as regards the general effect. The most striking peculiarity of this light, as perfected by MM. Tessie du Mothay and Maréchal, is its perfect steadiness and freedom from flicker. It was the first remark made to me by a bystander—"How steady the light is!" The zirconia cylinders or balls are placed inside the ordinary street lamps, and the jet of mixed gases plays upon them. The light, although very brilliant, is not so painful to the eye as the electric light, and diffuses itself better. You see a globe of pure white light, about the size of a *large* marble, perfectly steady, and throwing its moonshine rays all around. The contrast between the lamps lit up with this light and the ordinary gas jet is very striking in two particulars, and I had the opportunity of comparing them side by side.

The gaslight is yellow, wavering, and flickering, and comparatively dull; the zirconia light is white, steady, no flicker, and brilliant. I have seen many attempts to introduce the electric light for lighting streets, &c., but it is too penetrating, and the light is blinding, even at a distance, to those who are making towards it; and everything, except in the rays of this light, are in total darkness. The effect is like that of a policeman's lantern, which enables him to see all before him, but which keeps him and his surroundings hid from all in front of him. The zirconia light is free from this defect. The question is, can the oxygen gas be procured cheaply enough, and this is asserted in the most positive manner.

A few weeks ago, I saw an account of a photometer which, if your readers are not already acquainted with it, I think will interest them. A solid cylinder of metal, some two inches in diameter and eight or ten inches long, is supported on a foot, and is graduated in divisions down the whole of its length. The top of this cylinder is painted *snow white*, and a round black mark is made in the centre. A hollow cylinder is made like the brasswork of a portrait lens, to fit over the solid; but it would be better, it struck me, if it were made to move backwards and forwards by means of rackwork. The photometer thus constituted is used in this way:—When the hollow cylinder rests on the foot it corresponds with the degree zero, and the white top of the solid cylinder, with its black mark, is fully visible. In moving the hollow cylinder upwards from zero, the black spot on the white surface becomes less visible at a certain distance, on account of less light falling upon it from its interception by the rising of the hollow cylinder. The amount of light is, therefore, judged from the number of degrees required to render the black mark so much indistinct. If it should require ten degrees one day to make the mark invisible at ten feet distance, it may only require eight degrees on another day, when the light is less intense. I hope I have explained the principle of this contrivance, so that all your readers may see its application to their particular requirements.

I was speaking to M. Schaeffner the other day about the carbonate of silver paper made by his firm. He is much pleased with the favourable reports which they continue to receive respecting it, and they are directing their attention to the equal preparation of the paper, so that every sheet may be always alike. They would like, if possible, to dispense with the ammoniacal fumigation, but there does not appear to be any chance. They are making an enamel paper on the same principle, but, to render this sensitive, it must be suspended in the fumigating box, the impregnated blotting-paper not being sufficient. With respect to the blotting-paper, M. Schaeffner gave me a caution:—"Never use blotting-paper that has been used for nitrate of silver, or anything, in fact; for if such blotting paper, or any which absorbs moisture, should be left in contact with the negative, the latter will probably be injured. Therefore, always use clean, dry blotting-paper for the pads of the pressure-frames."

Now a few words for your excellent correspondent, Mr. G. Price. Whenever I have attempted anything in the *abstract* line, or strayed into the mazes of metaphysics, even a little way, it has been my privilege or punishment not to be agreed with in the conclusions I have drawn. From my youth upwards, when I have solicited loans on the abstract principle that such lending would be beneficial to the lender, inasmuch as it would produce pleasure to the borrower—past the period when I have endeavoured to enlighten essay societies on the "unity of truth," "the meeting of extremes," or some theme of the kind—on to the present time, when I have failed to illumine an intelligent reader of your Journal upon my ideas of science in the abstract, people said they "did not see it." Well, I have always been sorry that they did not see these things—fancied they missed something by not doing so—felt, generally, subdued about things in general, and abstract things in particular, but never found that further argument or reasoning was of much avail towards bringing my friends nearer to my views. The winding-up of the argument, generally, is, that I am supposed to be a fair hand at hair-splitting, and a maker of distinctions without differences. So had it not been for Mr. G. Price taking the trouble of going over me again about "what is science," and you printing his letter, I should have been spared the task of explaining the meaning of what I have advanced, which, in these subjects is to my mind as bad an operation as having to explain a joke—all the more painful if you have a secret belief that the joke is "rather a good one." Thus far had I written a reply to Mr. G. Price last week, when I was pleased to find, on Saturday morning, a short letter by "Diogenes" in The British Journal of Photography, which accords so much with what I was going to add to my remarks, that I can cut them shorter.

There is science, and there are the sciences. Were a sculptor to represent science he would not take the statue of any particular science and give it a position before the others. He would err, also, in my opinion, if he were to embody knowledge in a statue; for so he would include *all* knowledge, which, to my mind, science does not. The fine arts are not, I take it, included under the term science, although I do not see why they should not be, as the laws of colour and form constitute sciences. Religious knowledge cannot be classed as science. Science is the essence of all the sciences—something "right away at the back of all"—a *perfect* knowledge emanating from the Creator, which is divided by men into sciences, and the truths, perfection, and completeness of which we shall never know here, but hope to go on learning hereafter. In short, I hold that science is the mind and knowledge of the Creator respecting certain laws of His universe. Hence I hold, also, that if "science knows nothing whatever about it," there is no chance for us ever to know anything about it. Your pages are scarcely the place to hold a discussion of this sort, and I little expected it when I penned my remarks on the action of solutions of salts upon films of albumen.

Passing a shop in the Rue de Rivoli a few weeks ago, the window of which was full of photographs of all kinds, I entered into conversation with the proprietor, and asked him how it was that such shops as his paid, as there were many like them in Paris, where nothing but photographs and albums were sold. I said that in England I believed such shops would not pay, and did not. He told me that he considered the reason to be chiefly because the articles were not *well displayed* in England (he has often been to London); that a mistake was made in selling other things than photographs and albums in the same shop; that the trade was not sufficiently a *specialité*. The chief customers for photographs in Paris, *i.e.*, retail, are the English and Americans; hence there seems some ground for this gentleman's remarks. *Carte-de-visite* portraits are displayed as much as ever, and all other photographs are seen in profusion in certain shops devoted to their sale. This "*specialité*" is a great system here; you cannot get a pair of braces where you buy your gloves, nor can you purchase sugar where you obtain your *best* tea and coffee.

R. J. Fowler.

Home.

CYANIDE IN THE BATH.

To the Editors.

Gentlemen,—In perusing the pages of The British Journal Photographic Almanac, I find there an article, by Mr. Vervega, on pinholes, &c., wherein he advocates the use of cyanide.

I do not wish to rake up an old subject, which is, perhaps, not of sufficient importance to interest many; but there I find Mr. Vervega says the use of cyanide in this connection was known to him some time before I published it. So it was to me four years before; in fact, before paper pictures were much in vogue, thirteen or fourteen years since, and I communicated it to the public in 1861; so I, therefore, *claim* priority of bringing it into public notice. Some one might say that they knew of the Daguerreotype process before Daguerre himself, but that requires proof.

The wise men all knew how to balance the egg when they saw Columbus do it. In fact, it is astonishing how people find they knew all about many things when they see them or hear of them being done—only it never strikes them to mention it before.

Trusting I am not trespassing,—I am, yours, &c., James Tulley.

26, *Division-street, Sheffield, Feb.* 16, 1869.

THE PHOSPHORIC AND OTHER LIGHTS.

To the Editors.

Gentlemen,—In your editorial article, published in this Journal on the 5th inst., you mention that my experiment with phosphorus "points to many curious and useful modes by which the luminosity of an ordinary gas flame might be enormously increased and its chemical power also augmented." My own idea in performing the experiment to which attention has already been directed, was not to increase the power of a common gas flame, but to obtain the splendour and effect of the phosphoric light.

On more than one occasion preceding that on which the apparatus was tried before the members of the Manchester Photographic Society, I have been able to cause the evolution of the pure phosphoric vapour with sufficient rapidity to produce a continuous light without using a current of hydrogen gas. When, however, it is impracticable to obtain this amount of heat, as was the case at the Society's meeting, when many other gas jets were burning at the same time, I found that the phosphoric vapour might conveniently be diluted with coal gas, and that, when so diluted, the light emitted was exceedingly brilliant. Obviously, however, the brightness of the light is dependent upon the quantity of phosphorus consumed, which must necessarily be greater when its vapour is evolved with sufficient rapidity to afford itself a continuous stream; and hence the light obtained at the public meeting referred to, though eminently bright, was inferior to that of the pure phosphoric flame.

In the case of the Editor's experiment with magnesium, I consider myself that the current of hydrogen gas used, to a great extent, prevented its success. Judging from what was stated, it would appear that the magnesium vapour was never under sufficient tension to make its presence known, and hence dilution with gas was premature. We know that magnesium is capable of distillation, although the temperature at which its vapour is evolved is enormously high. When, however, it *is* in a state of vapour, I think there can be but little doubt of its obeying the same laws which regulate the expansion of other gaseous bodies; and, if so, there must be a still higher temperature at which its vapour would acquire a higher tension than that of fifteen pounds to the inch, the amount of its force at the boiling point.

This being the case, there can be no doubt, it seems to me, that if enclosed in a vessel sufficiently heated, the magnesium vapour would issue from any orifice provided for the purpose in a continuous stream; and, as the point of the ignition of this metal is below its boiling point, this vapour must surely become ignited immediately on making contact with the air, and therefore, from such an apparatus as mentioned, I cannot but think it might be made to issue both in a continuous and a burning stream. I must confess, however, that experiments I have myself made with it have not resulted in a satisfactory manner, which failure I attribute entirely to an insufficient application of heat and the want of suitable appliances.

Although some time ago I thought that the volatilisation of the metal would afford a convenient means for its employment as a source of light, I am of opinion at the present time that the very high temperature required before this could take place will remain a bar to the commercial success of this idea. As the boiling point of metallic zinc is not far from that of magnesium, the same objection would, I apprehend, apply to its use, although, of course, experiment is the only satisfactory way by which this point can be determined. I shall, however, at my earliest convenience set about working in this direction also, and should the results prove at all encouraging I will make them known through the columns of this Journal.

With regard to the dangers of phosphorus: like gunpowder or steam, there is no danger when it is properly used, and with the aid of suitable appliances, without which all three substances are likely to produce appallingly disastrous results. There are few lecturers on chemistry who would care to have four ounces of phosphorus subjected to a high temperature upon the lecture table. This, however, was the amount I employed at the meeting of the Manchester Photographic Society, and the whole experiment passed off with no more hitch or want of regularity than would be experienced in burning a "dip" in a candlestick, simply because in the construction of the apparatus every precaution had been taken to make it suitable for the purpose for which it was intended.

Respecting the suggestion made by your correspondent, Dr. Markham, the idea of using saltpetre and phosphorus in a state of mixture is not new, neither is the method convenient. It was suggested in one of the photographic journals some three years ago, and I have frequently performed the experiment with the use of powdered chlorate instead of nitrate of potash. The result, however, to be obtained is too primitive in its nature to be of much real service. The light is under no sort of control, but must burn to the end when once started, and, except when prodigiously large amounts are used to work with, lasts only for a few minutes, and during that time there is generated a large amount of oxygen, which is blown away without aiding the combustion.

As to the fumes proceeding from the combustion of phosphorus, it is mentioned in the editorial article that "this latter objection to the use of the phosphoric light could, of course, be to a great extent removed by the employment of a suitable chimney communicating with the air external to the apartment." From this remark, and also from the suggestion by Dr. Markham to convey away the fumes through a tube of brown paper supported on a spiral column of wire, it would seem as if there was an impression prevailing that in my own experiment before the members of the Manchester Photographic Society no provision had been made to carry off the phosphoric acid. So obvious was this necessity, that our Secretary did not think it necessary to allude to the fact that the whole arrangement was enclosed in a large lantern having a sliding front of glass for the passage of the light.

This lantern was surmounted by a long and substantial tin chimney, which passed through a hole in a board out at one of the windows of the room. Both the lantern and its chimney were constructed specially for employment in the room in which the light was exhibited, the experiment being performed upon one of the oilcloth-covered tables belonging to the Memorial Hall. A gas-burner had been fixed inside the vertical portion of the chimney, so that, by the use of a flame there, a powerful draught might be created. This, however, was found to be unnecessary, as the whole experiment worked from beginning to end without there escaping a single puff of smoke.

In a short time I shall have pleasure in directing attention to further experiments with the phosphoric light.—I am, yours, &c.,

D. Winstanley.

[In the course of our recent remarks upon our correspondent's interesting experiment, we gave the result of our attempt to obtain a magnesium light by volatilising the metal in a stream of hydrogen, for the purpose of showing that, with the temperature usually obtainable in a chemical laboratory, it was impossible to obtain the magnesium light of the kind sought. Of course, we are well aware that at a very intense heat the metal could be made to yield a vapour of considerable tension.—Eds.]

THE LIME LIGHT.

To the Editors.

Gentlemen,—Some persons may think I copied Mr. Highley's idea of giving great pressure to the mixed gases, to prevent explosions; but I have to remind them that my letter, published in your Journal of January 22, was dated January 18, and posted to you the same day, while Mr. Highley's lecture was not delivered until two days afterwards. I was the first person that pointed out the fact that the condition is, that the gases *must leave the jet faster than the flame travels backwards*, and then an explosion is impossible. Hydrogen requires greater pressure than coal gas. Five or six inches of water, at least, should be used.

The use of the oxyhydrogen light for lantern purposes has been greatly retarded by the fear of explosions. Let a small orifice be used, as I have pointed out; for the velocity of the escaping gas is greatly increased by that means without increasing the quantity of weights on the bags. Even a snap in the jet I have been unable to obtain; the flame is kept farther from the orifice, and it is not until the velocity is reduced by the resistance of the air that it begins. The lime can also be kept farther off.

If any person has read of a double nozzle being used before I published a description of mine, perhaps they will let me know where it is to be found. I mean a double small orifice nozzle, so as to get the light of the large bore with the perfect safety of the small orifice.

Once, when I was delivering a lecture on chemistry, I was asked at the conclusion how it was that my blowpipe (large nozzle) melted everything I put into it, and did not melt the brass nozzle itself. I gave the usual reply—that it was owing to the cooling effect of the metal. I felt it was a poor explanation, as I had melted the end of an iron rod. The cooling effect of that mass of metal did not prevent it. I have received several letters on this subject, and perhaps this one will make the matter plainer.—I am, yours, &c.,

T. S. Reeves.

Exeter, February 14, 1869.

MR. KING'S PAPER.—AN ACKNOWLEDGMENT.

To the Editors.

Gentlemen,—I ought to have mentioned in my paper (published in your last number) Mr. J. Stuart as one of the few who have produced first-rate photographs of architectural subjects. The small presentation prints of *Canterbury Cathedral*, which the North London Photographic Association gave last year, are some evidence of his work.—I am, yours, &c.,

W. Warwick King.

February 17, 1869.

Preserving Negatives.—With the view of preserving negatives when stored away and out of use, Mr. England has of late been trying the effect of protecting the varnished film by means of a coating of white wax which had been previously dissolved in turpentine to the consistence of cream. Before storing away the negative, he recommends that some of the above be applied by means of a tuft of cotton wool. When the negative is again required for use, it is only necessary to warm it, and remove the coating by means of cotton wool. "Plates protected in this way" (says Mr. England in the *Photographic Journal*) "I have purposely subjected to very rough treatment, such as extremes of temperature, moisture, and exposure to strong acid fumes, without the slightest injury resulting. I feel very sanguine that by waxing the negatives before storing them away an efficient protection will be afforded. As a final remark, I may say that I have never known a negative to become spoilt by the splitting of the film, so long as it remained in the pressure-frame and was constantly printed from. On this point I can speak decisively, as some of my negatives have been in constant use for many years, and not a single instance of injury of the above description has occurred. This seems to prove conclusively that it is only necessary to protect the negatives from atmospheric influences when not in use."

EXCHANGE COLUMN.

I wish to exchange one volume of THE BRITISH JOURNAL OF PHOTOGRAPHY and one volume of the *Photographic News*, both for 1868, complete and in good condition, for a musical box.—Address, L. L., 14, Upper Park-street, Liverpool.

I have a camera by Ross for exchange for plates 6 × 6, beautifully made, Spanish mahogany, swing back, the sliding part nicely panelled, cost £6 10s. I will take for it a landscape lens, size 10 × 8, by any good maker.—Address, J. W. SMITH, Wrawby-street, Brigg, Lincolnshire.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

Charles Mitchell, Bristol.—*Portrait of the Poet Chatterton, from a drawing by H. Horlor.*

☞ *Correspondents should never write on both sides of the paper.*

J. R. C. (Upper Mitcham, Surrey).—Received, and will be attended to.

A.P. (Birmingham).—Received, thanks. The other matter is being looked out

"PHOTO.-GALLERY."—Your model is received, but too late to be commented on this week.

SCOTUS.—Mr. Meagher, 21, Southampton-row, has recently brought out an article of the kind you require. We at present know of none else.

R.—If at all obtainable the zirconia *shall* be obtained. You are, of course, aware of the mode in which it is prepared, and, "if the worst should come to the worst," it will have to be made. More of this next week.

A. Z. (Newcastle-on-Tyne).—We have a drawing in hand ready to be engraved. What we are deficient in is *personal* experience. This we are acquiring. We shall hand your letter to an importer, who will next week reply in this column.

YOUNG PHOTO.—Beautiful crystallisations may be made upon your windows by sponging them over with a strong solution of Epsom salts, alum, or other salts. This will prove much superior to white lead, which would stop a great deal of light. For the part over the sitter's head the black colour will be preferable to the blue, but some of the drab class of tints would probably answer best.

CHAS. A. FERNELEY.—The best lamp is that figured in our article on the lantern in the ALMANAC; but, for getting a good ten-foot disc, you should have the oxycalcium light. The half-plate lens is of too long a focus to be generally useful. It answers well as an adjunct, but, for general utility, the quarter-plate lens is best. The stella lamp is a very good one, and, although it differs in form, it is identical in principle with the solar Argand. An inch burner would, however, be better than that which you now have.

GEORGE DAVIDSON.—The ALMANAC for the present year is the ninth which has been issued. It will prove difficult if not impossible for you to obtain them all, seeing that the greater number of them were out of print within a few months after publication. Moreover, they could not be bound together, for the first was issued as a sheet; it was followed by a small pocket volume, which after a few years was superseded by the larger and better form which the work has of late years assumed, and of which there have now been four annual volumes issued.

"BLAIR ATHOLE."—Your proposed method for enlargements is very good You are, of course, aware that the inclination of the pivot on which the apparatus revolves must correspond with the latitude of the place where it is erected. From nine to twelve inches is a suitable diameter of condenser. A good *carte* lens is also required. The proper distances for the various sizes of enlargements can either be ascertained by experiment or from the enlarging table in our ALMANAC. The condenser is absolutely necessary for the method you propose to adopt. A concave reflector would answer, but a good one would be more costly, and be more troublesome to manage, than a condensing lens.

"EGO VINCAM" (Northampton).—1 and 2. If you send a drawing or description of the condensers you have, we shall then advise you as to their suitability. The "very best construction" of condensers and object-glasses are not, with respect to the former, obtainable in commerce. They would be achromatic, and this, for condensers, involves much expense; but we hope soon to have an article on the subject, giving details. Meanwhile, see the description of Dr. Morton's condenser given at page 61 of this year's ALMANAC. You will also there notice what we say about object-glasses.—3. London Stereoscopic Company.—4. There is no magneto-electric machine made on a scale sufficiently small to serve for the purpose desired. A "C.-D.-V. lens" simply means a quarter-plate portrait lens corrected to cover a flat field. They are made of various focal lengths to suit local and other requirements.

A. CLARKE (Stourbridge).—The point you raise is important, but you will more readily comprehend it from the following:—If you induce some celebrity to sit, and, *having previously obtained his consent*, register the portrait, then, if any photographer make a copy, you can procure a certificate of registration when the case comes on for trial. For giving this certificate the registrar's fee is five shillings for each picture. If a piracy be committed in London you must sue there, or wherever the person resides. However, observe that you must not only be able to prove the registration—which is easy enough—but you must prove that the *copyright* is legally yours, and that in virtue of that right you claim the protection afforded by registration. In your case get the persons who order the photographs to make over to you in writing the copyright in the group, then register them, and everything will be secure.

QUIZ.—The stains on the print are sulphide of silver, and have, probably, been caused by your fingers, when wet with hyposulphite of soda, coming in contact with the paper.

"FOG" (Burmah).—1. To get rid of the surface deposit see first that the bath is slightly acid, and that the collodion is of a sherry colour. A little tincture of iodine added to the collodion often effects a cure of the peculiar fogging you describe. If these methods of treatment do not effect a cure, add a little solution of bicarbonate of soda, sufficient to render it *slightly* milky, and place in the sun for a few days.—2. The fact of the image of an "alligator" appearing so persistently in all the negatives taken on a certain day, and invariably appearing on a particular part of the sky, we account for by assuming that the silver solution draining down had touched the slide, imbibed some impurity from it, and had then caused the stain of the shape referred to. In the absence of more knowledge of the facts we offer this as the explanation.—3. *Three* grains per ounce is evidently a mistake; it ought to have been thirty.—4. Try the addition of common acetic acid.—5. Dilute your glutinous collodion with ether.—6. Of three parts of an iodide to one of a bromide. Each maker, however, has his own formulæ.—7. You ought to have mixed together the contents of both bottles. The result points to your having much over-iodised the fifteen ounces of collodion you have used. The remaining collodion may be iodised by the formulæ given in our ALMANAC. —8. The next time you and your friend make a bath do not add any iodide of potassium, but merely coat a plate with collodion and allow it to stand in the silver solution for half-an-hour. This will prevent a repetition of the annoyance described by you.—9. The distilled water is evidently very bad. Use plain boiled water.—10. The red colour is owing to an organic salt of silver.—11 & 12. Render it neutral, as described in reply to the first query. We shall "lump" together all your printing queries. Seeing that you have such an excessively high temperature in your part of the world, reduce considerably the strength of your printing bath, and see that it be *acid*. We suspect that many of your troubles are owing to your distilled water. Try common boiled water, as previously directed, and do not add alcohol to it—not, at any rate, until you have overcome the difficulties which now beset you; *then* you may do it by way of experiment. A drop or two of a solution of chloride of gold will generally restore an inert toning bath; if it be acid, add a little chalk.

HYDROGEN AND ITS ANALOGUES.—On Saturday last, Dr. Odling, F. R. S., delivered one of a series of lectures on this subject at the Royal Institution. In support of the "new views" concerning hydrogen being a metal, he said that mercury can be boiled into an invisible gas, and analogy seems to point out that hydrogen at all temperatures yet produced by man is similarly the vapour or gas of a metal, and that by a sufficiency of pressure or cold it may be reduced to a liquid metallic state, so as to resemble quicksilver. Many chemists support this opinion, much evidence on the point having been brought to bear by M. Dumas. Hydrogen will combine with chlorine, just like sodium. Sulphuric acid is simply a sulphate of hydrogen, and hydrogen is made by decomposing sulphate of hydrogen into sulphate of zinc, thus liberating the gas. All these facts point to the metallic nature of hydrogen. In physical properties the gas acts like a metal, by conducting heat with facility. Mr. Graham's experiments also favour the view that hydrogen is a metal. Palladium seems to absorb vapour of hydrogenium, just as gold absorbs vapour of mercury. When palladium wire full of hydrogen is placed by the side of palladium wire free from the gas, both exhibit equally the properties of a metal, which could hardly be the case unless a metallic alloy be really formed. When palladium is feebly charged with hydrogen, it holds the gas very tenaciously; but when it is well saturated with the gas it gives it off very readily and gets covered with bubbles of hydrogen when placed in water.

LONDON GAZETTE, *February* 12.

DISSOLUTION OF PARTNERSHIP.

KELLET & ELLIS, Lancaster, photographic artists.

METEOROLOGICAL REPORT.

For the Week ending February 17th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Feb. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
11	30·07	58	49	52	54	WSW	0·46	Dull
12	29 85	52	42	42	42	SE	0·29	Rain
13	30 26	52	34	36	38	WNW	—	Dull
15	30·39	52	37	46	48	SW	—	Dull
16	30 13	55	45	44	47	SW	—	Fine
17	29·81	—	46	49	52	SW	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 460. Vol. XVI.—FEBRUARY 26, 1869.

A NEW TEST FOR AN ALBUMENISED SURFACE.

In the last number of the *Journal de Pharmacie et de Chimie* we find a notice of the discovery of a new reagent for discriminating between albumenoid and non-albumenous compounds. The test consists in employing a solution of a body but little known to photographers, viz., molybdic acid in oil of vitriol. This reagent, when applied to an albumenous substance, turns the body tested blue, owing to reduction of the molybdic acid. The chemist who suggested this test is M. Froehde, an experimentalist to whom we are already indebted for some useful suggestions.

On considering the bearings of this test, it became evident that we might employ the molybdic solution as a very convenient means of distinguishing between photographic papers coated with albumen or similar protein compounds, and papers treated with gelatine or bodies allied thereto. It sometimes happens that a sample of paper or a print presents some peculiarities as to surface which render it desirable for us to know whether the "glazing" material is albumen or gelatine, since the latter substance can be made, under certain circumstances, to yield at least as good results as albumen, when applied to photographic paper.

In such cases, ordinary means afford no clue whatever as to the nature of the substance forming the surface of the paper or of the print, and the discrimination between the two classes of substances used as "albumenisers," by means of the usual chemical tests, is a matter of too much difficulty for the tyro in chemical operations; since, when gelatine or albumen are either present as a thin, insoluble film on the surface of a small piece of paper, it is not always an easy matter for a beginner to ascertain satisfactorily which substance actually forms the coating. A simple test, therefore, which would quickly distinguish between either kind of film would be worth knowing and examining as to the value of its indications.

Within the last few days we have examined the new test, and find its indications to be trustworthy and obtainable with sufficient ease to render safe aid in solving the problem we have already referred to.

We prepared a sulphuric solution of the molybdic acid in the following simple way:—A few grains of the molybdic acid—a substance of which we shall speak more particularly presently—is placed in a test tube, and about thirty minims of strong liquid ammonia poured over the yellowish powder. The mixture is then shaken and allowed to stand in a warm place. After a short time it will be found that the molybdic acid has all dissolved. We now place the solution of molybdate of ammonia in a capsule, or a common saucer will equally serve our purpose, and add gradually and with constant stirring about two drachms of oil of vitriol. Care must be taken in adding the acid to avoid spirting; this can be done by rapidly agitating the liquid. When all the acid has been added, the capsule or saucer is placed in an oven for a short time, in order to evaporate off some of the water; the fluid is then allowed to cool and is placed in a bottle for use.

If it be found, on trying the experiment, that a piece of ordinary writing paper is rapidly blackened by the test, the solution has been too much concentrated, and may be easily brought into proper condition by the addition of a few drops of water; of course the amount of water added must be in proportion to the quantity of solution which is to be diluted.

Having prepared the solution we use it as a test very simply. If we suppose it to be desirable to distinguish between two samples of paper—one coated with albumen and the other with gelatine—it is only necessary to proceed as follows:—Place a little of the sulphuric solution on a plate, and warm this slightly by allowing it to stand for a short time in front of a fire. When sufficiently warmed we let down the paper on the acid—glazed surface toward the liquid—just as we should do in sensitising the sheet on a nitrate of silver bath. After leaving the surface in contact with the acid for a few seconds we remove it, turn the piece of paper over on its back, and leave the test to take effect.

If the paper be coated simply with gelatine no effect will be produced; but, if an albumen film be experimented with, it will be found to gradually discolour under the influence of the molybdic solution—first taking a faint slatey hue. This tint gradually acquires intensity on prolonged action, until the albumen surface has been coloured of a deep bluish-grey tint, never a pure blue; at least we did not obtain anything approaching to a pure blue in our experiments.

If the paper be left exposed to the air for a few hours we find that the slate colour slowly disappears, and is replaced by a faint brownish tinge, which is permanent. This characteristic of the molybdic blue, which results from the reduction of the molybdic acid by albumenous compounds, serves to prevent mistake in using the test, since actual reduction is at once distinguished from mere charring of the paper by the action of the strong sulphuric acid. As we have already stated, gelatine printing paper does not exhibit this reaction, nor do any of the ordinary papers which we have tried.

Our readers may probably like to know what is molybdic acid, and we will now give the necessary information.

Molybdic acid—as it is called—is the teroxide of a rather rare metal, molybdenum, which occasionally occurs in combination with sulphur in scattered masses in certain rocks in Sweden, the Donegal mountains in Ireland, and at Mont Blanc. This sulphuret of molybdenum is a substance remarkably resembling the better varieties of black lead or graphite, and is often mistaken for the latter. When the sulphuret of molybdenum is powdered and heated strongly in the air, the sulphur is driven off as sulphurous acid, the molybdenum at the same time taking up oxygen, and forming the teroxide or molybdic acid—the substance which, when in sulphuric solution, we subsequently employ as our test for an albumen surface in the manner described above.

"RUDENESS."

When a pretty little girl is annoyed by a naughty little boy who has returned her pinches, &c., in kind, the young lady usually stigmatises her tormentor "a teaze, and *such* a rude boy." We should suppose that a contemporary looks upon us in somewhat the same light when he last week considered us "rude" for having, with honest indignation, entered our protest against the mode which he adopted in criticising our article on the influence of persulphate of

iron in the developer. In his last issue he records his opinion, with due solemnity, that we are "rude." "Such rude men"—we think we hear him murmur in soft and mellifluous accents—"to think they would return my delicate insinuations with such words!"

In his reply to our last remarks upon the subject of persulphate of iron in the developer, our contemporary has not even taken the trouble to examine our argument, wherein we showed that our view of the matter was in accordance with general experience and not at variance with it, as our contemporary appears to think. We repeat here what we said fully and distinctly a fortnight ago, that our original article dealt essentially with a question of *degree* as regards the influence of the persalt of iron in the developer, and that no other question of *kind* actually came under discussion. We also pointed out that our remarks were the result of a line of thought and experiment suggested by an exceedingly interesting paper communicated to these pages by our valued contributor, Mr. M. Carey Lea. And we showed further, by a quotation from Mr. Lea's communication, that the paper—nay, the very sentence which suggested some of our observations—contained, clearly and distinctly expressed, the refutation of the error into which our contemporary thought we fell. We, of course, see that, when subjected to an ingenious twisting process, our remarks might be misinterpreted; but it is evident to us that they must have conveyed to a great extent what we meant they should, when we find that our contemporary could only extract anything attackable from them after six weeks' cogitation, and then only with the aid of "Veritas"—who, by the way, now also accuses us of "rudeness," in addition to the other high crimes and misdemeanours of which he delights to consider us guilty.

We may add that we dislike pen-and-ink tournaments as much as most people; but we shall never allow a meaning to be attached to our words which we did not intend them to convey without strong and decided protest, even if at the risk of being considered "rude" and teazing, or of being classed, in a delicate feminine way, amongst "naughty boys."

COLLODIO-BROMIDE PROCESS: EFFECTS PRODUCED BY VARIATIONS IN THE COLLODION.

The whole collodio-bromide process is still so new that we have little or no positive information as to the effects traceable to variations in the composition of the collodion. We know, however, that the same rules that govern the ordinary wet process do not prevail in the collodio-bromide, and it consequently follows that all our knowledge of such detail must be obtained by diligent and careful study; only so can we build up this branch of photography, and lay all its advantages open to the intelligent photographer.

The following examinations were entered into with a view of endeavouring to make out the influence—first, of different saltings; second, of varying the proportions of alcohol and ether:—

I.—Effects of Different Saltings.

Three collodions were made by the following formulæ, and were placed aside for a month to ripen:—

1. In each ounce of solvents were dissolved—

Bromide of cadmium	12½	grains.
,, ammonium	2	,,
Pyroxyline	6	,,

2. Potash collodion. To each ounce of solvent—

Bromide of potassium	1	grain.
,, ammonium	3	grains.
,, cadmium	8	,,
Pyroxyline	6	,,

3. Zinc and potash collodion—

Bromide of zinc	1½	grain.
,, ammonium	3	grains.
,, potassium	1	grain.
,, cadmium	6½	grains.
Pyroxyline	6	,,

The first of these collodions, after ripening for a month, was sensitised with twenty-two grains nitrate of silver to the ounce; the second and third with twenty grains, as they contained a proportionately less amount of bromides.

Although bromide of potassium has very little solubility in alcohol and ether, yet this slight solubility is very materially helped by the presence of the cadmium and ammonium salts. It is, therefore, a very great mistake, in mixing any collodion in which any potassium salt finds a place, to attempt to dissolve the respective salts separately. The proper plan is to place them all together in a large test-tube or small flask, and to pour alcohol over them. Heat is to be applied with care, to avoid accidents, and the potassium salt is got into solution by virtue of the other salts, with which it appears to form double salts of materially greater solubility than that of the bromide of potassium alone.

In the course of a few days a distinct difference is noticeable in the collodions. That to which bromide of potassium is added assumes an extremely pale straw colour, whilst that made without it remains perfectly colourless. The difference, though not great, is perfectly evident when the bottles stand side by side.

I may take this opportunity of mentioning a fact of considerable interest to workers in collodio-bromide. It is, that when it is desired to have a newly-mixed collodion ripen as soon as possible, the collodion, instead of being placed in a cool, dark spot, should stand in a warm, well-lighted room, in order that the salts which it contains may be made to react as quickly as possible upon the pyroxyline in solution, and bring about that condition which is so essential to success in collodio-bromide work.

When these collodions had stood a month they were sensitised with nitrate of silver, and a set of plates was made, to which exactly equal exposures and equivalent developments were given; and the following facts, which will have considerable interest for collodio-bromide workers, were clearly made out:—

The addition of even so small a proportion as one grain to the ounce of potassium salt exerts a perfectly well-marked influence upon the collodion. This *ripens with considerably greater rapidity*, and at an earlier period gives images free from veiling, and with the necessary density.

But the *collodion is distinctly inferior in sensibility*. It therefore gives stronger contrasts and more brilliancy, but less softness and less detail in dark shadows, and in the less illuminated part of the picture generally. On the other hand, it shows less tendency to fog.

A difference, produced by the very small proportion of potassium salt, and one which could not in the least have been anticipated, was produced. This was a much-increased tendency to osmotic action, *i.e.*, penetration of the film by the liquids employed. This effect varied with different preservatives. With some it rose to such a pitch that, when the plate was plunged into the alkaline developing bath, in half-a-minute the plate appeared covered with round, dark spots—darkest in the middle and shaded off to the edges. These were from one-tenth of an inch up to half-an-inch diameter, and so near as to touch each other. Apparently the plate was ruined, but in the later operations these disappeared and left no trace or stain behind. They consisted of developing liquid, which had forced its way through the film and had collected in these scattered drops, flattened by the pressure of the film against the glass. When working with collodions containing only cadmium and ammonium salts, even in very various proportions, nothing of the sort had ever presented itself. This action seems, therefore, to be a characteristic action of the potassium salt.

Action of Zinc.—I was induced to test the action of bromide of zinc from the following circumstance:—An intelligent photographic friend, whilst lately travelling in Europe, met with some remarkably fine specimens of copying work, which he purchased. In a conversation with the maker, the latter stated that he used *bromide of zinc* in his collodion, and that without this addition he found it impossible to get such good results in copying oil paintings. The proportion used varied with the circumstances of the case, depending upon the greater or less actinic power of the colours in the picture, but, if I recollect aright, was mostly about one-tenth the whole salting.

Without conceiving that there exists much resemblance between copying oil paintings and collodio-bromide dry work, the above seemed to point to some destructive influence of bromide of zinc. I therefore included it in my trials; but the result was markedly unfavourable. It was indeed curious to see how much influence the trifling additions of other bases produced. Plates made with the zinc collodion were very decidedly less sensitive, and they showed a tendency to produce small hazy spots, not met with at all in using the other collodions.

Rejecting, therefore, totally the zinc collodion, the question narrows down to the advantage or disadvantage of the addition of one grain to the ounce of bromide of potassium. And I think this addition may be useful when it is desired to have newly-mixed collodion in order at the earliest possible moment for use. But when time can be given to the ammonium-cadmium collodion to ripen fully, it will deserve the preference, by reason of its greater sensitiveness and detail in the shadows, and in its much less disposition to blister.

II.—Influence of Alcohol, Ether, and Water.

When a collodio-bromide collodion is extended over the plate it has to carry with it a body of bromide of silver, which adds materially to its viscidity, and requires somewhat greater care in the work. The smooth extension of the liquid will always be more easily effected when the materials are free from water than when the alcohol and ether are of lower grade.

With respect to the relative proportions of alcohol and ether, my experiments brought me to the conclusion that the proportion of alcohol could not be increased beyond that usually employed—equal parts of each—without manifest disadvantage. The tendency latterly amongst wet operators—amongst some at least—has been to give a preponderance to the alcohol, in the belief that greater detail in the shadows was thus obtained. However this may be in the wet process, it is certain that, when a collodion is mixed with alcohol two parts, to ether one part, such a collodio-bromide is very difficult to coat a plate with, without getting crapy lines and a more or less structural film. It is certainly not impossible to obtain a perfectly-structureless film with such a collodion. I have succeeded in doing so, but it is more difficult, and there seems to be no object whatever gained by such a change. It is, therefore, probable that the equal bulks of alcohol and ether, now commonly used, will continue to be recognised as the most useful proportions. When it is deemed advisable to use bromide of potassium in making the collodion, it is hardly necessary to say that it should be reduced to fine powder before attempting to dissolve it. This is not necessary with the other bromides. M. Carey Lea.

TRANSFERRING COLLODION FILMS.

In connection with the subject of Edwards's patent carbon process, described in another article in the present number, we have to make a few observations upon the subject of transferring the collodion negative film from the glass plate on which it was originally taken.

Our readers are already quite familiar with the process adopted by Mr. Woodbury, which has been described both in a previous number of this Journal and in our Almanac of this year. From the description it will be seen that the *modus operandi* consists in applying a coating of gum arabic over the unvarnished negative, and, when dry, following it up with another application of plain thick collodion. When dry this is placed in water, and in the course of a short time the film is found to be detached from the glass.

Before we direct attention to Mr. Edwards's modification of the method in question, we should like to observe that, from the commencement of the collodion process on glass, the removal of the film from its glass support claimed the very earliest attention of its introducer. Those who have the good fortune to possess one of Mr. Archer's manuals of photography will not fail to have observed the stress he laid upon the removal of the collodion film from the glass. His original method was, doubtless, imperfect; but a later and patented method was decidedly good, although not equal to those adopted at a more recent date. It consisted in varnishing the picture with a solution of gutta-percha in benzole or naphtha, and, after the film had become dry, immersing it in water until the combined films left the glass and floated clear away from it. In this manner we have removed many films from glass; but we are bound, in justice to modern inventors, to say that it did not produce such a useful transfer as may now be obtained.

Mr. Edwards's process differs from that of Mr. Woodbury, inasmuch as the latter uses an intermediate film of gum arabic, whereas the former prefers a solution of India-rubber in benzole. The *rationale* of the intermediate film is as follows:—If a second application of collodion were made over the first coating, the latter would be in danger of being dissolved and the picture thus destroyed; but a thin layer of transparent material, insoluble in ether, will isolate the primary coating from the secondary film. Gum arabic undoubtedly fulfils this condition—so does India-rubber. Mr. Woodbury adopts the former and Mr. Edwards the latter.

Before, however, Mr. Edwards specially advocated this method of transferring films, Dr. Markham had called our attention to the advantages resulting from the substitution of India-rubber for gum arabic as an intermediate film.

From our own experience, we recommend those who purpose transferring their negatives from the glass plate to the pages of their folios to get rid, in the first place, of the varnish by which it may have been protected. In the case of most varnishes, an immersion for a short time in a bath of alcohol will effect the requisite removal. Some negatives may resist this, in which case it is best to let them alone. We have never seen any hitch occur in the removal of films which could fairly be attributed to the negative having been previously varnished.

The intermediate transfer solution may advantageously consist of two or three grains of India-rubber to the ounce of benzole, to be followed, when dry, by a plain collodion very much stronger than would be employed for negative purposes. The solvent may be methylic alcohol or wood naphtha, provided it be sufficiently strong to dissolve the pyroxyline, and the proportions may be from ten to fifteen grains of the pyroxyline to the ounce of solvent.

The negative must have been well dried, and, after being coated with the India-rubber solution described above, it should be placed on a levelling stand, and be then coated with the plain collodion, which may consist of the ingredients mentioned above, together with from three-fourths to one per cent. of castor oil. This takes a considerable time to become thoroughly dry, and sometimes the film is opalescent instead of being transparent. Heat proves a remedy for this defect.

Several hours must intervene between the coating with collodion and the removal of the film, because it is imperative that the film become thoroughly dry. When this is the case it is cut round the edge with a sharp penknife, and placed in a vessel containing water for a short time, or until the film is found to have become detached from the glass.

This operation is one which any of our readers can accomplish for himself, if he really turn his attention it. We have neither failed ourselves in any trials we have made nor do we know of any of our friends who have done so. In carbon printing by a single transfer process it is of much importance that the negative be so obtained that any side of it can be placed in contact with the sensitive pigmented surface.

Some friends who have tried this method of transferring negatives speak strongly in its praise, and contrast the space occupied by say a couple of dozen films as thin as bank post paper with that of twenty-four plates of patent plate glass, not to speak of the matter of weight.

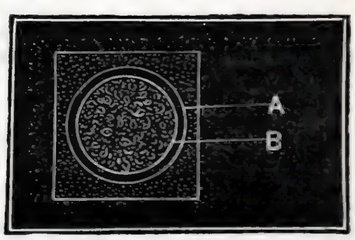
PHOTO.-NOMENCLATURE.

HALATION: ANOTHER MEMBER—"NEGATIVE OR "POLAR HALATION.

While penning the article which appeared in The British Journal of Photography, August 7, 1868, I overlooked another phenomenon I have observed many times in dry plates, and lately in wet ones. It is one I have never seen mentioned, nor has anyone ever spoken to me about it. It can hardly be described apart from a consideration of the circumstances required for its production. It generally occurs when the film has a tendency to blacken, as I usually call it, but which might be termed fogging without streaks in the direction of the dip, and which in dry plates is chiefly on the surface. It occurs when the picture is under-exposed and there are pretty broad spaces without image.

What I wish to direct attention to is the middle of these spaces void of image. They will blacken or discolour from the general deposit not due to exposure, *with the exception of a narrow space all round the image.* This space, it must be remembered, is free from deposit either from exposure or from blackening, and which would, if the exposure had been prolonged, have been occupied by the middle shadows of the picture. No blackening would have been seen on the picture if the exposure had been right.

This same phenomenon I have observed very recently while photographing microscopic objects. In these cases the appearance may be illustrated as in the annexed diagram.



This diagram represents a square glass plate with a circular image in the centre marked B. The diameter of this circle is the extent to which the lenses will cover the plate, consequently the corners and along the sides are not occupied with image. But outside this image another circle is drawn marked A.

It is well known that if the iron developer be applied to a plate which has not been exposed, or not sufficiently so, and the development prolonged, spangles of silver are deposited over the unexposed parts. Just so is it the case in the above illustration, at the corners and along the sides outside the circular image, *with the exception of a narrow space between the circles,* pointed out by the lines proceeding from A and B, which is free from deposit, either of that peculiar to exposure or that from want of exposure. It must be observed that the central image does not terminate abruptly, but gradually fades away into nothing; but it does not extend out far.

Now, what is the cause of this absence of deposit in this ring? Has this space been exposed, or has it not? If the former, why is

it not covered with the deposit peculiar to exposure? and, if the latter, why is it not covered with the silvery deposit peculiar to the absence of exposure? The conclusions I have arrived at are as follow:—That this portion has been very slightly exposed—sufficiently, however, to bring about some peculiar condition, a condition in which neither large nor small particles are taken up or deposited. It is evidently different to its neighbours, or why is it not covered with deposit?

As these are palpable facts, it is evident they must have considerable weight in discussions on the nature of the invisible image. Seeing, then, every probability of this having been exposed very slightly, the question arises—Does the first contact of light set up a repellent action for the particles of silver, which is afterwards replaced by one which is attractive? If so, this looks very much like polarity. Besides, it is well known that, with certain conditions of film, if the exposure be conducted past that which gives the maximum intensity the film is unable to take up the amount of deposit required in the high lights, while those parts which have formed the shadows develope intense instead.

These phenomena combined would suggest that the first action of light is repulsive, the second attractive, and the third again repulsive. The union of these facts increases still more the probability of a polar action, the *modus operandi* of which will, perhaps, require some ingenuous explanation.

But, supposing the action is one of chemical decomposition, how can we account for this phenomenon? Can we suppose that the first action of light is opposed to decomposition, and that afterwards this is replaced by one of decomposition by a further exposure? One would think that decomposition would set in from the *first* contact of light, and not *wait* till the exposure had been carried on for some time. The latter would seem to be the views of some writers—those who think that the effect of light is instantaneous, and that we only want a suitable developer to bring it out. Of late, the attention of photographers has been directed rather considerably to this question, and, if I mistake not, the tendency of various writers has been towards the hypothesis of chemical decomposition.

Let the results of a future investigation of this phenomenon in its connection with the nature of the invisible image turn which way it may, it must be admitted to be one deserving of attention, and it will be interesting to know in what way this negative result is brought about.

It is desirable to give this phenomenon a name, and one that shall be lasting. It is desirable, also, that it should include the cause; but this, probably, cannot be done at once. In this dilemma it will oblige us to confine our attention to its effects. It will be seen, from the diagram, that it belongs to the family of halos. Seeing that we have a negative effect where we might, *à priori*, have expected a positive one, we cannot do better than designate it "negative halation." This, I think, will be sufficiently distinctive not to be confounded with other names I have given to other phenomena. I have not determined upon "polar halation," because the polar action spoken of *may* be questioned, whereas the negative result *cannot* be questioned.

I do not know whether I shall be called to account respecting the propriety of including this phenomenon in the family of halos. I should not like it to be considered that I am harping too much on one string; but there seems no other alternative than to do what I have done. Perhaps we may have a few comments on the subject, and something will transpire that will satisfy all requirements.

G. Marlow.

ON THE REQUIREMENTS OF THE WET-PLATE WORKER IN THE FIELD AS TO CHEMICALS.

I. The Bath.

Having received letters asking me to give some details on the above, and gathering from their tone that my previous communications have been of service, I propose to treat in this of some of the minor points so necessary to ultimate success in the making of the bath.

We heard and read much last year from our Manchester friend, Mr. Lachlan McLachlan, upon the sunning of the bath for three months; and Mr. David Winstanley, in a recent number of The British Journal of Photography, has spoken of the fine negatives he has seen produced by such a course of procedure. But to the amateur and to the professional portrait photographer, who can make up a goodly supply, and use it at or near home, this may be easy to carry out; but to those who, like myself, are "ever on the move," either by road or rail, such a course is not so practicable. Besides, we sometimes "come to grief," and then a fresh bath *must* be made, for the work will not stand still.

How, then, can we utilise our Manchester friend's experience, and at the same time avoid the delay? Without touching on the chemistry of the matter, I will simply state my plan, which has always proved successful with me long before I heard or read of Mr. McLachlan's suggestion.

I get my nitrate of silver either at Johnson and Sons' or Johnson and Matthey's, and their names are a sufficient guarantee for its purity. I never use the recrystallised nitrate, for I have a shrewd suspicion that it is nothing more or less than the larger and finer crystals picked out, leaving the smaller ones for printing. Now, as it all comes out of the same batch, the smaller must be equally as pure and good as the larger. Then, as to distilled water. At home, where it is easy to be procured, I generally use it; but when out—sometimes in districts far away from any chemist's establishment or scientific appliance, except the teakettle—I take the purest river or spring water I can procure. I make the bath as follows:—Having weighed out my silver (thirty-five grains to the ounce), I place it in a bottle kept for this purpose and no other, and to it I add about half the quantity of water I require, *only boiling*, and allow it to stand. When the silver is all dissolved it is well shaken together, and then half is set aside. To the remainder I add a quarter of a grain of iodide of potassium to every five ounces of bath, dissolved separately in a little cold water. When it has fairly precipitated I thoroughly shake and intimately mix it, and add the remainder of the water—only in a hot, *not* boiling, condition—and about half-a-drachm of sifted white sugar;* then it all stands till cold; filter; and when finished, through a fresh filter, I add the half I previously set aside. I now test it. If alkaline—which it probably will be—I add a few drops of dilute nitric and glacial acetic acids combined (two minims of the latter to a greater quantity of the former), and try a plate. It should be just acid to work well. I never have any difficulty with it. Filter it *every night* after work, adding about one-half to an ounce of a fresh solution of nitrate of silver made with boiling water, but only ten grains to the ounce. I seldom add acid after the first time of using.

When it gets charged with ether and alcohol, I precipitate it with salt and make a fresh bath. It saves worry of mind; for, in order to compose fine, artistic pictures, the mind should always dwell on pleasant things, and the life led should be temperate and consistent.

This bath keeps the film clean and moist a long time, and is invaluable in very dark interiors, the plate rarely drying, even in exposures of more than an hour's duration; it also bears working upon for a long time without getting rotten. I seldom have oyster-shell markings. It is wise to have two baths in use, one newer than the other—the older of the two for long exposures and trees, the other for open landscapes, shipping, &c.

I always use a silver dipper, which I do not leave in the bath, but wipe carefully when done with.

Those of my friends who have followed out the rules I have here given have never had cause to regret that course, as they save trouble, time, and expense; and, best of all, on very hot days, one never loses one's temper.

In my next communication I shall treat of collodion.

W. Harding Warner.

* According to the temperature of the season and time of year—less in winter than in summer.

EDWARDS'S CARBON PROCESS.

The specification of Mr. Edwards's patent carbon process having been published early in the present week, we here reproduce it *in extenso* for reasons which will be ascertained as we proceed.

Some time about the beginning of November last we were invited by Mr. Edwards to witness the operation of carbon printing, as carried on by him at Willesden, which now forms one of the metropolitan suburbs, accessible by the London and North-Western Railway. We saw the various operations, but as we were requested not to take any public notice of them at the time we acceded to the request, and refrained from then publishing the details, knowing that they were soon to be published. We may, however, now state one or two things which then invited attention, in the hope that the annexed specification will be read with the greater interest from such brief description. First of all we shall speak of—

Carbon Enlargements.—Mr. Edwards, having acquired some reputation in this department, we witnessed the operation with much interest. But let it not be understood that we are now speaking of enlargements produced from tiny negatives of two and a-half inches square, to which reference has been made by Mr. Edwards in his excellent article on *Small Cameras and Enlargements*, written for our Almanac for 1869, where (at page 105) it will be found. The enlargement in question was one of the ordinary everyday class, that

is to say, it was produced from a *carte* negative. The enlarging camera was one of Woodward's solar cameras, with a condenser of nine inches in diameter. The negative was apparently well adapted for the purposes of enlargement, being clear, and without great density. The day was rather stormy, and the sunshine was interrupted by dense clouds, which obscured the rays so much and so persistently that the whole time the sun's rays were concentrated upon the negative did not exceed five minutes. The total exposure was of course much longer than this, but the above-named time appeared to represent the effective exposure.

Removed from the frame to which it had been pinned during exposure, the black pigmented sheet was transferred to a large trough or tray, where it was, by means of a pad, firmly pressed in intimate contact with the sheet of paper destined ultimately to receive the picture. The paper was made thoroughly wet when the cementation was effected, and every precaution was taken to prevent air-bubbles being formed. *How* this white paper was prepared is now revealed in the specification.

The impressed pigmented film, with its latent image now firmly sealed up between two sheets of white paper, was next placed in a drying room, and after a short time, when it was presumed to have become quite dry, it was immersed in a large tray of lukewarm water, when in the course of a minute or so the two papers were forcibly separated one from the other. At this stage both presented a similar appearance, for the pigmented film had split up apparently in the centre.

The paper which originally bore the pigment was now cast aside, and the sheet which had been attached in the manner described was transferred to a vessel containing water of a rather higher temperature, under the action of which a very soft and beautiful enlarged photograph emerged from the dark, chaotic surface in less time than it takes us to describe it.

We saw numerous small prints (printed from negatives in the pressure-frame) treated in a similar manner; none of them, however, surpassed in delicacy and general effect the enlargement we had seen produced under such untoward circumstances.

Our readers will be aware, from the legal opinions obtained from eminent jurists by Mr. Edwards and the Autotype Company (to be found in our advertising pages), that the latter firm consider Mr. Edwards's patent to be an infringement of that of Mr. Swan. Be this as it may, we now present the specification of Mr. Edwards, so that each reader may, on this point, judge for himself:—

My invention relates to improved means of producing photographic pictures, and consists—

Firstly. In rendering gelatine, gum, albumen, fibrine, and such like organic substances insoluble for the purpose of receiving for the process of washing and permanently retaining gelatine photographs; and for the same purpose or other purpose of photography in preparing paper and other materials by treating it or them with a preparation of the said organic substances (one or more of them) so rendered or to be rendered insoluble.

Secondly. In the use and application of powdered glass as a pigment in the preparation of pigmented papers and surfaces intended to receive photographic pictures.

Thirdly. In the reproduction of tints or colours in (and as a part of the process of treating) paper and other materials for photographic purposes, as firstly set forth.

In performing my invention I apply to a surface of paper, glass, slate, metal or other suitable substance a coating consisting of gelatine colouring matter, and a bichromate, upon which I obtain an image by means of light in any of the well-known manners; to the surface thus exposed to light I apply what I term a transfer paper. This transfer paper may be made of paper of any thickness, surface, or colour, or of linen, canvas, glass, porcelain, wood, metal, leather, or of any substance which does not injuriously affect the materials employed. This transfer paper is prepared with gelatine, gum, albumen, or fibrine, to which has been added sufficient of one of those substances or of a combination of those substances which have the property of tending to produce insolubility of gelatine, gum, albumen, or fibrine; for instance, the preparations known as ammonia alum, iron alum, and other varieties of alum, acetate of alumina, the chromates, or bichromates, bichloride of mercury, and tannin.

The preparing of the transfer paper is effected by floating it on, coating it with, or immersing it in, the preparation of gelatine or organic substance above described. The transfer paper thus prepared is then allowed to dry, after which it is ready for use; or a suitable quantity of the preparation can be mixed with the pulp of the paper or material in the course of its manufacture. The following is a good formula for the preparation:—Ammonia alum one part, gelatine four parts, water one hundred parts; but this may be varied. I always use insoluble gelatine or organic substance, as above described, as the support or cement for the picture during development. The surfaces of the transfer paper and of the gelatinous image obtained by light having been moistened with water are placed together in such a manner as to exclude air, the two surfaces adhere, and are in this state allowed to dry; the resulting mass is then placed in water of a sufficiently high temperature to wash away the parts of sensitised gelatine and pigment not acted on by light, together with the paper or other substance which originally supported them, and the picture is found to be very firmly attached to the transfer paper, its adhesion to which is not affected by the use of the warm water employed in washing away the unaltered portions of gelatine and pigment.

To produce enamels I proceed in a precisely similar way, substituting vitreous for the ordinary colours, and placing the print on the surface on to which it is to be burnt. To produce pictures in relief, from which to make electrotype or other moulds for printing or other purposes, I proceed in a precisely similar way, omitting where necessary all colouring matter. And sometimes I produce on the paper or material which is to be used for transferring one or more tints or colours by means of lithography or other means.

Pictures produced by these methods from ordinary negatives are "reversed;" when it is desired that this should not be the case, I first remove the negative or screen from its support. I do this by producing on its surface alternate films of India-rubber and collodion till a sufficient strength has been obtained; or, in place of India-rubber and collodion I sometimes use gelatine or other organic substance rendered insoluble, as above described, either alone or alternately with collodion, and I then remove these films together with the photographic negative adhering thereto from its glass plate or support, and print from its reversed side; or I originally take the negative through instead of on the glass plate; or I use any of the other means by which it is usual to print from the reversed side of the negative, such as camera printing, printing by lenses, and other means.

And in the preparation of the pigmented paper or substance for printing on I use as the colouring matter carbon, earths, and other colours, aniline, and other dyes, and sometimes glass of various colours in a fine state of division. And, further, I prepare collodio-chloride of silver paper by first pouring on to a glass plate or other suitable surface the collodio-chloride of silver, and having applied to it the transfer paper remove them together from their support; or I coat the transfer paper with collodio-chloride of silver. I also prepare in a similar way to the transfer paper the surface of paper or other material on which it is desired to attach collodion or other films or substances, so that their adhesion may be unaffected by the action of hot or cold water.

And in the preparation of the transfer paper I sometimes add iodides or chlorides, and use it in place of and in all respects as albumenised or other chlorised or iodised paper is ordinarily used.

By means of this my invention the following advantages are obtained:—

1. Greater simplicity in and a great reduction in the number of the operations usually gone through in the production of photographic pictures in pigments, whereby the cost of their production is very much reduced.
2. The production of the proof on any material or surface that may be desired.
3. Greater indestructibility of the finished proof.

PAINTED STATUARY.

Passing along the Strand a few days ago we observed in a shop window some very nicely-coloured photographs which arrested our attention. There was something about them with which we did not appear to be totally unfamiliar, although at first we could not recall the associations connected with these pictures.

It soon, however, became evident to us that the beautifully-coloured pictures in question were photographs of *statuary*, but so be-naturalised by judicious colouring as to render them scarcely recognisable in their original connection. This department of photographic practice has, we find, been practised for several months back, and is one which yields considerable emolument to those who engage in it.

From such inquiries as we have made, it appears that the photographer has two methods of proceeding. One of these consists in his obtaining a very sharp statuette in parian—now procurable at a cheap rate; and, by means of liquid China ink of a greater or less degree of dilution, to suit circumstances, he brushes over the hair, eyebrows, eyes, and other places requiring such retouching, as to convert the "stone gals" into models for photographic purposes. Where there is drapery it is, of course, carefully attended to.

To such a degree of perfection has this doctoring of statuettes been carried by one artist who prostitutes his talent by this reprehensible and offensive procedure, that, on examining some of the figures before being coloured, it is impossible to arrive at any other conclusion than that they have been obtained from living originals. As the China ink can be removed from the statuette by washing, it is obvious that it can be made to serve both for life effects as well as for those of pure sculpture.

The other method of producing these life effects consists in obtaining a print of large size from the statue, and working on this with crayon, pencil, or China ink so that a reduced negative may be taken, which, when printed from, will yield life effects. In this way was produced one picture which has had a large circulation.

On the painting of statues, in the abstract, we should not at present have had a hostile expression to offer; but in some of the statuettes here alluded to, we saw such offences had been committed against propriety and decency that only one opinion relative to them could be entertained. We are informed that the idea originated from inspecting a photograph of Gibson's famous *Tinted Venus*—a well-known work of art, much admired at the Great Exhibition of 1862.

IMPROVED MODE OF FIXING DRAWINGS.

The subject of fixing drawings is one which, at all times, claims attention from those artists and photographers whose work (such as enlargements) requires the aid of chalks or crayons. Every schoolboy knows that a pencil drawing executed by even the softest of pencils is readily fixed by sponging it over with, or floating it on, a little milk. But a more delicate and effective mode of proceeding is evidently required to fix valuable drawings and tracings; and the means of doing so is the subject of the patent of M. Rouget, of Paris, to which we shall now direct attention.

The inventor assumes that the methods in use at the present time are imperfect from some cause or other. He says, for example, that when drawings in crayon, charcoal, blacklead, or chalk are fixed on paper by applying a resinous or other adhesive solution on the under side or back of the picture, which transudes through the pores of the paper, and by thus coming in contact with the particles of the pigment, cements them together, thus fixing them—when this method, he says, is adopted, the freshness of tone and mellowness of the work are for the greater part lost, the drawing is tarnished, and the tone of the paper is lowered. Artists, therefore, prefer not to resort to this method of fixing their prints.

To secure the complete fixation of drawings of the above kind without any objectionable features accruing, the patentee mixes a liquid of such a kind as is capable of being ejected from a bottle in the state of fine particles, or, as the patentee expresses it, "atomised." This is done by means of a finely-pointed glass tube, which is inserted through the stopper and dips down to the bottom of the liquid; and thus, when air is blown, by means of a second tube, into the vessel, its contents are forced out as a fine spray, which can be directed to any special point of the picture. There is a little toy called a "spray-producer," sold at most bazaars, which, we think, would answer the purpose well if slightly modified.

As for the fixation liquid, says M. Rouget, "any colourless or nearly colourless liquid which allows of being atomised, and which, after becoming dry, causes the particles of the charcoal or other drawing materials made use of to adhere sufficiently firmly to the paper or other drawing surface, may serve for the purpose. Thus, for instance, a liquid which has given me most satisfactory results is obtained by adding to a solution of three ounces of white sugar candy and two ounces of white shellac in about two pints of spirits of wine a decoction of about one ounce of fucus crispus in one pint of distilled water. For operating according to my invention any apparatus which allows of atomising or reducing into a fine spray the fixation liquid to be made use of, and of projecting this spray unto the surface of the drawing or tracing, may be employed."

HYDROGEN AND ITS ANALOGUES.

Last Saturday afternoon Dr. William Odling, F.R.S., delivered another of his course of ten experimental lectures at the Royal Institution, upon *Hydrogen and its Analogues*.

On this occasion he gave attention principally to the combinations of hydrogen. He burnt a jet of pure hydrogen in a jar of chlorine gas; the flame increased in brilliancy, and the product of combustion was hydrochloric acid gas. Next he filled an inverted Florence flask with hydrogen, and, after lighting the gas at the mouth of the flask, he lowered it over a jet of chlorine issuing from a fine glass tube; the chlorine was then seen to burn inside the flask of hydrogen. Both the foregoing experiments show the surface nature of chemical action, for all flames are nothing but shells, the luminous layer being where the two gases come into contact; it does not matter which gas forms the jet or which forms the exterior envelope, as in any case the flame will be produced. A jet of hydrogen was next burnt in a large glass jar full of common air, and the union of the hydrogen with oxygen of the air produced water-gas or steam, which was condensed upon the cold sides of the large glass vessel. The same experiment was shown with pure oxygen in the place of common air, which is oxygen diluted with hydrogen.

Dr. Odling afterwards filled a glass globe with a running stream of coal gas, and, by means of a little piece of tube piercing the bottom of the globe, a jet of common air was admitted into the sphere; this jet was then lighted, so that the common air was seen burning in the middle of the atmosphere of coal gas, this being a reversal of the household experiment wherein jets of coal gas are made to burn in common air. As before stated, it does not matter which gas is outside the other, and the slow combination of the two forms a shell of luminous chemical action. If the two gases are well mixed together, and then lighted, combination takes place at once, and they go off with a bang, which is the reason why a large mixture of coal gas with the air of a room may cause an explosion when a light is introduced; no explosion can take place unless the two gases be mixed before they are ignited.

When one volume of hydrogen unites with one volume of chlorine, two volumes of hydrochloric acid gas are produced, so there is no alteration in bulk. But when hydrogen unites with oxygen, steam is first produced and then water; in the latter case there is great alteration in volume, and there is some alteration even in the transformation into steam, for two volumes of hydrogen uniting with one of oxygen produce only two volumes of steam. To show this by experiment, it was necessary that the vessel wherein the two gases united should be kept at such a high temperature that the steam produced could not be condensed into water. This was effected by first mixing two volumes of hydrogen with one of oxygen, in a large tube closed at its upper end, and inverted over mercury.

To maintain the requisite temperature a second and larger tube was inverted over the first; and the space between the two was kept full of the transparent vapour of boiling aniline, for aniline boils at 180 degrees Centigrade—a temperature much higher than that of boiling water. The mixed gases in the inner hot tube were then fired by an electrical spark; they combined with an explosion, after which the mercury instantly rose in the tube, and showed that the transparent steam or water-gas produced occupied only two-thirds of the space which had been taken up by the two gases while uncombined. After showing how hydrogen will decompose vapour of tetrachloride of carbon, under the action of heat, by uniting with the chlorine to form hydrochloric acid, the lecturer showed how the ignition of a mixture of hydrogen with nitrous oxide or laughing gas will set up decomposition, resulting in oxide of hydrogen and nitrogen gas.

Dr. Odling next took a jar of chlorine gas, and shook up in its interior a little of the most volatile spirit which can be distilled from petroleum. When this mixture of gas and vapour was ignited the hydrogen united with the chlorine, producing at the same time a deep red light and volumes of black smoke.

Another very neat experiment exhibited by Dr. Odling was the combustion of oxygen and ammonia. Some strong liquid ammonia was placed in the bottom of a glass flask, and a stream of oxygen was directed upon the surface of the liquid by means of a glass tube passing down the neck of the bottle, till it just touched the surface of the ammoniacal solution. Upon dropping a light into the flask the mixed oxygen and ammoniacal gases caught fire, and burnt brilliantly upon the surface of the liquid. Substances rich in hydrogen and carbon, such as wood and tallow, will usually burn vividly in oxygen or common air; but when the exterior gas is highly hydrogenous, the substances easy to burn therein must usually be rich in oxygen. Chlorate of potash, which is very rich in oxygen, is incombustible in common air; but when Dr. Odling made some chlorate of potash red hot in a metal spoon, and immersed it in a glass jar filled with coal gas, the chlorate of potash burnt away brilliantly.

In this summary the best of a very large number of experiments have been described, and the whole of them were expeditiously performed by Dr. Odling in less than one hour, accompanied by very clear explanations of the principles involved.—*Daily Telegraph.*

THE ARTISTIC LICENSE.

In The British Journal of Photography for Jan. 15th, Mr. Wake replies to my article on *Scenic Backgrounds*, which appeared the week before. The old proverb "unity is strength" is as true, to a certain extent and in a certain way, of fallacious as well as of accurate ideas or theories. Any attempt to disprove two theories by one argument is very likely to result in only partial success. If we try by one stroke to demolish half-a-dozen phases of argument even partial success is much less likely to be attained, and yet this is a very customary mode of dealing with a number of opinions opposed to our own; hence, probably, the very prevalent idea that argument leaves us where we began. When it is true that it does so there is something radically wrong about the method adopted. Either unsubstantial premises, illogical "reasoning," or an attempt to answer several points by the use of one reply, will probably be found among the reasons which have led to failure, where argument leaves both parties where they began. There are four or five points in Mr. Wake's letter which require an individual and careful consideration before the whole subject of "scenic backgrounds" can be fully set at rest to everybody's satisfaction.

As to the "artist's license:" Mr. Wake contends that the beauty and fitness of the natural background in the pictures of Mr. Edge and others is owing to the use of the artistic license, and also that without calling

this license into requisition we should probably find it difficult to discover that there was a head at all in a picture taken with foliage as a background.

Mr. Wake's idea and my own on this point are totally at variance, or else, which I think is much more probable, we fail to attribute the same meaning to the same terms. What is a license?—what is art?—and what, then, is artistic license?

License, as I understand the term, is an exceptional liberty—an occasional deviation—a special privilege—an exodus from the beaten track, so to speak—a freedom not permitted, as a rule, in that to which the license refers.

Next as to the question—"What is art?" Supposing this to be decided, and that an artist is one who is distinguished by his making use of art, it follows that the artist's license (if my definition of the latter term above given be the correct one) is the occasional liberty or the exceptional deviation from the path acknowledged and recognised as the proper and beaten track. What then is art, *i.e.*, legitimate, fair, and desirable art? The etymological meaning of the term "art" is "skill"—the result obtained by exercising ability. To make the human arm assume the form of a corkscrew would be art, and would be art of a very unusual order; for to do this would obviously require skill and ability of no common variety. The product of this peculiar variety of skill, however, would be the total loss of the original form—in fact, the *deformity* of the original; and the art by which such a result was obtained would be essentially an art of deformity.

The expression of ideas in words is an art—a vulgar one truly, but still an art. The expression of these ideas, in strict accordance with the grammatical requirements of a well-constructed language, is art of a higher kind; but the conveyance of thoughts in language which, in addition to being legitimate, becomes from the very style of its arrangement enormously increased in force and point, and *demands* rather than *solicits* our appreciation of its full meaning, involves the use of art of an exceedingly high order.

Some years ago, when the writer was occupied in the laboratory of the Manchester School of Medicine, on the occasion of a presentation by a number of students of an elegantly-framed and expensively-got-up document on parchment, in token of their appreciation of one of the professors, there occurred a little incident which showed—firstly, that there was much art to be displayed in literary effort—and secondly, that the display of this art greatly augmented the value of the composition. The document alluded to terminated with the words—"We have learned to look upon you with feelings of the profoundest veneration as well as with those of respect and love." This sentence, which conveys a fine idea in suitable and legitimate phraseology, was objected to (though, unfortunately, not till too late for alteration) by the Professor of Chemistry—a gentleman of considerable rhetorical ability. He said the monosyllabic termination of this final sentence was weak and flat; that a word of three or four syllables, used in the place of the abstract noun "love," would bring the whole sentence to a climax which would give force and beauty to the phrase. He proposed to alter the arrangement of the words as given above, and put them in the following order:—"We have learned to look upon you with feelings not only of respect and love, but also with those of the profoundest veneration." The words here used, the reader will perceive, are identical in meaning as those made use of in the original passage, but the style of their arrangement in the latter instance gives them a weight, a dignity, a beauty, and a force which in the former instance they altogether failed to possess. The sentence, however, is none the less grammatical, though so much more beautiful; and, being composed of almost exactly the same words, shows the high skill—in fact, the masterly art—employed in their use. This is legitimate art. A point is gained; some useful purpose is served; no discordant element is introduced; but, by the sheer force of skill, of ability, materials whose services we require are compelled to yield those services with grace—in fact, they are obliged to answer their end, and whilst doing so to contribute to our rational enjoyment, and that too without introducing, even to a small extent, any item obnoxious to a refined (*i.e.*, a minutely appreciative) feeling. In short, they are obliged to answer their purpose, adding, when possible, to our enjoyment, but in no instance causing a feeling of impatience, of incongruity, or any other variety of displeasure; and this, I take it, is the legitimate end of *every* variety of art.

When, however, in addition to force and power, the arrangement of words is accompanied by the charm of occasional rhythmical sound and the elegance of metrical division, then the art of composition itself is exalted to a climax at once admirable and impressive. Such language is to be met with extensively in the writings of Lord Byron, whose lines on the *Ocean* and the *Field of Waterloo*, are published over and over again as examples of the most splendid composition in our language. Amongst the verses given under the second of these two headings, the following lines possess considerable rhetorical magnificence:—

"The mustering squadron, and the clattering car,
Went pouring forward with impetuous speed,
And swiftly forming into ranks of war;
While the deep thunders peal on peal afar,
And near, the dread beat of the alarming drum
Roused up the soldier ere the morning star."

In these lines there are some very distinct and striking ideas conveyed in sound and grammatical English.

There is also a very evident beauty of diction, which is much increased by reading the verses preceding the above lines, for when the various incidents described previously have taken hold upon the imagination the first three of the quoted lines almost seem, as it were, naturally to *run* from the tongue themselves with "impetuous speed," and when carefully read by anyone possessed of a powerful and manly voice, the next line, to give it effect at all, must be uttered with a deliberation as suggestive as any ordinary intonation of the words can be of the thunders to which the line alludes, and the following one rolls from the tongue with a rapidity in itself suggestive of the "rub-a-dub-dub" of a drum, while the concluding words demand a measured utterance appropriate to the stern mandate which bids the soldier to rise from his slumbers at so untimely an hour.

Contrast such lines as the above with the feeble attempts to be met with in abundance, even amongst the writings of distinguished poets; as, for instance, the following couplet from Tennyson's *May Queen*:—

"Upon the chancel casement and upon that grave of mine,
In the early, early morning the summer sun'll shine."

These two lines, for any idea which they convey, are simply contemptible. There is no other information given than that at a certain period of the day the sun will shine on certain mentioned objects. The statement itself is one of only probable veracity, not of absolute certainty; and, even if strictly true, is totally unworthy the number of words used to mention it, seeing that the sun is just as likely—in fact quite certain—to shine on numbers of other graves besides the particular one alluded to, and is, moreover, by no means confined to an individual portion of the chancel. Again: objects upon which the sun could shine for a few moments only immediately after its rising (and these few moments I understand to be what is very inelegantly described as the "early, early morning") must certainly occupy a marvellously unusual position, so that if the sentence mean that the light of the sun falls upon these objects only for the very brief period alluded to, in all probability their meaning is diametrically opposed to the fact, as will be seen upon reflection. If, however, the "poet" merely meant to inform us that in addition to the supply of sunshine likely to be presented to the two objects named during the course of the day, that they would also have the benefit of that light immediately after the sun had become visible above the horizon, the words are still totally superfluous, inasmuch as there will be countless other objects in the immediate vicinity quite as favourably situated. To be brief: the lines mean almost nothing. Either the line ending with "mine" was introduced with its childish wording merely to rhyme with the other one ending in "shine," or the sun was called into requisition with its power to "shine" merely with the purpose of rhyming with the inevitable possessive pronoun "mine." This, at least, is my own idea of the matter. It is very likely, however, that the whole couplet, and not merely one line of it, was got up on the make-weight or, rather, make-measure principle.

As the conveyance of ideas from one person to another in grammatical and, if possible, elegantly-disposed words is really the legitimate use to which language should be applied, it follows that we take a liberty—in fact, that we make use of license pre-eminently—when there are no ideas to convey by making use of words; and this phase of verbal license, though least acknowledged and most extensively practised, I think there can be no doubt constitutes the most outrageous part of all verbal license. When there is no idea conveyed, of course it is not right to say it is conveyed in inelegant language; but to use inelegant and ungrammatical language *without* conveying an idea at all is surely license with a vengeance. The above couplet, far from forming an exceptional instance, is very close in its resemblance to the whole amount of very lengthy poems, as, for instance, Tennyson's *Maud*.

To return to the artistic license. Of course there is, as everybody knows, a great variety of arts; but the particular one to which we are now directing our attention is that of producing, by means of the pencil or colour brush, results intended for examination by the eye. These results may be subdivided into several varieties, and considered in respect to the several ends for which they are produced. As some colours, when placed in juxtaposition with others, produce upon the eye an unpleasant effect, whilst others so treated produce the reverse of this result, and assume what is termed "harmony," it follows that in the mere blending of colours alone, apart from all ideas of configuration or shape, art or skill may be used to produce either the one or the other of these results. The production of harmonious, and therefore pleasing, results is, according to the writer's idea, a branch of legitimate art, whilst the production of inharmonious and, consequently, offending results is not so. Those who would be informed on such matters as the contrasts and harmonies of colour may find a world of information on the subject by turning to that standard volume, Chevreul *On Colour*.

Again: in the matter of form alone there is an almost endless variety of ways in which results of a pleasing nature or its opposite may be produced. Curved, straight, or irregular lines may be associated or combined together so as to give harmonious or inharmonious results—a fact which has been already demonstrated, with the assistance of diagrams, in some of the earlier numbers of this Journal. As the merest tyro can with facility produce combinations of colour or of regular and irregular lines which shall be anything but pleasing to the eye, the production of harmonious results is usually considered the sphere of art, although it will be obvious that it requires exactly as much skill to produce results

which shall never under any circumstances please, as to produce others which shall never offend; but, as already stated, the legitimate sphere of art, according to the writer's notion, is in the production of the latter variety. By blending the harmony of lines with that of colours an infinite variety of delightful results may be obtained, as in the patterns on cloth or calico, on wall papers or on carpets, &c. The use, however, of "designs" (as these prodnctions are termed) ends with their pleasing optical effects, just as harmonies in music unassociated with any words are delighting to the ear, though productive of no other immediate result.

Musical harmonies may, however, be suggestive of, or conducive to, some particular state of mind. Tunes heard for the first time without having any words counected with them we are apt to describe, according to this suggestiveness, as "pathetic" or "plaintive," as "lively" or "jolly," as "martial" or "grand." The adaptation of a sparkling tune to doleful words could scarcely, as a rule, yield us a satisfactory result. There are varieties of harmony so naturally falling in with all the varieties of mental feeling, that even of two perfectly lively tunes adapted to words as lively, one may be vastly more suitable than the other. Still, however, music cannot be substituted for language and convey everything which words may be used to express.

In the delineating art, however, any given form may be reproduced with absolute accuracy, and a flat picture copied with such exactness that the original and its imitation may be undistinguishable from each other. As it is impossible for a flat sheet of paper to be other than flat, a solid body cannot be represented upon such a sheet exactly as it is in its solidity; but the effects of light and shade, of form and colour, may be so exactly imitated that the illusion of solidity is all but perfect. The amount and variety of ability, however, required to produce results of this sort with the highest degree of perfection attainable is, of course, very unusual indeed, and involves the use of art of quite as unusual an order. This, of course, is imitative art, the object being to produce an effect such as is produced by something else.

I may be condemned for mentioning things which any schoolboy knows, when I say that it is not necessary to have before us that whose form and colour it is our intention to represent, and that it is possible to delineate that which we saw days ago with a greater or less amount of fidelity in proportion to its simplicity or complexity. We may even represent that which, as a whole, we have never seen at all, but which is built up in the mind from elementary materials, which observation has copied there. An artist may draw a beautiful face resembling no one he has ever seen in all its details, but yet whose elementary lines in no respect differ entirely from something which has been seen. Such productions are often spoken of as creations of the mind, although there is not a single new touch in the whole formation. The combination of all the old atoms of form, so to speak, is that in which the whole novelty lies. A picture may be produced in which "originality," as it is termed, is called into use, but to a far less, though more definable, extent than in the construction of a face the like of which has never been seen by its producer. For instance: we may make an exact representation of a man in form and feature, in position and costume, precisely as he appeared at some given period of time, and we may represent him as if sitting upon what is really exactly like a stone which has existence in nature, but near which he was never in his life found. We may also delineate him as being in the foreground of a landscape—of an existing and well-known landscape—within a hundred or a thousand miles of which he was never located. The landscape itself may be combined with atmospheric effects such as in detail never were witnessed there, or even with trees situated where cottages really exist, and *vice versâ.* Such effects are often enough produced by unaided photography in what is known as "composition printing." Every detail in these pictures is a rigidly truthful representation of something which actually did exist, although as a whole the picture is an exact representation of nothing as a whole.

In the production of a portrait, whether by photography or otherwise, as I take it, the representation of something existing is the main object. It is desired to produce, so far as circumstances will admit, such a combination of light and shade, of curves and other lines regular and irregular, as will give the nearest illusion of the original possible. I can quite understand that a professional portrait painter will not give the bad features of his original on his canvas quite as bad as in reality they are, for the simple reason that his picture would probably be pronounced by the person represented as unlike, inasmuch as few have the "moral courage" to see their own failings mirrored true to nature, but cajole themselves, however unprepossessing their appearance, into the belief that if they are not positively handsome, at least they are by no means "homely." This I say I can quite believe; but that an artist should himself imagine that he has painted an exact likeness of the original as that original really is, when he has purposely altered some feature, is too preposterous an idea to entertain.

I do not for a single moment doubt that there is, as Mr. Wake says, something more than mere geometrical accuracy required for the production of a perfect likeness. That something, however, be it what it may, is obviously not antagonistic to, but thoroughly consistent with, geometrical accuracy, inasmuch as in nature both occur together. This point I fancy Mr. Wake overlooked in his letter, for from its tone I gather that he considers it justifiable, on other than commercial grounds, to make the pug nose a little less puggy and other unpleasing features a little less so. A portrait of *any* subject, no matter how ungainly, cannot be expected to be thoroughly artistic in every respect; indeed the fact of its being a portrait at all is necessarily a fetter upon its merits as a picture. Some persons it is absolutely impossible to throw into a graceful or elegant position; some have faces the very lines of which can never be made to harmonise. Nevertheless the ungainly figures or irregular features contribute enormously to their identity, and it seems to me that where identity is wanted at all—as I believe in every instance of portraiture, properly so called, it primarily is—it seems to me the artistic work begins *after* and not *before* we have secured the geometrical accuracy of face or figure. The introduction of suitable accessories, of a harmonious background, or of various other effects of light and shade, colour or form, it seems to me is, after such geometrical accuracy of face and figure, with the most skilful posing and lighting of the same which can be practised upon a given subject, the real and legitimate field for the display of art.

If this opinion be correct, the introduction of a becoming background, as in the pictures of Mr. Edge, or the separation of the head of the figure from the foliage of the background, as alluded to by Mr. Wake, or the concentration of attention upon the figure itself, as effected in the works of M. Adam-Salomon, is a process indicative of sound and legitimate art; whilst the establishment of incongruity, or the introduction of impossibility, inasmuch as it must necessarily be offensive to the sense of harmony or the appreciation of veracity, although such courses are advocated by the "Gossipping Photographer" of a contemporary, it seems to me are deviations from the beaten track—exceptional liberties in reference to art; in fact, they are glaring examples of the artistic license.

If the definitions of "art" and "license" which have here been given do not fall in with the notions entertained on these subjects by gentlemen who, like Mr. Wake, make such matters their special study, we shall, in the event of these gentlemen giving their views upon the matter, probably pave the way to a definite and lasting settlement of many of those vexed questions upon which fine-art writers are so apt to dilate at inordinate length, by settling, once for all, the question of "legitimate art" *versus* the "artistic license."

David Winstanley.

Contemporary Press.

ON VITRIFIED ENAMELS.

[Comptes Rendus.]

The enamel plates which were used for that kind of painting in which the illustrious Petitot excelled, and which are at the present time skilfully applied to vitrified photography, are made on copper or gold, or sometimes on platinum—a metal which can stand the highest temperature. They are principally composed of silica, of oxide of tin, and of oxide of lead; they are very high-priced, and have the grave defect of not being able to present a flat surface.

Plate-glass covered with a fusible enamel, with an arsenical base, might, on the contrary, replace these plates with economy, whilst standing the fire just as well, and thus open up a new path for the progress of photography and the fine arts. At the same time, the fusibility of enamel must always be greater than that of glass, but, on the other hand, the dilatation of glass must always—all other things being equal—bear a relation to that of the enamel. The ancients have, so to say, taught us this necessity by counter-enamelling metals in such a manner as to counterbalance the dilatability of bodies. It is, therefore, not a matter of indifference whether we shall make use of certain descriptions of glass for the application of a more or less fusible enamel; and, until the middle of the eighteenth century, the nature of the glass employed would have rendered impossible the employment of the fusible glass-enamel, which is the subject of this communication. But the immense progress which chemistry has made during the last fifty years has given to modern glass such qualities that many kinds are suitable for the application of the following enamel:—

Arsenic	30	grammes.
Salt of nitre	30	,,
Sand	90	,,
Litharge	250	,,

This kind of enamel-glass, which is not yet industrially manufactured in France, may, besides an important use in photography, meet with numerous and useful applications. Thus it is possible to write and draw on this glass as freely as on paper, and it only requires one minute afterwards (in an open muffle and with great ease) to make the writing unalterable. This process, which I apply to vitrified photography, opaque or transparent, would also easily perpetuate drawings, autographs, administrative deeds intended to endure for long periods of time, explanatory labels for horticultural establishments, &c. The specimens of drawings, writings, and photographs which I had the honour of laying before the Academy of Sciences, at the sittings of the 7th, 14th, and 28th of December, 1868, should be conclusive on this subject.

I will now enter specially into the question of photographic proofs. For direct execution, without collodion or transport, the enamel glass which I use has undergone no other operation than a simple roughing, which allows it to be closely laid on a stereotype plate. If after the roughing the surface of the enamel is sufficiently glazed, the most delicate photographs are obtained. It is, in a word, a perfectly plane surface, of which the enamel is more or less thick or transparent (which could not have been obtained, either readily or economically, with enamel on metal), which serves me to catch the photographic image, either in the dark chamber or under a negative or a positive, according as I perform the operation with such a substance. If, for instance, I employ the bitumen of Judæa, or the citrate of iron, the perchloride of iron and tartaric acid, or the bichromates, or any other salt, a few minutes suffice to obtain, without collodion, a good photographic proof.

Let us take, for an instance, the bichromate of potash, employing the following solution:—

Water	100	grammes.
Gum	4	,,
Honey	1	gramme.
Bichromate in crystals	3	grammes.

When spreading this solution, thoroughly filtered, over a glass enamel, and drying the enamel thus impressed, in order to give a vitrified proof, after the impression by light, four simple operations will be sufficient, which may be executed in a few minutes:—

1. Exposition of the sensitised glass to the light.
2. Development of the image by means of a brush and a powder, of which the following is the formula:—

Oxide of cobalt	10	grammes.
Oxide of black iron	90	,,
Minium	100	,,
"*Sable*"	30	,,

3. To decompose the bichromate of potash by plunging the developed proof in a bath composed of—

Water	100	grammes.
Chlorhydric acid	5	,,

Afterwards wash the proof in pure water, and dry it.

4. Vitrification of the proof on a plate of very smooth metal, covered with a layer of chalk, so as not to disfigure the glass enamel which it is desired to vitrify. About a minute will suffice, in a sufficiently heated muffle, to fix and glaze the proof, which must afterwards be allowed to cool, with the simple precautions which are taken for enamels on copper. Practice, which so often contradicts theory, has demonstrated to me that these plates of enamel stand the fire as well as enamels on metal, and that the art can certainly make them of utility.

I wish to point out that, glass covered with enamel being capable of representing a large surface, it will now be possible to directly execute large vitrified proofs. M. Duchemin.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 3rd	North London (Ann. Meet.)	Myddelton Hall, Islington.
,, 3rd	Edinburgh	Hall, 5, St. Andrew-square.
,, 4th	Glasgow	Andersonian University.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 11th inst.,—the Rev. Canon Beechey, M.A., President, in the chair.

The minutes of the previous meeting having been approved of, Messrs. Warwick Brooks and John Oldham were elected members of the Society.

The President then called upon Mr. Winstanley to perform further experiments in connection with the production of artificial light.

Mr. Winstanley said, as it was anticipated that many gentlemen would be present that evening who were not at the last meeting, it was not intended that the whole of the experiments to be performed should be entirely different from those exhibited at the late meeting; indeed, he said, it was intended that the phosphoric light should play an important part in his experiments that evening. He (Mr. Winstanley) alluded to the discovery of oxygen by Dr. Priestly, and to the interesting properties of that gas, especially its power of increasing the energy in the combustion of those bodies which are capable of being burned in common atmospheric air. In illustration of his remarks he then ignited a piece of sulphur upon a deflagrating spoon and plunged it into a jar of oxygen, calling the attention of the members to the increased beauty and brightness of the flame. He mentioned that this light, though affording very little illumination, might, to some extent, be considered an actinic flame, inasmuch as the rays emitted by it are exactly of the colour of those rays of the spectrum which produce the greatest actinic effect. What the exact value of the sulphur light might be from an actinic point of view, he said, without carefully-conducted experiments he could not pretend to determine; but whatever that value might be, he thought it would be interesting to the members of the Society, and to photographers generally, to know that that light might easily be rendered continuous, which they would perceive was not the case when the combustion took place in the jar of oxygen. He (Mr. Winstanley) then described, in some detail, the properties of sulphur, of its combination with carbon, and the properties of the carbon bisulphide—a sample of which latter body he then exhibited. He proceeded to explain the construction of his new apparatus for the production of the bisulphide of carbon light, and exhibited it in action.* The members, he said, would perceive that the flame produced when that apparatus was used was, so far as colour and brilliance were concerned, the analogue of that obtained in the former experiment, but with the advantage that it could be maintained for as long a period as was desired, and so whatever value it might possess could be utilised. He then exhibited a specimen of the element phosphorus, and described at some length its discovery by Brande, of Hamburgh, and its interesting properties. He then burned a piece of it in a jar of oxygen, calling the particular attention of the members to the enormous acceleration in intensity undergone by its flame. He briefly described his phosphoric apparatus, and, after removing the sulphide of carbon arrangement from the lantern, exhibited it in action. He said that, when having a sort of a rehearsal in that room the evening before, he had attempted, with some approximation to success, to take a negative from a living subject. He (Mr. Winstanley), however, stated that any attempt to take a negative under such extemporised circumstances as were alone possible at a public meeting, in a strange room, and with a supply of chemicals and apparatus such as could with the very little assistance he had received be hastily got together for the occasion, must necessarily be a very hazardous experiment. He would, however, try what could be done. He then prepared a plate, and having focussed upon the head of the President, exposed it for two minutes and a-half under the influence of the phosphoric light. Upon development, however, it proved to be under-exposed.

The members then adjourned to the committee room, where a lantern exhibition was given by Mr. Chadwick, Jun. During their absence Mr. Winstanley tried a second plate upon an engraving on tinted paper, and obtained a successful negative in two minutes and a-quarter. The direction of the wind outside (which had previously interfered with the draft of his chimney) having become favourable, the phosphorus burnt with greater brilliancy. A third plate was then exposed upon the head of Mr. Lafosse, and, after two minutes and fifteen seconds, was developed, and proved to have been sufficiently exposed. The result (which, as a photograph, was of course much inferior to a picture produced in a gallery) was then taken into the committee room and passed round amongst the members, who were enabled to perceive what Mr. Winstanley intended to demonstrate, viz., that the light possessed considerable actinic power.

With the exception of the under-exposure of the plate used when the President sat, all the experiments were conducted with smoothness and success, and the audience listened to Mr. Winstanley's remarks with considerable attention and evident interest.

The meeting, which was the largest ever known in connection with the Society, terminated with the usual complimentary votes.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on the 22nd ult.,—Dr. Zenker in the chair.

The Chairman presented to the Society, in the name of the author, Dr. Vogel's second handbook of photography, as a contribution to the library.

Herr Krüger addressed the meeting upon the chemistry of iron, and its connection with, or effect upon, photographic developing processes. He showed, experimentally, the difference between the reactions of oxide of iron and oxide salts, and that the sulphate of iron, which is obtained by purchase, contains the oxide.

Herr Junghans said that an oxide contained in sulphate of iron was no detriment—nay, according to some authors, it was an advantage; and that it was almost impossible to protect these salts, when manufactured in any quantity, or when being preserved, from oxidisation.

Herr Krüger replied to this that he had only shown the reaction, and that he in no way wished to make it appear that the oxide contained was a disadvantage. He further remarked that, when put into alcohol, the sulphate of iron became perfectly free from oxide.

The Chairman drew the attention of the meeting to the progress exhibited by the new stereoscopic (American) pictures. They appeared perfectly true to nature in the deepest parts, whereas, in the old stereoscopic pictures, these always appeared to be shortened, and thus the whole scenery became like a side scene. The reason of this was, because the distance between the lenses in the camera was considerably larger than the distance between the eyes, consequently the apparent place of any object was pushed nearer to the eyes, and the dimensions of the deep parts of a picture were shortened thereby. Now, he said, if by ocular enlargement of the pictorial angle of objects they are brought to the proper size, and appear of the natural size, the deep parts of the

* A description of this apparatus, and also of that for the production of the phosphoric light, will shortly be given, with drawings, in the pages of this Journal.

picture cannot be so altered, and in this way they remain too short. In most cases this defect is overlooked and not perceived, on account of the satisfaction experienced by reason of the space afforded to the eyes. In order to avoid this defect, the stand line should never be made greater than the distance of the eyes. In other pictures there is the fault that the objects appear too small, and consequently the dimensions of the deep part are often exaggerated. This arises from the photographic objective being of shorter focal distance than the stereoscope eyepieces, where the pictures cover a smaller portion of the retina than in the direct sight. The object would, therefore, appear very distant, or, if the stand line at the same time were enlarged in order to bring them near, correspondingly smaller.

Herr Jann (a visitor present) mentioned that the public who visited his large stereoscopic collection objected to many of the pictures as appearing unnaturally small, like playthings, and not real. This fault was brought more particularly against Ferrier's pictures from the Paris Exhibition, notwithstanding his fifteen years' experience in stereoscopes, as well as having at command all the newest and best-adapted expedients in every case. On the other hand, the public at once acknowledged the natural appearance of the pictures by Negretti and Zambra.

Herr Prümm said that M. Braun, of Dornach, photographed his collection of Swiss views with a single camera.

The Chairman observed that when in many stereoscopic views the backgrounds appeared too far off, the lenses of the stereoscope might have had greater focal distance than those of the photographic instruments. He explained this by a drawing of the defect.

Herr Jann said, in his opinion, the construction of stereoscopic glasses had some influence.

Herr Williams, on the contrary, considered the cause to be the faulty construction of the stereoscopic apparatus.

Herr Jann instanced an example that photography was to blame—the decision of Herr Rüth and Professor H. Hirzel, of Leipsic; they attributed it to photographing stereoscopic pictures with apparatus of too great angle of sight.

Herr Prümm spoke of his experience in photographing stereoscopic flower pictures. Take, for instance, roses; with a double apparatus of two and a-half-inch lens they appear in the stereoscope unnaturally large, consequently, for such cases, lenses of the focus of one to one and a-half inch should be employed.

Herr Ernst mentioned that he had purchased a double apparatus in which the two objectives had shown somewhat different focal distances, and he knew that, with this apparatus, very many stereoscopic pictures had been taken. It was not to be wondered at if, on contemplating such stereoscopic productions, a smarting of the eyes were occasioned.

The Chairman laid before the meeting some carved photoxylographs of the State seal, the original of which, in wood, was discussed at the second meeting of the Society in November, 1868. It at that time excited considerable attention on account of its exceeding fineness, and many wood carvers considered it altogether too difficult to imitate.

A treatise was then read by Herrmann Becker, on *Photography and Painting*, taken from the *Cologne Journal*, in which, as Dr. Jacobsen observed, there was much truth but many errors.

The meeting then separated.

Correspondence.

Foreign.

Philadelphia, February 7, 1869.

There is no reform that would be a convenience so great to photographers generally as a reform in the flanges of photographic objectives. So far, every maker adopts his own guages, and many opticians have a different guage for every different lens and every different size that they send out. It results that the photographer collects a great quantity of camera fronts, for he cannot be at the trouble of screwing on and screwing off his flanges, and in the end, if not at first, he adopts the plan of having a front for every flange. Even this plan is full of inconveniences. Fronts that lie by in warm, dry rooms are very apt to split at the screw holes, and, if this be not noticed in time, the photographer is apprised that something is wrong by curious cases of fogging. In working in the field, not only must the flange be brought for every lens but the camera front, thus adding largely to the weight to be carried and the danger of forgetting, with, moreover, the trouble of changing the front whenever the lens is changed. All this naturally tends to taking but one or two lenses, and so often the lens that is particularly required is found to have been left behind.

These troubles are not trifles, and they are perfectly unnecessary. The microscopists encountered the same annoyance, and got rid of it by adopting a standard guage for the screws of their objectives, which is now exclusively used all over the world. So that a microscopist using a microscope made in any part of the world, and ordering a new object-piece from every other part of the world, knows beforehand that it will screw on to his instrument as perfectly as if the two parts had been made for each other.

It is quite time that photographers had the same advantage. Not that all photographic objectives could be made to fit one and the same flange; they vary in size too much for that. But two or, at most, three sizes could be used. Stereoscopic and other short-focus lenses up to six or seven inches focus (except portrait tubes), could all be adjusted to one flange. All medium-sized lenses could be fitted into the second size of flange, and there might also be a third occasionally employed for exceptionally large lenses. Some makers have shown a tendency to adopt this system in their own work, but that is not sufficient. We want a general reform to be adopted by all makers, precisely as has been done in respect of the microscope. The need in the present case is even greater than in that of the microscope, and the innovation is not a greater one.

Such makers as will institute this change will be the gainers by it; for, once the movement is well started, people will be indisposed to buy lenses that do not conform to the uniform guage system, and will look back to the present confusion as a great evil happily got rid of.

In the English correspondence of the Paris *Moniteur de laPhotographie*, I notice a statement which has taken me a little by surprise. It is to the effect that a German chemist named Werther has discovered that the sesquichloride of ruthenium gives a purple colouration with hyposulphites, and that Mr. Carey Lea has proposed to use this reaction for the detection of hyposulphite of soda in photographic operations.

Now, as I myself made the discovery attributed to, and apparently claimed by, M. Werther, it seems time to assert my priority, especially as this splendid reaction is by far the most reliable test we have for the presence of ruthenium, and that least affected by the presence of other cognate bodies. This novelty of today I discovered about five years since, and a description of it in full will be found in the *American Journal of Science* for July, 1864.

I observe that M. Despaquis prepares carbon tissue which preserves its sensitiveness, when properly cared for, for five months, and that a specimen deposited during that length of time with the *Societé Photographique* of Paris was found, on examination by a committee, to be still in a condition for use.

As no explanation is given of the mode of making paper keep in this way, it seems worth while to remark that I called attention long since to the useful properties of *neutral chromate of potash and ammonia*, and the advantage of substituting it for the acid chromate of potash generally used for sensitising carbon tissue. Others proposed *bichromate of ammonia*—a substance much more difficult to prepare, and destitute of the advantages of my compound. This last is got by simply supersaturating a solution of common bichromate of potash with ammonia. Careful experiments which I made showed me that the sensitiveness of this compound is very nearly equal to that of the ordinary bichromate of potash—ample, in fact, for all useful purposes; whilst the keeping properties of sensitive compounds made with it are eminently increased. This modification has never seemed to me to have received the attention which it merits, and may be the secret of M. Despaquis's tissue.

From time to time I see articles which appear in the *Philadelphia Photographer*, without signatures, ascribed to me—why, I cannot understand. I take this opportunity of repeating what I have said in your columns before, that I invariably sign all that I write, and beg not to be made responsible for that which I do not see until it appears in print.—Very truly yours, M. Carey Lea.

Paris, February 22, 1869.

I do not know whether the readers of The British Journal of Photography have had any information respecting a remarkable geological formation, which forms the source of great wealth to several German manufacturers of chemical products. If not, perhaps a little account of the industry of the town of Stassfurth, at a short distance from Magdeburg, may not be uninteresting. At the Universal Exhibition of 1867 there were many exhibitors of the products manufactured in this district, and fine samples of bromide, iodide, chloride of potassium, carbonate of potash, &c., were to be seen. The Prussian Government began to see after the mineral wealth of this district about the same time that photography on paper was announced, in the year 1839. Then the borings for rock salt were commenced, and the product was found about 300 yards below the surface of the earth.

In 1851, or eleven years after, the workings had penetrated 280 yards into this bed of salt, and no indications of its failing were found. Indeed, from geological data, it is calculated that this layer of chloride of sodium extends some 300 to 400 yards deeper still! But considering that it is only 280 yards thick, and its extent nine square miles, the amount is enormous, and would indicate the largest mass of salt produced by natural evaporation of saline waters, during long geological periods, that has ever been found. This mass of salt would alone have afforded wealth to the district; but, as if in confirmation that it was produced from the evaporation of sea water, and to add still more to its value, a mixture of potash, soda, and magnesia salts was found at about 280 yards. These continued for about seventy yards, and made the explorers

fear for the purity of the salt in which they were in search, and several times they were on the point of giving up their researches from finding the chloride of sodium diminishing in quantity, and the other "impurities" increasing. However, in the hope that these "impurities" only existed on the surface, the work was continued till 1859, when the celebrated Herr Rose announced the true nature of these "impurities," saying they consisted of a double chloride of potassium and magnesium.

The attention of the Prussian Government was drawn to this fact, and in 1860 nearly 3,000 hundredweights of the mixed salt were used for agricultural purposes. In 1861 the quantity was increased eight times, and in 1862 the larger quantity was doubled. Chemists and manufacturers had their attention drawn to these striking facts, and the progress and success of the pits and mines at Stassfurth have been increasing ever since. The Government occupied itself about the matter, hoping to find in the chloride of potassium a means of making their "villainous saltpetre" much cheaper. It was found that, although the stratum of potash salts was less than that of the chloride of sodium, still there was enough potash to supply the world for centuries to come! The manufacturers of the district chiefly confine their operations to—1. The production of chloride of potassium. 2. The transformation of the chloride into sulphate of potash. 3. To the manufactory of carbonate of potash from the sulphate. 4. To the making of sulphate of soda. 5. To making manures from the potash products. 6. To the making of bromine and the bromides, and, in some cases, the iodides.

Having given this short account of the nature of the wealth of Stassfurth, it would not be of much interest to your readers were I to go into further details respecting the manufacturing of the larger products, but I can devote a little time to the subject of bromine and the bromides, both so well known to the photographic world. It is only within the past two or three years that it was suspected that the salines of Stassfurth would contain bromine; before then this substance was supplied by a manufactory at Schoënebeck to the whole of Germany, and then an enterprising manufacturer took the Stassfurth salines in hand, and now the various works at that town produce ten tons of bromine every year! This seems an immense quantity. What irritation a few drops of this substance produces! and what difficulty there is in securely stoppering the little bottles in which it is sold! How great must be the difficulties in manipulating ten tons! The bromine is extracted in the usual ways from the saline residues, and redistilled in glass retorts heated by steam. It does not contain any iodine, which shows that the Stassfurth waters do not contain any more of this metalloid than the sea waters themselves, and that neither can be used for the extraction of iodine. Several exhibitors show iodide of potassium, but I take it that they import the iodine, and, having potash cheap, they find they can offer this salt to advantage.

When the bromine is condensed in the form of bromide of zinc or iron, it is transformed into bromide of potassium by precipitating its solution by carbonate of potash. One maker sells four tons of bromide of potassium yearly! These quantities do not by any means represent what could be produced at Stassfurth, for the chief makers care more for manufacturing the other products than for troubling themselves about these comparatively trifling matters.

The carriage of bromine is very dangerous, and one of the makers sends his out, as a rule, in compounds of bromine, especially the bromide of ethyle. This compound is readily formed by distilling a mixture of bromide of potassium, alcohol, and sulphuric acid in an earthenware retort. The bromide of amyle can also be obtained by an analogous process, but it is rather more difficult on account of its lesser volatility. It is hoped that by the cheap production of bromine, it will take its proper place in the industry of the world as a more convenient reagent than chlorine, being liquid instead of gaseous. Bromine is, I believe, employed in the making of several colouring matters, and none of it need be lost, for all can be recovered from the residues after the colour is made. The process, however, is more difficult than with the iodine residues, but it would be worth the attention of those who use bromine in this way whether they could not sell their residues to the makers of this body, who have proper apparatus, &c., for obtaining it.

I am indebted for the information I have tried to give your readers to the able article of M. Balard, in his report on the chemical industries of the Universal Exhibition. Your readers will know the gentleman by name as an able photographer, and President of the French Photographic Society.

The articles on the magic lanterns, in your Journal and Almanac, are read with much interest here by some who are using the oxyhydrogen light very frequently. They are going to try the safety valves described in your Almanac. R. J. Fowler.

Home.

DARK SLIDES.

To the Editors.

Gentlemen,—Some time since, in The British Journal of Photography, many complaints were lodged against camera makers for furnishing the lid of the dark slides with strong brass springs that tended to throw the plate forward, and so put it out of focus.

I think that the dark slides are made much too thin; for, if they were made deeper from back to front, many advantages would be gained, as I can testify from experience, having a dark slide and camera made by the late Mr. S. Buckle, of Leamington—a gentleman who was a thoroughly good photographer, and one who well knew the requirements of the art.

The dark slide of the $8\frac{1}{2} \times 6\frac{1}{2}$ camera I allude to is one and a-quarter inch in depth from back to front. The lifting shutter is a quarter of an inch thick, and pulls out sideways. This gives ample room for it to slide out easily. The inner frames are nearly three-eighths of an inch thick; so there is no risk of the frame giving way, all being stiff and firm, with room to put a good pad of blotting-paper at the back of the plate. The slide may be used all day, and at night be as dry as dust.

Now, how different is a modern slide! I take one of ——'s make for plates 12×10, and find it only seven-eighths of an inch from back to front, the lifting shutter about three-sixteenths of an inch thick, the inner frames of course very thin, and with silver wire corners that are certain to give way if the plate be only of moderate thickness, owing to the whole affair being so narrow. The slide, after a few plates, is messy and sloppy, for you can only put a little blotting-paper on the back of the plate; and the shutter, again, generally gives one the benefit of a few splashes at the bottom of the plate, because the shutter is so close to it. The outside frame of this dark slide is about five-eighths of an inch thick; so the camera has to be made larger, and, for a 12×10, this is a consideration.

I omitted to mention that the inner frames of Mr. Buckle's slide are cornered with a little polished plate glass. This is unyielding, and with a little cyanide solution can be easily cleaned; but the wires of other made slides are difficult to clean, and uncertain in use.—I am, yours, &c., Thos. Gulliver.

Swansea, February 22, 1869.

[The silver wire corners in the London-made slides that we have seen are so strong as to render it almost impossible that they could be displaced. Mr. Gulliver's experience evidently differs from ours in this respect.—Eds.]

HYDROGENIUM.

To the Editors.

Gentlemen,—In reference to the *novelty* of the view concerning hydrogen being a metal, spoken of in your last number, allow me to make one remark:—In the early part of the spring of 1851 I had the pleasure of attending, among others, the lectures of Professor Brande, at the Royal Instution; and I add an extract from my notes of the lecture he delivered there on the 15th February of that year:—

"Hydrogen is most like in its affinities to a metal. On water being decomposed by the voltaic pile oxygen appears at the positive pole when the electricity enters, and hydrogen appears at the negative pole when electricity goes out. Water alone will not be thus decomposed, some sulphuric acid must be added to the water—one volume of oxygen and two volumes of hydrogen then appear. All the metals without exception appear at the negative pole as hydrogen does. Almost all other substances or gases appear at the positive pole."

The probability that hydrogen is a metal was quite a new idea to me then; but it did not appear to be so to the lecturer.—I am, yours, &c.,

Gravesend, February 22, 1869. Kent.

[Our correspondent must not suppose that Professor Brande claims to have suggested the idea that hydrogen is a metal, for this has been recognised by chemists for thirty years at least. The value of Mr. Brande's researches is due to the fact that he was the first who succeeded in producing a true alloy of hydrogen, in which the metallic character of the latter can be distinctly recognised.—Eds.]

MORALITY OF THE NUDE.

To the Editors.

Gentlemen,—The extracts on the *Morality of the Nude*, which you have recently quoted from the pages of your contemporaries, well deserve the prominence you have given to them; for the subject of which they treat is, if possible, of even greater importance to the photographer than to the general public, involving, as it does, his pecuniary no less than his moral interests.

Photography, as applied to portraiture, landscape, architecture, astronomy, &c., is a very truthful, charming, and useful art, and by virtue of these qualities it is gradually taking deep root in public esteem and affection; therefore its followers ought to be very jealous of its fair fame, and to regard with quick suspicion any attempt to lead it astray into bypaths that might expose it to the danger of contempt or ridicule.

I tried some time ago (see page 165, vol. x., of The British Journal of Photography) to prove, on physical grounds, that photographic representations of the nude were mere indecencies; and it is gratifying to find that the opinion I then ventured to express is not opposed to the judgment that has lately been passed upon them in quarters so high as are represented by your extracts.

A number of very well-executed photographs of nude figures were once shown to me, which helped to settle the question, to my mind, that all such works could, by possibility, be nothing *more* than indecent representations, so utterly destitute were they of the perfection of form and refinement which alone save statues and paintings of this class from condemnation. And my conviction was the more strengthened because in these examples great knowledge of art was manifested in the general treatment, and the attitudes of the figures were as delicate as could be chosen without sacrificing all artistic effect. But, notwithstanding, the results were much too real to allow the spectator to examine them with edification; for, instead of the thoughts being engaged and "elevated by the skill of the artist," the passions were excited and carried away by the subjects, which, by a necessity of the means of their production, were grossly sensual and vulgar.

The uncompromising exactness of photography, so valuable in other cases, would seem to quite unfit it for this branch of art.

Thus the answer to the question, "If it be right and proper to exhibit in public the statue of a nude female, on what grounds is it indecent to exhibit a photograph of the same female in a similar state of undress?" appears to be very short. A photograph is a too real representation; and because, on moral grounds, it would be considered wrong "to exhibit in public" the reality, it is felt that the exhibition of an exact literal imitation cannot be right.—I am, yours, &c., WM. HANSON.

Leeds, February 17, 1869.

EXCHANGE COLUMN.

Wanted to exchange several years' Journals (British), Almanacs, Hardwich's *Chemistry*, Lake Price's work, Russell's *Tannin Process*, Williamson's *Chemistry*, *Art Journal*, *Art Student*, Colouring Manuals, &c., &c., for anything useful in connection with photographic lenses or apparatus of about equal value.—Address, A. B., Post Office, Jedburgh, N.B.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

J. G. Tunny, Edinburgh.—*Three Portraits of the late Ernest Jones.*

John Robert Chart, Upper Mitcham, Surrey.—Two photographs, respectively representing *The Angel of Intercession*, and *The Angel of Peace.*

☞ *Correspondents should never write on both sides of the paper.*

J. H. (Edinburgh).—We shall be glad to see you.

OLD HYPO.—See an article in the present number.

J. MASSEY.—Your second letter was received just in time. In another hour it would have been too late. The three prints are returned.

GEORGE F——.—A piece of string attached to the bottom of the camera, and made to terminate under a heavy stone, or even the foot placed underneath the camera, will prove the best means for keeping it from shaking during a strong wind.

J. BROWN.—We quite agree with you in your estimate of the composition of the *Waterloo Banquet*, which is characterised by a great want of taste on the part of the artist. While the groupings individually are good, collectively they are not so.

J. S. L.—The answer that we gave to your former query embodied the information derived from the maker of the paper. We shall reserve your letter, and if we obtain really reliable information concerning a colourist of the kind you require, shall write to you. In the meantime, we regret that we cannot afford you assistance. A notice in our advertising columns would probably bring you in contact with the right person.

OUTSIDER.—You may remove the old varnished collodion films from every one of your glasses in less than five minutes, and at a twentieth part of the price that your proposed method will cost, by adopting the simple expedient we have so frequently recommended, viz., immersing the varnished negative in boiling water, which contains, in solution, some common washing soda. In the majority of cases, the time occupied in the removal of the film will not much exceed half-a-minute. Do not allow the plates to remain any longer in the solution than is necessary for effecting the object intended; but, after rinsing them in water, place them for a short time in the bichromate of potash and sulphuric acid solution, the formula for which we have given in our ALMANAC.

"W. D." writes:—"A few evenings ago, when exhibiting some photographs by means of the magic lantern and oxycalcium light, I met with a source of failure of which I had never before been warned. On the evening preceding that of the exhibition, when I tried the lanterns and made all things ready, everything appeared quite right. In the interval, however, I had filled up the reservoirs with methylated spirits of wine procured from a shop in the country town where I was then residing. After the exhibition had proceeded for a short time, I found that the wick charred so rapidly and became clogged up in such a manner as to interfere seriously with the success of the exhibition, eventually compelling me to cut it short. The cause was soon discovered. Many country dealers who have not a license for selling methylated alcohol sell instead what is known as 'finish,' which, in the majority of cases in which the spirit is required, answers quite well; but for the spirit lamp it is quite unsuitable, and clogs the wick with great rapidity. If this note prove to be the means of preventing any brother exhibitor from experiencing a similar mishap to that which befel me, it will not have been written in vain."

J. S. B. (Madrid).—We cannot enter at present into the details of the cause of you obtaining a sharp image on the ground glass and an ill-defined one on the collodion plate. We simply inform you that with a plain lens, such as you are using, you must, after focussing on the ground glass, push in the lens toward the plate to the extent of a thirtieth of its focal length. This will enable you to get nearly as sharp an image on the collodion as you formerly saw on the focussing screen.

DUN-EDIN.—For solar camera work, a condenser of twelve inches diameter will be four times more rapid than one of six inches, this estimate being subject to a slight reduction on account of absorption. The same rule does not apply to the action of condensers in the *lantern*, for, in that case, a well-made three or four-inch condenser will transmit as large an angle of light (if not larger) as one of the greatest diameter that can be made. We trust to be able to make this plain to you in the course of a few weeks.

SUBALTERN (Deesa, Bombay).—The particular sample of collodion you are using is one which is so favourable to great contrasts that we should advise you to try another kind for a time. It is certainly very trying, both for one's chemicals and skill, to photograph such natives as those you describe, with white turbans and coats, and faces of the colour of Vandyke brown. The kind of collodion you must use is one which, while being sensitive, does not give such strong contrasts as that you employ at present. It is a property which is very valuable for copying engravings, but we can scarcely imagine anything worse for your purpose. On looking over your formulæ we discover nothing amiss except the iron developer, the gelatine in which favours the intensity so necessary to avoid. Try the following:—

Protosulphate of iron	12 grains.
Glacial acetic acid	1 drachm.
Water	1 ounce.

You will find it to work well, even with a very brief exposure. We are surprised at the rapid deterioration of collodion after it has been iodised for a short time. In this country it would be getting into nice working order, when with you it would have become totally worthless.

"POURQUOI."—Received. In our next.

APPLICATION FOR NEW PATENT.

February 8, 1869.—"Improvements in Photographs to give them Artistic Effect, and to Produce Enlarged and Permanent Pictures from Small Negatives. No. 385."—OLIVER SARONY.

February 10, 1869.—"An Improved Photographic Printing Process. No. 417."—WM. HENRY FISCHER.

VIEW METER.—Mr. Werge (of the establishment of Jabez Hughes, Oxford-street) having recently being trying to solve the problem of making a view meter in which the qualities of simplicity, cheapness, and efficiency should be combined, has now produced an instrument possessing these several requirements. It consists of a small and flat japanned tin box of an obtuse pyramidal form, the apex being removed, to permit of the application of the eye. On the base is fixed by a pin a series of four diaphragms with square perforations of different sizes. These represent an angle of view varying from 90° on the base line, downwards. When a photographer knows the focus of his lens and the size of his plate, he has only to turn on the appropriate diaphragm and apply the instrument to his eye, when he will at once see exactly so much of the landscape before him as would be represented on his plate; and, moreover, this with equal accuracy if he have a variety of lenses of different foci, this being provided for by diaphragms of various sizes, on which may be scratched the angle of view permitted by each, together with the special lens with which it is best suited to work in harmony. This instrument is a most pleasant companion during a walk in the country; for, by placing it to the eye, pretty, natural pictures may thus be seen "here, there, and everywhere."

METEOROLOGICAL REPORT.

For the Week ending February 24th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Feb. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
18	29·64	53	42	42	43	SW	0·02	Rain
19	29·98	52	35	36	38	WSW	—	Fog
20	29 95	53	37	41	43	NW	—	Dull
21	30·02	53	34	38	40	NW	0·26	Overcast
22	29 99	37	34	34	34	NNE	0·32	Rain
23	30·16	42	32	34	37	NNW	—	Fine
24	30·27	50	33	37	38	SW	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 461. Vol. XVI.—MARCH 5, 1869.

ON THE VERY RAPID FILTRATION OF SOLUTIONS.

The filtration of considerable quantities of liquids is at all times a somewhat tedious operation, more especially when we have to employ a sample of filtering paper which does not easily permit the percolation of a liquid through its substance. In conducting photographic operations on even a moderate scale large quantities of liquids have frequently to be filtered, either for the purpose of clearing the solution—the nitrate bath, for instance—from small quantities of mechanically-suspended matters, or of obtaining a precipitate—such as chloride of silver—from the liquid in which it has been formed. The time and attention which such operations require, though not very great, are together often much more than many are willing to bestow; therefore any mode of accelerating the ordinary process could not fail to prove of value, more especially to the professional photographer.

The arrangement which we are now about to describe has been devised by Professor Bunsen, of Heidelberg, and enables the operator to filter a liquid about as rapidly as he can quietly pour a solution from one vessel to another. When a considerable precipitate, such as that of chloride of silver, is present in the liquid, the chloride will be not only quickly filtered off and caught in the funnel, but, when caught, it can be drained and almost dried without removal, and this in a surprisingly short space of time. The apparatus by which such results can be obtained is extremely simple, inexpensive, and occupies but very little space. We now employ it in our own laboratory with very great advantage; and, though our apparatus is precisely similar to that described by Professor Bunsen in the number of the *Philosophical Magazine* for January last, we find that a slight modification may be made in the arrangement to render it quite suitable for use in the photographic operating room, as the filtrations

FIG. 2.

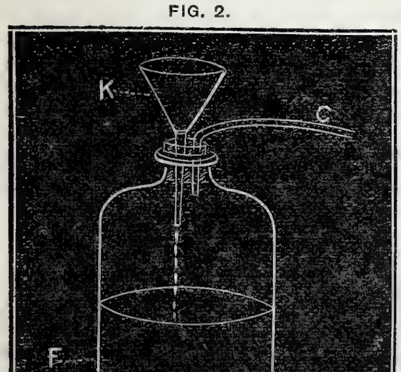
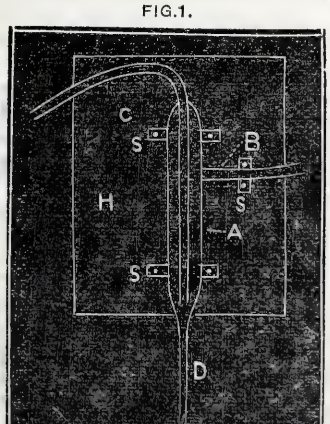


FIG. 1.



required by the photographer need rarely be conducted with the precision which is so indispensable in the chemical laboratory. The principle of the method is very simple, and consists in subjecting the liquid in the funnel to considerable pressure, in order to rapidly force it through the substance which acts as the filter. The pressure is obtained by exhausting the air from the vessel into which the liquid filters. The two diagrams which we give will facilitate our description of the simple and inexpensive apparatus needed for effecting this purpose.

Fig. 1 represents the simple air pump used to exhaust the vessel shown in *fig.* 2. The pump can be made by any plumber at a cost of a few shillings. It consists of the following parts:—A tube A of lead about eight inches long and nearly one inch internal diameter; within three inches of one end of this the tube B is soldered as shown. The diameter of this tube should be about three-eighths of an inch internally. We now solder to the other end of the wide tube the pipe D, taking care that the wide tube shall be contracted into a cone up to its point of junction with D. The internal diameter of D should be a little less than that of B. We now select a small tube C, one extremity of which enters, but must not at all close, the cone formed by the junction of A and D; and at this point its orifice is contracted so as not to exceed one-eighth of an inch in diameter. It is then soldered into the upper extremity of A. We thus obtain a chamber A, which can only be communicated with by means of the tubes B, D, and C. This constitutes our air pump, and for convenience it should be fixed to the board H by means of the straps S S. This air pump is now attached to the wall in a suitable position near a table, and the tube B connected with a pipe from a water cistern or the street main. The exit tube D, which should extend to a depth of at least seven feet, conveys the water away either to a reservoir or to the sewer. It is to be remarked that this tube should not be less than seven feet in length; but the maximum exhaustion which the pump is capable of effecting is obtained when the length of the tube is thirty-three feet. For all photographic operations, however, a length of seven or eight feet is quite sufficient. The tube must not be curved, but fall in a straight line from the bottom of the chamber A.

The *modus operandi* of this pump is as follows:—The water rushing in through the tube B in a regulated stream necessarily falls by its own weight through the tube D, and in doing so sucks air from the chamber and the tube C. The air as it emerges from the latter tube is caught by the water and carried down D in bubbles, the short columns of water in D then playing the part of a series of little pistons. This goes on continuously so long as water is delivered by B; the interior of any vessel with which the tube C is connected can, therefore, be kept partially exhausted for any length of time. This pump when once set up is ready for action at any moment, since it is only necessary to turn on the water tap at B until the point is reached at which exhaustion proceeds regularly.

A gallon or half-gallon bottle is now fitted with a good, sound cork—or, better, one of the caoutchouc stoppers now sold by instrument makers—and two holes bored in it. Through one hole passes the tube C (*fig.* 2), which is to be connected with the tube C of the pump (*fig.* 1), and through the second hole the tube of the funnel K passes, as shown in the diagram. When we want to filter a large nitrate bath, the cork with its funnel and tube is inserted in the neck of the bottle F, a good plug of moistened cotton wool is placed in the throat of the funnel, the tube C connected with that of the air pump,

and the water turned on to the latter. Exhaustion of F now proceeds, and on pouring the nitrate bath into K the liquid passes through as rapidly as the funnel can be kept filled. In this way a few minutes will suffice for the filtration of very large quantities of liquids. When the filtration is completed, the water is turned off from the pump, the liquid removed from F, the bottle and funnel washed out, and the whole apparatus is ready for another operation.

By this means the filtration of a printing bath through kaolin can be rapidly effected, or the separation of a small quantity of chloride of silver from a large volume of liquid, and the chloride of silver obtained in the funnel is drained and almost dried by the continued action of the pump. It is to be remarked here that only cotton wool, or similar material, can be used as a filter, since the ordinary paper cone would quickly give way, owing to the pressure to which it is subjected by the external air. For most purposes good cotton wool is unobjectionable, but, where desirable, well-washed pyroxyline may be advantageously used instead—more especially when strongly-acid liquids are to be filtered.

In conclusion: we can only repeat that we have found great advantage from the employment of the water pump for aiding filtrations in our own laboratory, and have no doubt that its use will also be appreciated by those of our readers who often have large quantities of liquids to filter. We must add that the application of a water aspirator to facilitate filtration is by no means so new as some may suppose, for, if we mistake not, Mr. M. Carey Lea, amongst other chemists, has proposed an arrangement for this purpose. We may hope, however, that the advocacy of Professor Bunsen will serve to direct more attention to this important practical subject.

LENSES OF ROCK CRYSTAL.—M. CLAUDET'S PORTRAIT

There is a good old Latin adage which, when converted into the vernacular, intimates that we must say nothing but good concerning the departed. This, we presume, is not intended to apply to the sentiments, opinions, or doctrines of those who are gone; accordingly we intend to make some remarks on the "notions" held by Sir David Brewster concerning photographic lenses—what they should do, and of what they should be made.

In the first place we must acknowledge the receipt of a *carte* photograph of the late M. A. Claudet, F.R.S., a man whose name is associated with the progress of the science of photography, and whose memory we revere. The portrait has been presented by Mr. Henri Claudet (son of the deceased gentleman to whom allusion has been made) to the Photographic Society of London. It is a capital likeness of the veteran artist, and as such we esteem it very highly. Had it not come upon us when busy in the preparation of the present number, we should gladly have availed ourselves of the opportunity of saying something of the services rendered to photography by the late M. Claudet, for he *did* render service—good service—to our art-science, especially in the more purely philosophical department of it. The portrait before us is, as we have already said, a good likeness, although the expression is certainly less pleasing than was that of the genial, smiling countenance of our departed friend, into whose society we have been so often thrown in past years. It was taken, if we are rightly informed, by means—not of an achromatic portrait combination, but of a single lens made of rock crystal, and this brings us at once to the subject proper of this article.

It was long a notion—we may as well say crotchet—of Sir David Brewster that a single lens made of a slab of rock crystal would act in a manner equal, if not superior, to that of a properly-achromatised lens. Sir David Brewster, we should state, knew little, if anything, of practical photography, and the same must be held to apply to his practical knowledge of the branch of optical science connected with photography. That he was well aware of the *principle* on which single achromatic combinations acted we can readily believe; but it is evident that he did not sufficiently realise the value of the principle of achromatism now so important in its bearings on optical instruments, nor did he appear to know much concerning the passage of a ray of light obliquely through a lens.

If a diamond could be obtained of a sufficient size out of which to grind a lens, that to Sir David Brewster would form the *ne plus ultra* of microscopic or photographic object glasses. For some reason or other which we could never comprehend, he did not "take kindly" to achromatic lenses for either photographic or microscopic work. Diamond and other gems wrought as microscopic objectives, and rock crystal lenses for photography, appeared to him better than achromats; although in both cases he was opposed by both true theory and successful application. This leads us to inquire—

In what respect is a photographic lens of rock crystal better than one of glass? If a lens be made of one kind of glass it will possess so much of that quality known as the aberration of chromatism that the various rays of light, now analysed as well as refracted by the lens, will arrive at focal points different from each other. Thus the blue or actinic ray is the shortest, next comes the yellow or visual, and lastly the red or calorific ray. If a transparent substance were known in which there was refraction or bending of the rays of light without dispersion or separation of the component parts of the ray, it would then be evident that that was the most perfect material for the formation of lenses. The refractive index of the diamond (2·439) being so high, and its index of dispersion (0·038) being so low, this naturally presented itself as the most perfect known single substance out of which to grind lenses. The objection to such procedure is one so tangible that we shall assume it to be accepted.

Rock crystal, also, has a rather high refractive and a low dispersive index; "therefore," says the mere theorist, "why not make lenses of that substance? The results will be much more perfect than can be obtained with a single glass lens—there will be greater sharpness with more light." This is quite true; when compared with lenses made of diamond or rock crystal, glass lenses would be "nowhere" if made of a single piece of glass; but in virtue of the beautiful principle, discovered by Dollond, of refraction without dispersion—or, in other words, of achromatism—lenses made of glass are now infinitely superior to those that could be produced either by the diamond or the more practicable rock crystal.

Nor, indeed, is it possible that it could be otherwise. In the rock crystal lens, no matter how carefully constructed, there is still so much dispersion—so much separation of the chemical and visual rays, and even of the various groups—that for practical purposes the chemical and visual foci are *not* coincident, although they are not greatly separated from each other. At the present day, we are getting so hypercritical in optical matters, our opticians have in their practice realised so perfectly our theories, that nothing short of a perfect coincidence of the blue with the yellow rays now satisfies the student of optical philosophy.

For some purposes rock crystal lenses may be still useful. We know that in a given area they transmit more of the actinic rays than glass lenses, and in this relationship they will continue to be very useful indeed; but there their utility ends. A studio "glazed" with rock crystal would be better than one whose roof was similarly filled in with crown glass; but for lenticular purposes this crystalline body cannot for a moment hold its own against achromatic lenses made of glass. In such lenses as those which form spectacle "eyes," they are rather better on account of their brilliance and hardness; but for object glasses, whether microscopic or photographic, they are not equal to a combination of flint and crown glass.

We have often heard Sir David Brewster descant on the advantages to photographers that would arise from the use of lenses of rock crystal with small diameter, as compared with achromatic glasses of large aperture; but, as we have already stated, we found his theories to be based on a somewhat slight superstructure, and to be quite at variance with well-ascertained facts based on truer theory.

Some time ago we incurred considerable expense in having rock crystal lenses made, to test and set this matter at rest so far as we personally were concerned. The result was that a common spectacle glass, costing only two or three coppers, proved in practice to be nearly as good as a carefully-ground and elaborately-polished lens of rock crystal. The portrait of M. Claudet is precisely such an one as those we obtained by the spectacle "eye," whether it were made of rock crystal or of crown glass.

PAPYROXYLINE.*

The preparation of soluble paper or papyroxyline (from papyrus and pyroxyline) takes place through the immersion of fine, white, silk paper in a mixture of equal volumes of nitric acid at 1·40 and sulphuric acid at 66°. It should here be observed that different kinds of paper render necessary alterations in the concentration of the acids—consequently, before preparing any large quantity, a trial should be made on a small scale, so as to get at the right proportions. The paper must be left in the mixture until one proof which has been taken out, after the usual washing and drying, is found to dissolve in a mixture of equal proportions of alcohol and ether.

The washing and drying of the preparation is much more rapid

* *Photo. Archiv.*

than that of collodion wool. The wet paper dries if only hung over a line from twenty to thirty minutes.

The papyroxyline dissolves *perfectly clear* in equal proportions of alcohol and ether. The finishing mixture, after the previous soaking in alcohol used to dissolve collodion wool, is here quite superfluous. The particular advantages of papyroxyline with wet collodion processes are the great sensitiveness of the skin and its perfect solubility. Both of these properties have been carefully ascertained. That a collodion perfectly structureless must yield finer pictures than one *with* a structure is self evident. This property is also of considerable importance in the finishing of microscopic pictures, as well as that of enlarged microscopic objects.

It was scarcely to be anticipated that paper collodion would be more sensitive than collodion cotton, and yet such is the case. Before me lie three photographs by Herr Jos. Albert, of Munich. On each plate are two portraits—one executed with paper collodion and the other with cotton. The two layers were silvered, exposed, and developed at the same time. In every case the paper collodion shows considerably more detail in the shadows than the other, and where the latter has received the correct exposure (lighting) the former is much over-exposed. Herr Rensing, of Amsterdam, also writes to say that he works considerably faster with the paper collodion than with collodion cotton.

The layer is likewise firmer, and clings better to the glass.

Particular directions for the use of paper collodion are not required, because papyroxyline is employed in the same manner as wool pyroxyline. As, however, I have been requested by many to do so, I here give you one prescription:—

Ether	750	grains.
Absolute alcohol	450	,,
Papyroxyline	18	,,

Rectified spirits of wine	150	grains.
Iodide of cadmium	10	,,
Iodide of strontium	10	,,
Bromide of cadmium	8	,,

The solution is filtered and mixed with the collodion.

The silver bath for this collodion must be at least eight per cent., and the developer must not be too weak.

How the papyroxyline behaves with the usual dry processes I have not yet ascertained. I have applied to Mr. M. Carey Lea, of Philadelphia, respecting the preparation of collodio-bromide of silver for that purpose. The process with this kind of collodion, it is well known, effects an important simplification in connection with the alkaline development on which to base dry processes, as it renders unnecessary the employment of the silver bath and any very particular washings. There was one evil, unfortunately, which was that only a certain kind of collodion cotton could be used, and that was American; but this preparation was no longer to be had, owing to a fire in the manufactory, and no useful collodio-bromide could be made.

As soon as I had arranged for my first experiment with paper collodio-bromide I received a letter from M. de Constant, in which he expressed his dissatisfaction at the difficulties which this process occasioned. I was, therefore, in suspense as to the result of my proofs. The first experiment succeeded beyond all expectation, and the papyroxyline answered perfectly. The plates were very clean, and developed excellently.

I will here give the description of the preparation. It is an alteration of Mr. Carey Lea's formula, and differs from this only that instead of the bromides of cadmium and ammonium it contains the light, soluble bromide of lithium; the proportion of bromine contained in it is quite the same. I take of—

Ether	120	grammes.
Absolute alcohol	120	,,
Papyroxyline	7	,,
Bromide of lithium	5	,,
Nitrate of silver	11	,,

The papyroxyline and the bromide of lithium were dissolved in the ether mixture, and then first the exceedingly fine nitrate of silver powder was added by pinches with a suitable solvent. The less silver applied at a time, and the better this is done, the slower the bromide of silver is in forming and the finer it remains. The addition of the silver, of course, must be made in a yellow light.

By carrying out the following directions the preparation is exceedingly simple:—Take a well-cleaned glass plate coated with collodio-bromide, and, after from thirty to fifty seconds, if the film has set, lay it in a basin of distilled water, and, as soon as the greasiness is gone, pour over it one per cent. of tannin solution. Leave it to dry, expose, and develope with carbonate of soda and pyrogallic acid in the usual way

In lieu of tannin, coffee, tea, gallic acid, albumen, or any other sensitising and preserving medium can be employed.

For collodio-chloride it appears that a mixture of paper and cotton is best adapted. On the last occasion we used the following:—

Ether	600	grains.
Alcohol	600	,,
Papyroxyline	9	,,
Cotton	3	,,
Chloride of lithium	5	,,
Citric acid	3	,,

This collodion was filtered, and twenty-four grains of the finest powdered nitrate of silver put into it by small pinches, and after each addition it was properly shaken.

The nitrate of silver must be exceedingly fine, so that not a grain of precipitate arises. Lastly: three drops of Canada balsam must be added. If the collodion film on the glass, notwithstanding the warming of the plate, do not continue the same, but shows crystallisation, thicken the collodion by adding one or two grammes of papyroxyline. E. Liesegang, Ph.D.

ON THE CLEANING AND PREPARATION OF GLASS FOR DRY-PLATE WORK.*

Glass cleaning, it must be confessed, is one of those few disagreeable details connected with our art-science which, however anxious we may be to have completed as speedily as possible, demands, notwithstanding—especially in dry-plate work—a certain amount of care and consideration, and, I venture to think, a little more than is usually accorded. It is at the best a most uninteresting operation, and I must ask your indulgence if you find my paper uninteresting also.

With respect to the selection of glass, I would merely urge that a little care be exercised. Let its thickness be in proportion to the size of the plate, but, above all, see that each plate is of nearly equal thickness throughout—not as I have seen some, three or four times thicker at one end than the other. With such plates it is unsafe to use even moderate pressure in the printing-frame; and there are other objections which I need scarcely mention. A slight curve in the glass is not objectionable if the concave side be used. Scratches and air-bubbles are rather objectionable; where the former occur the use of a substratum (if the reverse side of the glass be not available) and printing in the shade will reduce the evil to a minimum. In the case of air-bubbles use that side of the glass nearest to the defect.

Before proceeding to the operation of cleaning, my own practice is invariably to remove the sharp edges and corners of the glass by means of a corundum file, or piece of hard stone—such as a scythe stone. Some employ an iron file; I rarely have used one, as I am inclined to think that the sharp and jagged cuts invariably produced might, where the glass is thin, tend to the subsequent cracking of the negative. This, however, is merely supposition. If there be an imperfect or unpolished side to the glass scratch it in one corner, that it may be readily distinguished in the subsequent operations of coating with the substratum with collodion.

The glass having been so far prepared, the cleaning operation commences. Various solutions and substances have from time to time been suggested for glass cleaning; and, perhaps, in no particular do photographers differ so widely in their recommendations. Some invariably use acid solutions; others (perhaps the majority), pin their faith to alkalies, generally common soda; others, again—and I class myself among the number—avoid cleaning by chemical means, but confine themselves, where practicable, to the use of substances acting mechanically, such as tripoli, &c.

For new glass I do not think that, as a rule, any chemical whatever is necessary, except it may be for the removal of soap marks made by the manufacturers. I never encountered any difficulty with them myself, but I am told on good authority that it is very difficult to eradicate the effects of them.

For the removal of an old varnished film nothing is better, if indeed equal, to boiling water poured over the plate with some force.

For the removal of an ordinary unvarnished film I think I have tried nearly all the chemical solutions that have from time to time been recommended, and I have come to the conclusion that there is but little difference between them. To a dry-plate worker, however, the mere facility with which an old film may be removed or a glass cleaned is of secondary importance. His first care must be to avoid the use of any chemical calculated to eat into or saturate (if I may so say) the substance of the glass. To a wet-plate worker a trace of such chemical is not so important; the short time elapsing between the preparation of the plate and the completion of the negative does

* Read at a meeting of the Liverpool Amateur Photographic Association, Feb. 23, 1869.

not allow of the objectionable chemical attacking the film: the purity of the surface is to him all-important, and the cleaning operation often consists of a mere polishing.

With a dry-plate worker the conditions are nearly reversed; if a substratum be used the degree of polish required for wet-plate work is by no means necessary, whilst (as I have said) it is of great importance that no foreign chemical be absorbed by the glass.

I will merely take one illustration. Many here have, no doubt, met with the defect known as "tannin measles." These peculiar spots have been shown, by Major Russell and others, to owe their origin to the presence of foreign substances in the glass, and from my own experience I can fully confirm this. On many occasions I have distinctly traced these defects to the incautious use of soda as a cleansing agent. The soda has a strong, penetrating power, and the moisture ever present in the atmosphere acting on traces of the salt left in the glass causes it to act on the sensitive film. The longer the plate is kept (especially after exposure), and the damper the atmosphere, the more marked are the defects likely to be. It is important to observe that the action of the alkali seems to be not so much a destruction of the sensitiveness of the film as a destruction of the latent image when formed.

It behoves us, therefore, to be extremely careful when this chemical (and I may not be wrong in saying any chemical solution whatever) is used that all traces of it be destroyed by copious washing. It would, indeed, be prudent, where practicable, to abandon the use of all chemicals for the purpose, resting content with the use of clean water assisted by fine tripoli, or some similar substance. In my own practice I invariably adopt this method, and since I abandoned the use of soda—which at one time I used exclusively for the purpose—I have never been troubled with the defects I have spoken of. At the same time, I must not be understood to say that impurities in the glass are invariably the root of the evil. It arises, sometimes, from other causes; but on this subject I must not enter, it not being within the scope of my paper.

I consider the great aim of a dry-plate photographer ought to be to so regulate his working as to produce uniformity and certainty in the results. Dry-plate photography at the best is comparatively uncertain. Is it not, therefore, impolitic to increase that state of uncertainty by the use of substances which, in the absence of extraordinary care, may conduce to defective results?

Before I conclude, I ought to say a word or two on the various substrata usually employed. Though many have been recommended there are but two which are generally used, viz., a solution of India-rubber in benzine and dilute albumen. It is impossible to say which is the better; both have their merits and demerits. At one time I used nothing but India-rubber; latterly I have used albumen. Of the two it is easier of application, and, perhaps, not less efficacious than the other.

The India-rubber solution is best made of—

India-rubber	1 grain.
Common resin	$\frac{1}{3}$,,
Benzine	1 ounce.

Place in a warm situation for twenty-four hours, and filter. The sample of benzine must be entirely free from grease, and before dissolving the rubber pour a little over a glass, evaporate, and draw a finger over it. It will be readily seen if the benzine leave an oily residue; if it do, it must be rejected.

The film must be dried before a clear fire, and the greater the heat to which it is subjected the less the risk of cracking. Cracking is sure to follow if too much rubber has been dissolved. When coating a large batch of plates due allowance must be made for the evaporation of the benzine.

Albumen solution is generally prepared by beating up one part of albumen with from seven to fifteen or even twenty parts of water. I use about twelve to fifteen, as in my hands a strong solution gives rise to honeycomb-like markings, blisters, and other defects, clearly traceable to the substratum. The great merit connected with an albumen substratum is in being able to apply it without the necessity of drying and polishing the glass after washing; but care must be taken to avoid the production of bubbles. Let the albumen be filtered through sponge into a developing cup, and, when applying it, let the lip of the cup come almost in contact with the plate. The excess must be flowed off, and not used a second time.

The film may be dried spontaneously or by heat. It will be advisable to keep the plates, when once coated, in a dry place, otherwise the film will absorb moisture. If the weather be damp it is prudent to place the plates before a fire prior to use.

As far as my observations have gone, neither an India-rubber substratum (even when used strong) nor dilute albumen will protect the latent image from the attacks of deleterious substances contained in the glass; from surface impurities, if slight, a substratum may be a safeguard.

I may mention that I find the film is more sensitive to the action of a damp atmosphere where a substratum of albumen is used than where plain glass is employed. It will be well to remember this when storing plates for use. Another circumstance I would also call your attention to is that the latent image can be more speedily developed when an albumen substratum is employed. To anyone interested in the subject it will be time well spent to coat one-half of several plates with a substratum, and closely observe the action of the developer and the characteristics of the resulting negatives under varying circumstances.

In conclusion: I would again ask your indulgence for the uninteresting character of my paper. I do not profess to have brought anything new before your notice; but if by my remarks anyone be guided or assisted, I shall be amply repaid. EDMUND PHIPPS.

LIME TONING.*

SOME remarks in an article on lime toning in the last number of the journal call to mind some of my experiences in that line. Several years since I wrote a communication, which was published in Seely's journal, giving substantially similar directions for lime toning to those you published some weeks since, and referred to in the article to which attention is drawn above. I have used that, and modifications of that process, almost entirely in my business ever since.

Some two years or more ago I commenced using a concentrated stock solution for convenience, made of solution of chloride of lime and gold, and also one made of a peculiar combination of hypochloride of gold with hypochlorite of lime and chloride of calcium; this last I considered a great success at the time, on account of its brilliant tones and its superior keeping qualities. The concentrated solution was of a deep orange colour, a much more brilliant tint than the same strength of solution of chloride of gold; it did not deposit insoluble subchloride, as a strong solution of neutral chloride of gold is apt to do on standing, especially if exposed to light. The mode of preparation of this salt I do not give, as I have abandoned its use for reasons hereinafter mentioned. In toning with either of the above-named compounds, it was only necessary to add about two drachms of solution to half-a-gallon of pure water when it was ready to tone, and might be used over and over again by simply adding a small quantity of stock solution a short time before using. In fact it would give still more brilliant tones after having been used once or twice.

So much for its convenience. Its economy may be judged from the fact that the before-mentioned two drachms of stock solution contained less than one grain of gold, and was sufficient to tone between eighty and one hundred card pictures. Now for its defects. After using from this stock solution for some months, I began to find it necessary to use great care in the selection of my albumen paper, paper prepared with adulterated albumen becoming more difficult to tone. Very poor paper would persist in retaining a reddish tone in the gold solution, and, on being transferred to the hyposulphite, would immediately change to black and fade to a miserably dingy hue. Prints on good paper, from a strong negative, would still tone rapidly and brilliantly; but the shading of vignettes began to be defective, the background fading to an unpleasant tint, inclining to yellow in the lighter shades, although the head might be as bright as usual. I soon traced this difficulty to the changes time had produced in my stock solution, although it had not changed in appearance, being still the same colour and without any deposit or sediment; and after numerous experiments I became convinced that no compound of gold, which promises toning properties, can be relied on to keep in its best condition for any great length of time; even neutral salts, like the chlorides of sodium and calcium appeared to be more or less injurious.

I consider it best to keep a stock solution of slightly acid chloride of gold, which can be depended upon to be uniform in its action, and to add of this the requisite quantity to the toning bath every day some hours before using.

Every good operator can of course produce excellent results with any of the common toning baths; but my experience is decidedly in favour of the chloride of lime when properly used, for brilliancy of tint, clearness of whites, convenience, and economy. It is, of course, more economical to use a bath which can be repeatedly used rather than one which must be made up every day, chiefly because it is necessary that the bath should still be in good condition at the end of the operation, otherwise the last prints toned will be inferior; consequently a considerable amount of gold remains in the bath, which will count upon the next day's work.

* *Humphrey's Journal.*

If a toning bath made with bicarbonate of soda or phosphate, &c., be used to tone a great number of prints, it will turn, on standing, to a purple or wine colour, more or less deep according to age; in this state it has very little toning power. Now, if a few drops of solution of chloride of lime be added, a purple precipitate is thrown down. Allow it to stand a few hours, or, better, days, until perfectly clear; then carefully decant from the sediment, and add a small quantity of solution of neutral chloride of gold, and it will be found to tone excellently. The addition of a few drops of chloride of lime solution to either of the above-mentioned baths after using will prevent the formation of the coloured compound, and retain the working qualities of the bath.

I do not favour the accumulation of chloride of calcium in the bath; for this reason I prefer to neutralise the gold with bicarbonate of soda, and also to add a few grains of phosphate of soda occasionally to remove the lime or calcium. I make a stock solution of bicarbonate of soda of such strength that a given quantity shall be sufficient to exactly netralise a given quantity of stock solution of gold. I make up my bath with bicarbonate or phosphate of soda, or both combined, or chloride of lime, whichever will answer my purpose best at the time. After using I add a few drops of solution of chloride of lime, and pour the bath back into the bottle to settle over night; in the morning I decant the clear liquid carefully into my toning dish, and add sufficient gold solution for my day's work, and also soda to neutralise; after toning, repeat the lime, &c., as before. After using a few times, as the chemicals accumulate in the bath, I dilute with pure water. A large excess of chemicals is injurious; the bath requires only a few grains to the gallon.

I have indicated the principle on which I think this bath should be worked to be successful and economical. The quantity of chloride of lime necessary is very small. Any excess is injurious, and will cause mealiness. It is useless to give precise quantities, because commercial chloride of lime is uncertain; the amount of hypochlorite it contains is variable, consequently it must be used with judgment.

I think anyone who becomes familiar with the working of this bath will be pleased. The brilliancy of tint is also noticeable in porcelain pictures, especially if printed on collodio-chloride, made after directions given in my communication which you published some time since. For toning porcelain prints the bath should be diluted with three or four times its bulk of water.

I do not believe that a toning compound of gold can continue in its best condition for any great length of time, as I before said. This belief is founded on very many experiments, and is contrary to my previous opinion. I found that the compound hypochlorite would keep so long, and I hoped it might keep indefinitely. It will certainly keep longer than any other toning compound of gold I have tried. Other compounds soon begin to deposit gold. This does not; but after passing a certain point it deteriorates, consequently I think the method I have described is best calculated to keep it in its best condition.

I prefer a rather weak bath, that is, one containing not more than about one grain of gold to the quart; if much stronger than this it will tone so rapidly, if in good condition, that the prints are in danger of over-toning, at least on the surface, before they can be taken out, if there are many toned at once. I do not wish to be understood that this is the case with all toning baths; for I have sometimes seen operators at work with a bath containing over thirty grains of gold to the gallon, which toned more slowly and imperfectly than the above-described bath should do when of a strength not exceeding one grain to the gallon.

The action of light on solution of nitrate of silver is well shown by an experiment which I tried many years since. I placed a bottle containing a nearly saturated solution of crude nitrate of silver on a shelf in a south window. The solution was made for the purpose of preparing fulminating silver, and was simply coin dissolved in nitric acid, containing, of course, all the copper of the alloy, and also decidedly acid. After remaining exposed to sunlight for several months, I noticed a formation of needle-like crystals in the liquid and upon the glass. This I thought indicated the formation of nitrate of silver. I concluded to try its qualities as a sensitising bath. Accordingly I diluted and iodised, coated and exposed a plate. On pouring on the developer the image appeared to start out in all its details almost instantaneously. It proved to be remarkably sensitive, but was useless for positives, for no matter how short the exposure the lights were invariably overdone and solarised. This was before the days of card photographs, and I did not try the action on a negative. I think, however, it would have produced intense negatives with short exposures.

I have always intended to experiment further on the nitrate of silver and analogous salts, but have been prevented by various causes, among which is the trouble of procuring the nitrite of silver.

WILLIAM TERRY.

THE CLOUD STOP.

MR. SUTTON, writing on the subject of the invention of this stop, which, it will be seen from our number for February 12th, we attributed to the Rev. W. Read, of Manchester, says that he certainly was under the impression that he himself was the inventor, and that it was first published in his *Dictionary of Photography* in 1858. He trusts that we will again refer to our authorities and put him right if it should prove that he is labouring under a delusion in this matter.

It curiously happens that the writer of this article also at one time considered himself the inventor of this stop, and as such spoke of it to several of his friends—among others, to Mr. R. H. Bow. He afterwards discovered that he had been forestalled by Mr. Read; and the authority then adduced to him he now places at the disposal of Mr. Sutton.

In *Photographic Notes* for June 1st, 1858, page 30, Mr. Sutton says:—

"The Rev. William Read, of Manchester, has suggested an excellent mode of obviating, to some extent, one of the great difficulties in out-of-door photography, which consists in giving to the foreground sufficient exposure without over-exposing the sky. His plan is admirable for its simplicity, and we feel perfectly sure it will answer. It consists in turning the stop of the lens through an angle, so that its edge may be presented more towards the sky, and its aperture more directly towards the foreground. The *rationale* of this scarcely requires explanation, and it only remains for opticians at once to adopt the principle, and contrive some neat mode of adjusting the plane of the diaphragm to the axis of the lens. The idea is strictly correct in principle."

Mr. Sutton, in the following number of the *Notes*, again alludes to Mr. Read's stop, contrasting it with the "pectinate" or comblike stop of Mr. Ward, of Leeds, which, like the other, had for its aim the subduing of the light from the sky and the distant parts of the landscape. "The principle of Mr. Read's stop," he says, "appears to us to be more correct; for when its plane is inclined to the horizon the pencils from the foreground objects have a circle for their base, those from the sky an oval of less area, while in the 'pectinate' stop the base of *all* the conical pencils which diverge from the bright points of the view are of *equal* area and shape."

As the *Dictionary* had not been published at the time the above was written, we believe that the evidence afforded in the foregoing extracts will be sufficient to corroborate our statement relating to the invention of the "cloud stop." We may add that the way in which *we* mounted the stop was by a ball-and-socket arrangement, by which it could be placed at any angle, whether vertical, horizontal, or oblique.

ON THE REQUIREMENTS OF THE WET-PLATE WORKER IN THE FIELD AS TO CHEMICALS.

II. GLASS AND COLLODION.

IN my last I treated of the bath. Before passing on to our next important item, collodion, it will not here be out of place if I say a few words on glass plates—the structure upon which it is spread, and upon which so much depends. To the amateur, and to any person just commencing photography professionally, I would at starting give this piece of advice:—Make up your mind never to use any but the best patent plate glass upon which to make your negatives. You will find it the cheapest in the long run. Your breakage will be reduced to a minimum, and the plate may be used very often, if necessary, before "rusting" or showing signs of its surface being worn out. There are different sorts of glass in vogue amongst photographers. Flatted crown is often recommended, and a glass of a very white colour, called "German plate glass," which is virtually and in practice rubbish. It is apt to "sweat" and "rust," and is liable to all changes of temperature, so that negatives when taken upon it split and crack from its contraction and expansion. Some years ago I got hold of some of this, much to my regret, as I lost some fine pictures through these causes. The sort I would recommend is Chance's patent plate, one-eighth of an inch thick. It may be procured at any of the glass or photographic warehouses. There are three qualities, distinguished thus:—"Ordinary," which is very green in colour; "best," which is lighter; and "white," which is nearly colourless. Now, if thin negatives be made, or negatives of a non-actinic colour, the first will answer all your requirements, as it does mine, comes cheaper, is not so liable to change by exposure to light, and will enable the operator to get great softness and aerial effect in his finished productions. The greener the glass the thinner may be the deposit of silver in the film. Thus we need to know what material we are going to work with before passing on to the collodion.

Having got the glass, we must now prepare it for the reception of the film; and here I would suggest that those who really desire to succeed always, and preserve uniformity in their work, should personally carry out the directions here laid down, not leaving them, as is often the case, to boys and others who are not going to use them, and don't care. The proverb, "if you want a thing done well, do it yourself," applies here. When you are perfectly *au fait*, then you can instruct others; but even then you will find they need a great deal of looking after.

First, then, you must with a file roughen the edges of the plates or they will cut your fingers; next, lay the plate on some level place, and with a piece of wood, such as a straight edge and a scythe stone (easily procurable at an ironmonger's), rule a line along each side of the glass on one side, about three-sixteenths of an inch in depth. This is to prevent the collodion slipping away from the edges, because you might give a little too short an exposure, and then in your eagerness to save the picture which has cost you much time and trouble you push your development in order to get intensity, and thereby you make your film rotten and liable to split, especially at the edges.

Next, place the plates in a solution of nitric acid and water, about equal parts. This is to remove all grease, for in the warehouses they use soap to mark the glass with. After lying in this for an hour or so, remove singly, and well wash the plates on both sides under a tap, drying them with a linen cloth, when place in a plate box till required.

Before proceeding on a trip sort out as many plates as you may consider you will need, and pack them in a padded case, made for this express purpose and procurable at any of the warehouses. Between each place a piece of clean demy paper *exactly* (and this is important) the size of the plate; if it be smaller (as you often find only a small slip placed between plates), or, if newspapers or printed paper be used, they will be found to have impressed on either surface a mark of such paper extremely difficult to remove, and which, if used even after vigorous cleaning, will often form a line or mark in the finished negative which will be sure to print.

Packed, as I have stated, in the padded case, the plates will take no harm, even if kept in it for years. When required for use, remove just the number you need, taking care of the paper, as it will be of use in packing the negatives when finished. Placing each plate on a board covered with velvet, with a strip of wood moving from one end so as to catch the lower edge, which hold with your left hand, cover it with a few drops of a plate-cleaning solution composed of rouge, liquor ammonia, and spirits of wine. When dry, which will be in a few minutes, rub off briskly with a wash leather, which call No. 1; next give a good polish with a second leather, called No. 2, and wipe the edges from any solution which may have adhered; lastly, finish with a clean new leather, called No. 3.

If your hands or those of your assistant are liable to perspire freely, you must always perform this operation in kid or cotton gloves. At all times it is necessary to have duplicates of the leathers, and when they need washing it must be done in ammonia and water. The plates are now put into a plate box and locked, ready for the day's use. You work from this box into the draining box, which will be described under the head of "Manipulation," further on.

And now a few words on plates that have been used. When away from home, it is not at all times possible to procure nitric acid, and it is not agreeable stuff to carry with you in any quantity; therefore, I place such plates in a *hot* solution of common washing soda and water, which readily removes the films, even if varnished—the shorter time they remain in this the better; they are then soaked in plain water, hot; and lastly, receive frequent ablutions at a stream or river in preference to a pump, then carefully dried and cleaned, as before stated. If they should happen to be negatives that have been printed from, and much exposed to the light in conjunction with silver paper, the side not covered with film is scratched with a diamond on one edge before being cleaned, that side being the one to be used for making the negative in the future.

The cleaning board tests the flatness of the glass before being used, for great pressure can be put upon it in cleaning. By having all plates of even thickness, you can have no inconvenience in putting them into the boxes; and if, when roughing them, care be taken that they are the exact length and width—casting out any that are not so—you will have no difficulty with the plate-holder, for it is of as much importance that you should work smoothly and evenly when manipulating as that all your chemicals should be in good order. Thus you will always be able to "dwell upon pleasant things" by a little forethought and attention to these apparently trivial matters.

The shorter the time the plate is allowed to remain in the soda solution when cleaning dirty plates the better, because it exercises an influence on the surface of some kinds of plate glass, which only very careful cleaning will remove, and sometimes not even then—which would, in the case of an exposure of some length in an interior, split up the film and cause serious inconvenience. Such sometimes occur in patches on plates, and are at all times readily discernible by their reflecting the prismatic colours from the bare glass.

WM. HARDING WARNER.

(To be concluded in our next.)

Contemporary Press.

OLLA PODRIDA.

[HUMPHREY'S JOURNAL.]

HAVING written the following details of my experience, and thinking that they would be useful, or at least interesting, to the readers of a photographic journal, I concluded it would be best to give them in one paper instead of contributing them separately from time to time. When one contributes an idea or suggestion or the results of an experiment upon one thing belonging to a certain branch of the art, he for the time only writes for certain readers, or rather his contribution is of more value to some; for we know that everything connected with the art is of interest to the intelligent photographer. An article, therefore, treating on a mixture of subjects is of more value, at any rate in a journalistic point of view.

VARNISHING NEGATIVES.

The best varnish I ever used for negatives is that made by the following formula:—

Best white lac..	4 ounces.
Methylated spirit or patent alcohol..............	30 ,,

Let it dissolve near a stove with occasional shaking; when dissolved, filter. I have no doubt that the formula is well known to American photographers. The subject of varnishing negatives is pretty well studied by every votary of the art. I, therefore, fear I have little new to offer, excepting this: it is said, and it is written, that a negative should be *warmed* before applying this varnish. Now, in my experience, I have found that the reverse is the best, *i.e.*, the negatives should not be heated, and the varnish should be applied when *cool*.

In applying varnish to a warmed negative it is apt to flow in streaks, and veins are produced, especially if the collodion film is uneven or jagged round the edges of the plate. When such is the case with a heated negative the ridges and streaks cannot be obviated, as the varnish immediately begins to harden. Should a negative be too warm the difficulty of procuring an even coating is increased, the varnish not flowing smooth and oily, but as it were in fits and starts. When varnish is applied to a cold negative it flows easily, and should any ridges or veins be formed they can be got rid off by simply turning the plate round and letting the varnish drain from another corner. The varnished side should not be held to the stove or fire. If one has anything like a fire or any amount of heat in a stove, the varnish will not become chilled. I do think that a more smooth and glossy surface is obtained by this method of applying the varnish than the other. I have heard of a photographer who varnishes his negatives when cold, and allows them to stand until he has finished varnishing his day's work; as a matter of course they become what we termed "chilled" the coating of varnish being opaque, but by holding them to a good fire or stove for a short time the coating becomes brilliant and clear.

A METHOD OF PREPARING GELATINISED PAPER FOR PHOTOLITHOGRAPHIC TRANSFERS, CARBON PRINTING, &c.

This method is new. I have not heard of it before, and doubtless it is one which may be of service. Coat evenly a sheet of glass with a *thin* solution of Drummond's hydrocarbon varnish with a flat camel's-hair brush; when dry, level the plate and pour on the warm gelatine solution—the quantity, of course, regulated by the size of the sheet of glass or the thickness of the film of gelatine required. Now, carefully avoiding air-bubbles, lay on the gelatine a sheet of damp paper. The proper kind of paper is determined by experience and the purpose for which it may afterwards be used. When the gelatine is set, by turning a knife round the edges between the gelatine and glass, the paper, with a little care, can be detached with the gelatine and coating of varnish adhering, hung up by clips to dry, and when dry the varnish can be very easily rubbed off the surface of the gelatine by gentle friction by the hand or a piece of India-rubber. This process requires a little practice to succeed perfectly.

It possesses some advantages:—1. For carbon "tissue." Supposing the warm gelatine solution to contain pigment of any kind, when poured on the sheet of glass a small portion of the pigment would sink to the bottom (*i.e.*, the surface of the glass) before the gelatine became solidified; consequently the greatest quantity of pigment would be on the printing surface of the "tissue" when dry. Those who are acquainted with carbon printing will readily understand me.

2. The above method possesses the following advantage:—The layer of gelatine with paper can be detached as *soon as it is solidified;* thus the plate can be cleaned, revarnished, &c., &c.

The method employed for gelatinising French coloured lithographic prints and paper for fancy boxes is similar to the above. A sheet of glass is treated with ox-gall, followed by gelatine and paper as described; but they cannot be removed from the glass until the gelatine is dry, which takes some time. The coating of varnish recommended by me does not give such a glossy surface as the French method, but quite smooth enough for carbon tissue and photolithographic transfers.

PORCELAIN PICTURES.

American photographers decidedly excel in this department of photography. Many operators mix up their collodio-chloride only when required, which is not very convenient. As I cannot give a better formula than one they already possess, I would simply beg to suggest that it would be found much more convenient and economical to prepare the collodio-chloride in two or three separate solutions, and mix them when wanted for use; this could be done without departing from any formula. I think it would be found beneficial in practice. I would also suggest coating the plates with gelatine instead of albumen, which is generally employed (I should say for plain opal glass, not ground). The results are more brilliant and take a better tone. After washing the plates under a tap, flow over the following, and dry before coating with collodio-chloride:—

Cox's gelatine	12	drachms.
Loaf sugar	6	,,
Water	2	ounces.

PICTURES ON WHITE WAX.

The employment of white wax in photography can be dated from the days of the calotype, if not earlier. It has been used in a hundred different ways with more or less success in the various branches of the art. Pictures have been made on, and transferred to, nearly everything available; but pictures upon white wax I have never heard of—perhaps for a good reason, the perishableness, if I may use such a term, of the material. One might as well think of printing a picture upon compressed snow as white wax. Yet portraits upon white wax are certainly very beautiful. An hour spent in the experiment of printing a picture thereon is not without interest either to the amateur or the commercial devotee.

Melt white wax in a clean porcelain cup; flow over a level glass plate; when cold, coat with albumen or gelatine, then collodio-chloride; print, wash, tone and fix as usual; after which remove with a knife the wax from the sheet of glass, and, dear reader, you will be pleased with the result, and no doubt begin to expatiate upon the delicacy of half-tone, &c., &c. If the wax has a yellow tint the picture resembles a photograph upon ivory, and is, if anything, much better. Various pleasing effects can be produced by placing at the back of the wax pieces of tinted paper, the effects varying with the thickness of the wax. I wonder whether such pictures could be rendered available in commercial photography, if got up in neat cases. Ah! I wonder! For if the sun, on a hot summer's day, shone through the parlour window upon a case containing such a picture, if it stood upon the table—or if Fred pushed the table near the stove while he rehearsed the latest waltz with Virginia—the picture would melt and thaw itself into a dew, I fear. Yet, wax stands a high temperature, after all. DAVID DUNCAN.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 9th	Society of London	9, Conduit-street.
,, 11th	South London	City of London College.
,, 11th	Manchester	Memorial Hall, Albert-square.
,, 11th	Pho. Sec. Lit. & Ph. Soc., Man.	Rooms, 36, George-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Tuesday, the 23rd ult.,—Mr. O. R. Green, President, occupying the chair.

The minutes of the former meeting were read and passed, with the added note that a second print of Mr. Green's picture of *Pont-y-Pair*, size 24 × 18, had been awarded to Mr. Henderson for the year's work, his productions being so nearly equal to those which obtained the first prize.

The CHAIRMAN then made the following remarks:—Before commencing the business of this evening I will detain you with a few remarks, such as I would have made at our last meeting had I known that our esteemed late President was so soon to vacate the chair, and that I should then be called upon to fill that post of honour. At the present time, when we look at kindred societies, and consider the mercantile convulsions of the last few years, it must be a great satisfaction to all of us to find that our Association is in such a prosperous condition, both financially and numerically. As a provincial amateur association we have every reason to be satisfied with our position, and we may, I am sure, look back upon our past career with pleasure. Few arts have excited such interest since its discovery as photography; but, although it has done wonders, and conduced much to the happiness of the human race in every civilised country on the globe—and no individual could now do full justice to the aid it renders to the arts, sciences, and manufactures—yet its past history will doubtless be eclipsed by its future glory. Like the microscope, it will probably be instrumental in opening up new worlds to our finite senses, and be applied in ways and to uses not yet dreamt of. At our last meeting you saw photographs of the waves produced by sound exhibited by Mr. Skaife; and when we read in Professor Tyndall's work on *Heat*, that gas flames burning in glass tubes are made to dance and sing in harmony with the human voice, it does not seem beyond the region of possibility that photography may be able to fix both the sounds of music and the human voice. A few days since one of our members, Mr. Hayes, informed me of a new commercial adaptation of its powers in producing designs on glass, to be corroded by fluoric acid, by which means designs and pictures are produced in frosted glass more beautiful than anything hitherto done by the old and tedious manual processes. I am glad he has left some specimens this evening for our inspection. It is the object of this Association, be it remembered, to improve the many processes of this fascinating and useful art; also, to find new fields for its application. How best to further these objects should be our study, and it is desirable to bear in mind that the more fellow-labourers we have the greater will be our progress and the pleasures derived therefrom. Therefore, I take the liberty of reminding you that it is not desirable that we should be satisfied with keeping the flame burning by experimenting ourselves, but we should at the same time be photo-propagandists, and zealously endeavour to make converts. Of late years processes have been greatly simplified, and results rendered more certain; and, thanks to the energy of some of the members of our Association, landscape photography is no longer the dirty, disagreeable, black work which formerly deterred many from persevering in it, hundreds of beautiful negatives having been produced last year by our members without the slightest trace of free nitrate of silver or any other chemical which could stain the hands. If this stride were more known, numbers of gentlemen, and probably ladies, would find pleasure and recreation in the pursuit. Further improvements are destined to be made. With a view of giving a stimulus to that end, it has occurred to me that as our Treasurer has some gold to our credit, we might use a little of it to tone the next season's work by announcing a few prizes to be awarded at the last meeting of the year, which will be on the last Tuesday in November. If you approve of the proposal, we will discuss the subject if there be time later on in the evening; if not, at our next meeting. I will merely name a few objects for which prizes might be awarded, namely,—The best stereoscopic photograph by a member of the Association who has not worked more than three years at the art; the best twelve stereoscopic views of the streets of Liverpool; the best twelve stereoscopic views of the ecclesiastical architecture of Liverpool; the best twelve stereoscopic views of the docks and river; the best twelve stereoscopic views of public buildings and office architecture; the best six stereoscopic views of the river or coast during a breeze; the best six enlargements of microscopic objects; the best enlargement from stereoscopic size to 10 × 12; the best photograph in enamel; the best year's work; the best photograph in natural colours which will bear exposure to daylight without change.

At a later period of the evening it was resolved, on the motion of Mr. Cook, seconded by Mr. Mawdsley, that notice be given in the next circular that Mr. Green's suggestions in reference to prizes be discussed.

The Treasurer's report was next read, the accounts having been duly audited by Mr. Wilson and Mr. Johnson. There was a balance in hand of a satisfactory character after paying all expenses.

On the motion of Mr. Wilson, seconded by Mr. Hughes, a vote of thanks was unanimously passed to the Library and Museum Committee for the use of the room during the past year.

The following objects of interest were exhibited:—

By Mr. J. A. Forrest: A number of pictures on glass by Mr. Young's process, produced by means of fluoric acid, after taking the picture from a negative, on a stratum of bitumen of Judea.

By Mr. Mawdsley: Three stereo. negatives exposed and developed on the day of the meeting, one of which was on a plate prepared from collodio-bromide sensitised two months before, the same half-ounce of developer being used for all.

By Mr. Murray: Two *cartes* of Sir Charles Slingsby, by Mr. Holroyd, of Harrogate.

By Mr. Guyton: A plate-box of a novel kind, intended for one or two dozen wet or dry plates. The front was hinged, and springs were placed to prevent the plates from moving when carried, V-shaped grooves reducing the risk of tearing the films.

Mr. Guyton also exhibited ten photographs of clouds, taken by Mr. Sampson, of Southport.

On the motion of Mr. Cook, seconded by Mr. Watling, it was resolved that the presentation print for 1869 be selected and ordered before the end of July.

Mr. Hubback presented a handsome question box to the Association, as promised at a former meeting.

A vote of thanks was given to the exhibitors.

Mr. Wilson gave a short account of the recent *soirée* in Manchester, which he had visited with some other members, and been very cordially received. There was a beautiful and extensive collection of photographs, the contributions from Liverpool taking very satisfactory comparative rank, especially the large pictures by Mr. Green.

Mr. Green expressed a wish that the competitors for prizes at the last meeting would give members another opportunity of examining their productions, as in the midst of the business they had been imperfectly seen.

The following members were balloted for and unanimously elected :—Mr. G. H. Webb, Mr. J. G. White, Mr. E. L. Williams, Jun., and Mr. William Henderson.

The paper of the evening, *On the Cleaning and Preparation of Glass for Dry-plate Work* [see page 109], being the first of a series by various members on the collodio-bromide process, was then read by Mr. E. Phipps. This gave rise to a short discussion on the influence of the albumen substratum on the latent image; and a vote of thanks was subsequently pssed to Mr. Phipps on the motion of Mr. Wilson, seconded by the Rev. T. B. Banner—shortly after which the meeting separated.

MANCHESTER PHOTOGRAPHIC SOCIETY.—SOIREE AND EXHIBITION.

On the evening of Monday, the 15th ult., the fourth annual *soirée* of the Manchester Photographic Society was held in the large room of the Memorial Hall, Albert-square.

The room itself, which is capable of seating comfortably some 600 persons, has recently been decorated in a quiet and elegant manner for their own purposes by the Unitarians of Manchester, to whom the Hall belongs; and it is difficult to conceive of a room being more suitable for such an exhibition as that of the Manchester Photographic Society. Nearly five hundred photographs of almost every size were exhibited.

Taking a turn round the room, and commencing on the right hand side of the main fireplace, attention was attracted by a number of beautiful *carte-de-visite* vignettes of ladies, apparently belonging to the theatrical profession, photographed by Fritz Luckhardt, B. Klierneck, and Frans Eichens.

A number of 16 x 12 and 12 x 10 figure subjects, by Mr. H. P. Robinson, in his well-known style, caught the eye, together with some capital facial expressions of children, by Mr. O. G. Rejlander, a large number of whose excellent photographs were shown in various parts of the room.

Some collodio-bromide pictures of merit, serving admirably to show how much can be done in photography without the use of the silver bath, were exhibited by Mr. Atkins and Mr. O. R. Green, the latter of whom contributed a considerable number of pictures, amongst them being one or two of very large size and of some merit.

A few steps further on were some very successful enlargements in carbon, in size 16 x 12 and 12 x 10, which had been produced from negatives 2½ x 2. It was stated on them that the camera used was by Murray and Heath, and the printing by Edwards's process, the name of the manipulator not being given.

Next in order came a number of views by Mr. England, illustrative of scenery on the Rhine. The character of Mr. England's work is so familiar to the photographic world that it is unnecessary to say that his contributions were very excellent.

Some of the collodio-albumen landscape photographs of Mr. George Wardley were the next to attract attention. This gentleman's pictures are generally thoroughly up to the mark, and were quite unsurpassed by any dry-plate productions in the room. The *Banquetting Hall, Conway Castle* (18 x 14), a very soft, beautifully-detailed, and withal forcible picture, together with other views of the same size of Conway, and a panoramic view in polygonal perspective, were deservedly admired, and reflected much credit on Mr. Wardley.

Mr. Henderson also showed some good collodio-bromide stereo. pictures, as well as a case of enamels, which latter were very interesting, as also were some exhibited by Mr. Dancer. The productions in this line are still not equal to the enamels of M. Camarsac which were exhibited in Manchester last year.

Mr. Vernon Heath, whose Frogmore pictures came next in order (one of which possesses much merit), exhibited his well-known picture of the *Cottage Porch*, and some 10 x 8 views *On the Thames*, most of which were inferior to provincial work, and some of which would have been rendered vastly more meritorious by the use of the scissors.

A couple of 12 x 10 portraits and two or three *cartes* were exhibited by Mr. Warwick Brookes, of Manchester. The negative of one at all events of the 12 x 10 prints had been obviously stippled; but both prints were of a high standard of excellence, particularly that of the girl, whose sweet face, good pose, and excellent lighting make it an attractive picture.

Some pictures 8 x 6, by Mr. Notman, of Canada, though apparently much admired, did not, with one or two exceptions, justify the praise which has been lavishly bestowed upon them.

An enlarged print, from a negative by Mr. Kennerley, of Llandudno, was an admirable example of the success which has been met with in the instantaneous photographing of the sea waves.

Next came some very good 10 x 8 pictures by Mr. Underwood, amongst them another photograph of the *Banquetting Hall, Conway Castle*, which was a very effective picture. A number of large heads from 12 x 10 negatives, by Mr. A. F. Lafosse, of Manchester, were really excellent specimens of photography in the lighting, the pose, and the general execution. These were understood to be entirely untouched.

The crowning picture of the Exhibition was *Preparing for Dinner*, by Mr. Hubbard. It is a marvellous composition, a work of very unusual artistic merit, and a gem of photography, as were also two cabinet pictures by the same gentleman, viz., *Pensive Thoughts* and *The Toilet*.

Next came some 10 x 8 pictures by Mr. Wane, of Douglas, Isle of Man. They were wonderfully round and well modelled, and proved very attractive pictures. It was believed that in this instance both negatives and prints were to some extent retouched, which, when judiciously done, is surely a legitimate operation.

Some very good pictures were sent by Mr. Coote, a Manchester amateur.

Messrs. Jackson, of Oldham, exhibited a large number of landscape pictures—some of fair merit.

Next came some good *carte* pictures by Messrs. Bullock Bros., and others by Mr. Sampson, of Southport, who exhibited most excellent cloud and wave studies, and an untouched enlargement of small size, which was unusually meritorious.

Further on were some more examples of Edwards's carbon process, all of which were very good, those on coloured grounds being particularly effective. The remark made upon these pictures, relative to the cost of their production, was in somewhat questionable taste, but the pictures certainly were very superior examples of a style of printing which ought to be cultivated.

Next came a number of magnificent 12 x 10 landscapes by Mr. Francis Bedford—amongst them views of *Kenilworth Castle, An English Homestead, The Colonnade of the Temple of Isis, Bridge on the Luddr*, &c. After which came an excellent 10 x 8 picture of *Melrose Abbey*, by Mr. R. Mitchell, of Bolton, and some of Mr. Blanchard's well-known work.

A number of very fine carbon prints were shown by the Autotype Company. They were from negatives by Mr. H. P. Robinson. There were also two or three excellent 16 x 12 landscapes, with admirable clouds, upon which no name was written, but which were accredited to Mr. Cherrill.

Next were hung some excellent 17 x 13 collodio-albumen landscapes by Mr. Sanderson, of Manchester, which, unfortunately, were all hung in a defective light on the day following the *soirée*.

On one of the tables there were a number of nice, well-modelled whole-plate pictures by Mr. Samuel Fry, apparently in imitation of those of M. Adam-Salomon, and near to them were some very excellent transparencies by Mr. Walter Woodbury's relief process, which were mounted in a very proper manner for exhibition.

Mr. Wade (a Manchester amateur) exhibited a stereoscope and transparencies, amongst which latter there were great variations of depth and tone, but some were very well printed.

A number of transparencies by Ferrier were exhibited by Mr. R. Hampson, who also had provided some specimens of photographic chemicals.

There were also several photographic landscapes painted in oil, in an effective manner, by Mr. John Holding, of Manchester, and some very good *carte* pictures from stippled negatives, by Mr. Joseph Wake, also a local artist.

Such is a brief description of what was in the large room. The attendance was very crowded. The visitors "circulated" in the hall and in the committee room down stairs, where a number of microscopes, stereoscopes, &c., were placed for their entertainment.

During the evening, Mr. Okell (a member of the Society) performed a number of striking experiments with a fine selection of very powerful electrical apparatus placed upon a raised table. Some of these experiments were performed with the gaslights burning, and others with the lights turned down. Taking advantage of an interval—

The President (the Rev. Canon Beechey) addressed the meeting. He said that the Society had great reason to congratulate itself upon the progress that had been made in photographic art during the past year. The members of their Society had increased, so as to bring the number up to 106. No great discovery had been made since the last Exhibition; but the year had been marked by a healthy, gradual, and continued growth of science and art together in photography. There was scarcely a mediocre picture in the Exhibition. All were really good productions, and many of them productions of the highest excellence, showing that photographers paid much more attention to the realisation of artistic effect than to mere copying, with which the art originated. Two classes of pictures which they had last year in perfection were not to be seen this year. He spoke of Mr. Woodbury's beautiful work and Mr. Swan's process. By those processes, photographs were perpetuated by means of engraving. It was not for him to say which of them would ultimately attain pre-eminence, but both were worthy of being pursued. Speaking of the art-union which has been established this year in connection with the Society, he said that Manchester had taken the initiative in bringing forth a photographic art-union. He said that it ought to be mentioned that the prizes would all be selected from the works of gentlemen who were not members of the Society.

After the President's address, Mr. Okell continued his electrical experiments, which were succeeded by a lantern exhibition of transparencies by members of the Society and others. Most of the pictures shown upon the screen were beautiful examples of photography and transparency printing. The lanterns, which were an excellent and well-arranged pair, were worked by Messrs. Chadwick, Jun., and M. Noton.

The entire arrangements and management of an affair like this *soirée* can seldom be expected to be what Burns would call "fair without a flaw;" nor was it so in this instance, the descriptive part of the lantern entertainment being exceedingly defective. Picture after picture was shown in reference to which only the name of the subject was given, and to the oft-repeated question "by whom?" from the audience, "no name" came as frequently in reply! Other pictures were passed by without either name of subject or producer being given. The defective management of this particular department was an exaggeration of the bad management by which it was characterised last year, and calls loudly for reform, as the interest attaching to the picture is vastly increased by a knowledge of the place represented and the person "by whom" the photograph was produced. The lack of description was also greatly felt during the electrical experiments by Mr. Okell, who spoke only a few words from time to time in answer to such questions as "can't you tell us something about it?" The experiments themselves were performed in a very efficient manner, and would alone have formed an excellent evening's entertainment had they been accompanied by a proper description.

In the Polytechnic Institution of London, at intervals during the evening, a loud voice calls out to the assembly informing them what is about to take place, and where. Had the presidential voice been more frequently heard during the evening in a similar manner, the order and interest of the meeting would have been increased. However, notwithstanding the drawbacks mentioned, the *soirée* of the Manchester Photographic Society was eminently successful.

[The foregoing report has been prepared by our contributor, Mr. D. Winstanley, at the request of the Society interested.—EDS.]

EDINBURGH PHOTOGRAPHIC SOCIETY.

A POPULAR meeting of this Society (being the third of the session) was held on Wednesday evening, the 24th ult., for the purpose of exhibiting the pictures prepared by Mr. Samuel Highley, of London, for the Russian Government.

The exhibition passed off very successfully, and was highly appreciated by the unusually large audience, which must have numbered upwards of 600 persons.

Mr. JOHN NICOL introduced the lecturer, Dr. Robson, and, in so doing, explained why these pictures were being exhibited instead of the series which had been intended and prepared for the evening.

Dr. Robson then gave a short but highly-instructive lecture on early history, and described the various subjects as they were exhibited.

The great excellence of many of the pictures was very pleasing to the audience, who showed their appreciation by occasional applause. At the close of the exhibition,

Mr. WILLIAM NEILSON, in a few well-chosen remarks, thanked Dr. Robson for his lecture, and moved that a vote of thanks be also conveyed to Mr. Highley for the prompt manner in which he had acceded to the Society's wishes.

The meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A MEETING of this Society was held on the 10th ult.,—M. Teisseire in the chair.

After the minutes of the previous meeting had been read and confirmed,

The Secretary laid upon the table—first, a number of the journal *La Liberte*, containing some writings of M. Paul de St. Victor on the original drawings of the great masters, reproduced by the carbon photographs of M. Adolphus Braun, of Dornach; secondly, the second number of the *Rayon Bleu;* and thirdly, a catalogue of the photographic furniture of the house of M. Romain Talbot. He then read a letter from Dr. Liesegang, accompanying his note explanatory of the papyroxyline, which latter was read with the greatest interest, and ordered to be entered in the minutes of the Society *in extenso*. Dr. Liesegang was careful in stating that he was not treating upon a new product. The employment of the paper powder had been frequently tried or recommended, but he stated that the results of his experiments (which he does well to publish) show that the papyroxyline can be made to give, in a manner to be relied upon, collodions of a better consistency, less streaked, or not at all so, and, further, that it had the advantage of being soluble in equal proportions of ether and alcohol, and possessed the greatest sensitiveness. The note concluded by showing how the papyroxyline could be employed with collodio-bromide of silver.

The CHAIRMAN thanked Dr. Liesegang in the name of the Society, and invited the members to utilise the valuable instructions contained in his note. As soon as the samples should arrive they would be distributed amongst the members, in order that they might verify in practice the assertions of the author.

A letter was then read from M. Marion, stating that in patenting the Marion carbon process, or transfer of positive impressions by means of the pellicle, he had no intention of benefitting by a monopoly, but that he had done it in order to establish his priority as the author of the process; and he took that opportunity of renouncing the French patent, now that his right had been recognised without any reclamation, as he had already done with regard to the English patent. He expressed his obligation to M. Jeanrenaud for his persevering and successful efforts in bringing the process into such a practical condition, wherein he had displayed so much skill and disinterestedness.

A resolution was passed thanking M. Marion, in the name of photographic art, for this liberal declaration on his part.

M. Marion's letter was accompanied by some sheets of chlorided mica paper—a product recently introduced by the house of Marion—together with several proofs made with this paper, and the *sel Encausse*, which had served to strengthen them. They were also accompanied by special directions.

Sheets of the paper were distributed amongst the members present, and M. L. Vidal undertook to make a trial of the *sel Encausse*, and give an account of it at the next meeting of the Society.

A second letter from M. Marion was read, in which he gave the results of further experiments in detaching and returning the *clichés* on the pellicles. The following are the means by which he succeeded best:—

Place the pellicle in a basin, the bottom of which is entirely covered with varnish, and, while keeping the vehicle in motion, cover the pellicle with the liquid; take it up by the two top corners, and, after it has been allowed to drain, place the *cliché* upon it, taking care to avoid air-bubbles; allow the varnish to take effect, and, at the end of fifteen or twenty minutes, take it by one corner, which must be allowed to reach beyond the glass, and gently draw the pellicle, looking well to see that there be not too much resistance; continue to draw and detach the pellicle, which will bring with it the image abandoned by the glass. Then sponge it between two sheets of blotting-paper and allow it to dry. This operation is performed quickly and readily with all the *clichés* that are fixed with hyposulphite, but not so those which are fixed by cyanide of potassium, which absolutely rebel against being detached.

The varnish plunged fresh into water will have bleached, and the *cliché* will have taken an opaque aspect, but this will disappear on its being immersed in alcohol and hung up to dry.

Thick pellicles should be used as far as possible, for then the operation is much easier on account of their firmness. The specimens of pellicular *clichés* forwarded by M. Marion were double the thickness of the ordinary pellicles, and, consequently, much more expensive.

M. VIDAL called the attention of his colleagues to the great importance of these new experiments made by M. Marion at a time when the carbon process was being so continually improved. By the transfer upon the pellicle there was the possibility of printing *clichés* from both sides, and, thanks to this medium, in certain carbon processes of printing a double transfer would be avoided, and the carbon-printed proofs could also be obtained in their true sense, without penetrating the thickness of the paper. He (M. Vidal) laid before the meeting some positive proofs printed by M. Marion with pellicular *clichés*, which demonstrated their capability in the sense he had endeavoured to explain. He hoped that they would be able to obtain pellicles cheaper, in order that their employment might become more general.

M. PRICHARD asked whether these pellicles could be preserved without deterioration, to which no reply could be given.

It was stated that, as alterations had already been observed in sensitive beds of collodion, it was natural to infer that the pellicular *clichés* would be liable to decompose slowly, and it was desirable to solicit the attention of M. Marion to this important point.

M. VIDAL said he most feared the action of light. M. Poitevin had already demonstrated that collodion was impressionable by light. Might not this action be brought to bear on the pellicular *clichés?* But, in the meantime, as these foreseen alterations could only be very slow indeed, a very good business might be done in them. The inconvenience, if it existed, would be remedied; and, under any circumstances, the advantages of this system largely compensated for whatever there might be in it that was defective.

After a long discussion, in which MM. Prichard, Pellissier, Jacquemet, and Teisseire took part, on the manufacture of dry plates, the quality of varnish to employ, and the time for which they can be preserved, the meeting separated.

Correspondence.

Foreign.

Philadelphia, February 14, 1869.

THE experiments, published editorially, on the *Action of Silver Solutions upon Albumen*, in your Journal for 29th January, have just reached me. They are unaccompanied by comments; they suggest, however, the following reflections:—

According to these results the capacity of silver solutions to coagulate albumen appears to depend upon the presence of nitric acid, for the only case in which coagulation was not produced was also the only case in

which no nitric acid was present (solution of silver oxide in caustic ammonia). Nitric acid we know to be a powerful coagulator of albumen; it is the favourite reagent used for testing for that substance, so that this result is at least not in discordance with what we might expect *à priori.*

It is evident that a solution of silver oxide in ammonia might have some advantage as a sensitiser for positive printing; it could, however, be used only on plain paper, unless special arrangements were made to protect the albumen surface from dissolving in the bath, as, according to the experiments you have made, it should do.

A curious experiment suggests itself in this connection. Suppose paper were covered with albumen not salted, were then allowed to float upon a solution of very dilute chlorhydric acid, and then, after blotting off, were immediately sensitised on the solution of oxide of silver in ammonia: here the chlorhydric acid would coagulate the albumen, and at the same time furnish the means of precipitating chloride of silver in the film. It is possible (though of course impossible to predict with accuracy) that such sensitive paper would be very sensitive, and would lose nothing in the fixing. Prints so made might also be less susceptible of fading. If I mistake not, Blanquart-Evrard used hydrochloric acid for preparing his paper previous to sensitising, although in connection with an entirely different set of manipulations.

There is great room for experiment in connection with the positive silver process, especially when we consider that at least 95 per cent. of the silver disappears from the finished print.

Some years ago Liesegang published an interesting process, to which, as it did not secure adoption, there is, I suppose, some objection. But it was curious in this respect—silver was dispensed with altogether, and the prints were obtained ready gold-toned. This was certainly a capital step. The process was briefly thus:—A compound of uranium and ammonia was obtained by precipitating a uranium salt with ammonia. This precipitate was dissolved in citric acid, chloride of gold was added, and paper was prepared with the mixture. The light reduced the gold through the direct intervention of the uranium salt.

As regards photographic positives we are now falling into a rut. Everybody prints, or tries to print, in the same way. Year by year the taste in photographic printing (*not* in negative making, fortunately) is becoming more and more conventional.

I have myself at times spent a good deal of time in trying for some easy and satisfactory mode of plain paper printing for landscapes, if it were only for a variety; but I have so far found nothing satisfactory.

I notice Mr. Winstanley's communication in connection with Mr. McLachlan's remark as to the solubility of exposed iodide of silver in nitric acid. I published, several years back, the facts of this matter, which were then new. When iodide of silver is darkened by the sun acting in the presence of nitrate of silver or of organic matter suitable, it is converted into a subiodide. Nitric acid decomposes this dark-coloured substance, dissolving out just so much silver that the residue is sufficient, with the iodine present, to reproduce normal yellow iodide of silver. Thus the dark substance produced under the action of the sun's rays returns by the action of nitric acid to its original condition, and the acid, when tested with a chloride, gives evidence of having silver in solution. This would have been the right test to apply to Mr. Winstanley's experiments, not the heating on platinum foil, which by a residue left only indicates inorganic matter, and not its nature.

To return for a moment to positive printing: if anyone will invent a method of carbon printing which, by working *through* the paper and without transfers, will give fine pictures, good enough for adoption into regular photographic use, such an inventor ought to have a liberal donation from the Governments of all nations who use photography. Some time back I succeeded in carbon printing on glass without transfers, by using reflected sunlight, which enabled me to expose *through* the glass, and got the distinct traces in the head of a small portrait. But paper, not glass, is what is wanted as a support.

My attention has been called to an article published by Mr. Dawson, in one of your contemporaries, and directed at a paper written by me on the subject of *intense pyroxyline.* I shall endeavour, in briefly answering these remarks, to avoid their manner and confine myself to the subject itself.

I stated, I think quite clearly, that the conditions indicated in Hardwich's book as those necessary for obtaining an intense pyroxyline, would not lead to its production.

Mr. Dawson, defending Hardwich's manual, answers that the cause that the manufacturer, of whose experiments I spoke, did not obtain an intense cotton was that *water was omitted.*

Had he turned to the page which I cited in Hardwich—a citation which even appears in the extract which he makes of my words—he would have seen that Hardwich says:—"It is found that a high temperature increases the intensity of collodion, whereas a *dilution of the acids lessens it.*"—(7 Ed. page 349.)

That is, Mr. Dawson, assuming to speak for Hardwich, affirms that the reason that the formula in question did not yield an intense cotton was because no water was added; whereas Hardwich expressly says, as above, that water in the acids lessens the intensity.

It will be observed that there is no question about the actual facts. Mr. Dawson admits that the statements I made as to results are correct, but he desires to prove that the position taken in Hardwich's seventh edition, which he edited, are in accordance with the facts, which they undoubtedly are not. It is true that Mr. Hardwich directs that a small quantity of water shall be added; but it was found that in operating at so high a temperature the smallest addition of water caused solution and entire loss. Now, Hardwich especially mentions that if *solution take place the acids must be used stronger;* so that the spirit of Hardwich's directions was exactly followed, and his views proved to be untenable. I came to this conclusion reluctantly, having always liked Hardwich's writing and his fair and candid spirit, and having fully appreciated his great services to photography.

To sum up, then: Hardwich's idea was that the intensity of the resulting pyroxyline is directly as the temperature and inversely as the dilution (see seventh edition, 235, 349), and this is not in accordance with the facts.

I am glad to see that, on the page following that above referred to in the publication to which I have alluded, Mr. Dawson agrees with me entirely on another subject, having used my arguments and experiments in combating Mr. Sutton's hypothesis. It might have been well, perhaps, to have cited me as the author of those facts and experiments; but that is, after all, of little consequence.

I take this opportunity of answering another matter which I passed over as scarcely worthy of notice at the time. Mr. Dawson stated, some months back, that, having tried my formula for collodio-bromide, he found it impossible to get the mixture over the plate. A distinguished Continental photographer writes to me that he is surprised to see this statement, as he has used my formula and found no difficulty whatever. Mr. Dawson's failure can only have arisen either from careless manipulation or, more probably, from the use of bad and unsuitable pyroxyline. If that which he used, then, was prepared according to the principles laid down in Hardwich, it would, of course, have been impossible for him to succeed; and I do not wonder that he finds himself obliged to reduce the proportion of pyroxyline to three grains to the ounce. A really good pyroxyline works easily up to six or seven grains, and none that will not is fit for use. The solidity of the film, its sensitiveness, and the detail in the shadows require a full supply of pyroxyline, just as in the wet. Nor is this in the least surprising; on the contrary, the dry collodio-bromide film, developed with alkali, contains the whole image *within* the film, instead of being, to a large extent, *upon* it, as in the wet process. As M. Constant remarks, a good collodio-bromide alkaline plate scarcely needs varnishing. Mine may be forcibly rubbed with the palm of the hand over the whole surface and show no injury resulting.—Very truly yours, M. Carey Lea.

Paris, March 1, 1869.

We have dry collodion processes by means of coffee, eggs, beer, &c., and now we have one introduced to us in which tea is used. It will, perhaps, follow that the preparation of dry plates will be an after-tea amusement of amateurs and occupation of professionals. The process was communicated to the last meeting of the French Photographic Society, which your correspondent was unable to attend. M. Belbèze proposes the following manipulations for the tea process:—

1. Albumenising the plates, if they are to be prepared long before being used.
2. Use any good "wet" collodion.
3. Sensitise in a forty-grain bath, acidulated with two per cent. of acid.
4. Wash in filtered water slightly coloured with iodine.
5. Wash again in a dish of filtered water.
6. After draining, cover the plate with some of the following solution (in point of fact, strong tea):—

Water	10 ounces.
Tea	96 grains.

Make the tea by pouring the water boiling upon it. Very few persons know how to make good tea. They pour water that *has boiled* upon it, or what they call boiling water; but the water should be poured upon the tea from the tea kettle *whilst boiling*, and the kettle should therefore not be removed from the fire. Decant the photographic tea when ready, and add to the ten ounces, or to the quantity drained from the leaves, four drachms white sugar, and, when filtered, add half-an-ounce of spirits of wine.

7. Let the prepared tea plate dry in the dark. The exposure may vary from four to six minutes.
8. Develope with—

Water	5 ounces.
Gallic acid	24 grains.

Dissolve in warm water, and filter. To this add—

Glacial acetic acid	12 minims.
Alcohol	24 ,,

Develope in a flat dish, adding a few drops of the following silver solution, to bring out the image better:—

Water	5 ounces.
Nitrate of silver	72 grains.
Glacial acetic acid	72 minims.

If negatives of a blue tint are preferred to those of a black colour, the acetic acid should be replaced by citric acid. "Excess of exposure is not harmful—the development is more rapid." The beauty of the process is, according to M. Belbèze, that fogging is impossible. He has pushed the development of a negative till black without finding the least fogginess. This, if found so in the practice of others, will be a useful process.

MM. Geymet and Alker communicated a few fresh useful hints at the last meeting of the Photographic Society. They find that the formula for their "collodion" for the enamel process can be altered with advantage, by using glucose instead of gum. Glucose is grape sugar, and is met with in two forms—solid and liquid. The latter in the form of a thick syrup is much used in sweetening the fruit tarts, &c., which are sold by confectioners, and large quantities are said to be exported to England for this purpose. The formula now recommended for the preparation of sensitised enamel plates is—

Glucose	11 drachms.
Saturated solution of bichromate of ammonia.	72 minims.
Water	10 ounces.

This solution should be made several days in advance. The use of glucose enables the operator to place on the developed image as much enamel powder as he may desire, and *any colour* will "stick" well. MM. Geymet and Alker recommend that the plates should be held over a dish of steaming water, rather than that they should be breathed upon. By the use of glucose the production of vitro-enamels in two colours becomes very easy. The image is first brought out with the black powder, and then allowed to wait a few minutes. When the surface has become a little moist again, the developing operation is recommenced all over the plate with a powder of another colour. This second colour is lost in the deep blacks, but is very apparent in the lighter parts of the image and in the half-tones.

A practical application of vitro-enamel photography has recently come under my notice. As your readers are aware, Paris is a city of *cafés* and restaurants, and almost every one who goes to a *café* smokes while sipping his *demi tasse* or *petit verre.* Porcelain match-holders are upon nearly every table for the convenience of the customers when they require a light, and it is proposed to utilise these match-holders in the following way:—They are to be made with a number of escutcheons around them, and on these are the advertisements of any who like to pay at the rate of from fifty centimes upwards per escutcheon. The advertisements are burnt-in on the porcelain, and the letters and designs are reproduced by photography. I suppose the designs are drawn large, then reduced by the camera, and then transferred upon, and burnt into, the porcelain match holders. The idea appears to me grand in every way—both the photographic part of it and the advertising part—as it is generally a leisure time when people smoke cigars at the *cafés*, and reading the advertisements around the match holders will well fill up the time.

Last Saturday evening I was watching the zirconia light again in the court of the Tuilleries. It is very successful still, and the experiments seem to go on well. I was struck with seeing an ignited ball of matter exposed to the wind and rain without any injurious effect, and it was blowing and raining at the time I was watching it. The same evening I noticed the electric light in another part of the city; its insupportable glare was very painful, and showed its unsuitability for lighting towns without some great modifications for depressing the light. The images of the dust and mist in the atmosphere were distinctly seen upon walls a quarter of a mile from the electric lamp.

In the space left me in this letter I am unable to review a little work published on the photographing of colours, but I hope to do so in my next, limiting this letter to a notice of the author's preface to his work, which will amuse some of your readers, I think. The author, M. Cros, says that he has found a general method for registering, fixing, and reproducing *all visible phenomena*—that is, their two primary characters, form and colour—and the object of the work is to show how he does this. "Do not let anyone be astonished," he says, "that I do not bring any realised results, and if I do not try to work out my own ideas. To find out these practical means would be a great expenditure of time and '*mouvement.*' I do not say this so that some one shall come and offer to help me. I have no great wish for this, seeing that I have long had to give up these practical researches, being more accustomed to the general problems of science than to special realisations. The solutions which I have discovered repecting the special problem of photographing colours are published at the end of my volume, and I do not reserve any commercial right in them—this the consequence of my not caring to realise them myself. The idea will become public property, and special *savants* and clever experimenters will not be hindered in their researches. They will be able, also—and it is necessary it should be so—to render themselves exclusive possessors of the special details which are indispensable for obtaining the final result. As to the profit which I expect to obtain from this, it is also very real, although less simple to define. Supposing that in a given time the results, which I do not believe can be obtained from anything but my principles, are published, it will be very easy for me to recognise myself and my works in them. Then to the pleasure of seeing my idea take a form and life, without my having had hard work, will be added every possibility of various rewards, and of a just appreciation of my relative value, and other similar advantages. I pass now to my subject." And I hope to begin my next with an account of this subject. It is rather a droll preface—is it not? and from what I have read of the ideas in the book, I think I have met with *similar* thoughts before.

I find the following information in the *Gaulois* of this evening, and, thinking it may interest some of your readers, I send it:—

"A great loss. Lamartine died last night about 11 o'clock, in the presence of his niece, Madame de Sessia Lamartine, his nephew, M. de Montereau, and several other members of the family. At the moment we write, M. Adam-Salomon is photographing the illustrious poet on his death bed."

"The conference which was held yesterday at the Ambigu, on the phenomena of light, has given rise to several delicate incidents. During the experiments with the phantasmagoria, several enlargements of *carte-de-visite* portraits were shown, and certain amongst them were received with a disfavour which was shown by whistling. The simplest *convenances* make it our duty not to name the portraits which were the worst received. The obscurity which reigned in the hall gave a liberty of application to the spectators, by which they eagerly profited. We only say that the photograph of the Emperor Maximilian was warmly applauded."

Perhaps I may have more to add upon both these matters in future communications. R. J. Fowler.

Miscellanea.

"A Respectful Negative."—The photograph that flatters.—*Punch.*

Glass of Great Density.—We understand that Messrs. Chance have succeeded in making a flint glass of extraordinary density, viz., 4·4. The densest glass hitherto made has been 3·8. The great dispersive ratio will render this glass useful in spectroscopic research.

London to Brighton by Velocipede.—A few days ago Mr. John Mayall, Jun., photographer, accomplished the journey from London to Brighton on one of the new two-wheel velocipedes. He was accompanied by two friends, also on velocipedes. They started off at the rate of eight miles an hour on roads which proved to be generally good, but against a very strong wind all the way. Part of the journey, down hill from Clayton to Brighton, was run at the speed of one mile in four minutes.

Selling Indecent Ppotographs.—At the Congleton Police Court, on the 22nd ult., Charles Hughes, photographer, appeared on remand charged with selling and exposing for sale certain obscene pictures. Mr. Chaddock, solicitor, on behalf of the accused, read a memorial from a number of ratepayers, among the names being those of four town councillors. Notwithstanding the memorial, and an attempt at defence by one or two witnesses, the magistrates decided on several grounds that they could not deal with it otherwise than by sending the prisoner to Knutsford for trial. The memorial and the arguments used for the defendant would be unavailable there. But as far as the evidence on behalf of the defendant went, it made the case worse, for the Bench did not believe it; and, as the offence was a misdemeanour, they should commit the defendant for trial, bail being allowed.

E. & H. T. Anthony & Co.—This house have recently taken possession of their elegant new quarters at 591, Broadway, where they have the handsomest store for the sale of photographic goods to be found in the world. The building runs from Broadway to Mercer-street, two hundred feet in length, and is divided off into rooms for different departments of the business. There is a room for the stereoscopic department, filled with (probably) millions of stereographs of every conceivable variety, foreign and domestic, plain, coloured, and transparent; also stereoscopes of every description. The front part of the second floor is devoted to the exhibition of magnificent chromos and works of art from Europe and America. The rear of this floor is fitted up for an apparatus-room, and contains everything in that line known to photographers, and some things which *some* photographers never saw. On the floor above is the chemical department, where many of the chemicals used in the art are manufactured, and all are to be found. This room is a model of neatness and convenience. Next we come to the packing-room, where is everything necessary to the packing and shipping of goods, and from whence photographic goods are shipped to all parts of the world. On the upper floor Mr. H. T. Anthony has his laboratory, his *sanctum sanctorum*, where he tests chemicals, and has facilities for trying and testing lenses. The office, of course, is on the first floor, and is fitted up in the most tasty and convenient manner. Messrs. Anthony's old store called forth the admiration of a writer in one of the English journals, who described it as the finest and most extensive stock depot in the world. Wonder what he would say if he should see their present quarters. We wish the house all possible success in their new place of business. They have deserved and achieved success as a stock house thus far, and like "revolutions" they never go backward. Their march is onward and upward. They never had so fine a store or so large a force of *employés* as at present, and that, we take it, is an indication that they never did so large a business as at present.—*Humphrey's Journal.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A Ross portrait lens, with rack and pinion and diaphragm, will be exchanged for a medallion lens and camera.—Address, C. Rawlinson, Photographer, Over Darwen.

A pair of dissolving view lanterns in box, three-inch condensers, quite new, will be exchanged for a Dallmeyer's 5 × 4 rapid rectilinear lens, or a Ross's small-angle doublet, or for a pocket camera and stand.—Address, F. T. P., 67, College-street, Fulham-road, S.W.

G. W. Taylor, Doncaster, will exchange a really good whole-plate lens for portraits, and very strong sliding bodied camera for ditto, for a 10 × 8 doublet or triplet lens and bellows camera for same; or for a 1-1 doublet or triplet he will give a 1-1 or half-plate portrait lenses.

A good 1-1 Jamin lens, with arrangement for landscape work (rackwork a little out of order), and a bellows stereo. camera, with twin lenses, will be exchanged for a really serviceable dark tent to work 12 × 10; a good tripod stand; triplet 1-1 lens, with bellows camera; difference adjusted.—Address, W. Sharpe, Madeley, Salop.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

Archer Clark, Stourbridge.—*Photograph of Lord Lyttleton.*

Joseph Loretz, Bath.—*Photograph of Statue, "La Paresse."*

Charles Mitchell, Bristol.—*Photograph of William Canyngs, from a Drawing by H Whatley.*

☞ *Correspondents should never write on both sides of the paper.*

D. Winstanley.—Received.

A. Z.—We have not yet been able to obtain the desired information.

Thos. Haynes (Daventry).—Messrs. Blake and Stephenson, typefounders, Sheffield, can supply the type you require.

Thos. G. Perry (Trim, Ireland).—With the mechanical details of the velocipede we are imperfectly acquainted. We may before our next issue be able to procure the information you seek.

A. N. Myers.—The amber is admirably adapted for varnish. A small bit which we crushed and dissolved in chloroform yielded an exceedingly hard film. You will observe that the solvent is different from that recommended you, and which we have not yet had an opportunity of trying.

J. M. L.—We cannot at present offer any remarks on the subject of oil light *versus* lime light in addition to what we have published in our Almanac. Please peruse it again, and, in the meantime, do *not* use common gas if you can possibly obtain any other of the lamps there recommended.

Errata.—In Mr. Marlow's communication on *Photo.-Nomenclature*, in our last number, page 98, first column, line 24 from top, for "ingenuous" *read* "ingenious."—In the editorial append to the letter of "Kent" in last week's Journal, page 105, for "Professor Brande" *read* "Professor Graham" in both instances where it occurs.

"Salopian."—We have not yet investigated the properties of liquid silica as a protective varnish for photographs. The only remedy we can suggest in the case of your opalotypes is to make them by means of a developed process. We have never heard of fading in connection with opalotypes when thus made. Ordinary collodion may be employed, the great point being to have the chemicals so adjusted as to give a very thin image.

Mercurius (Derby).—1. A copper retort answers very well. We have long employed one, and can speak from experience of its good qualities. The best way to ensure safety from the choking of pipes in the making of oxygen is to have a large delivery tube. A safety valve in the head of the retort is doubtless advantageous, although we have never employed it. A good form of safety valve was described in our Journal three years ago by Mr. Harman.

Photo.-Gallery.—We have no other remark to offer relative to your plan than this—you cannot do better than adhere to that of the model; the glass to be as large as is consistent with strength, and let the blinds be mounted upon spring rollers. You should have one at each side of the roof in order to enable you to adjust the admission of the light frome either side, so as to leave a slit of light, as it were, either in the centre or at any distance from it. You will find pale blue to be the best colour for the interior.

K. W.—The silver appears to be quite good, and, when dissolved in distilled water, gives a clear solution. We shall, however, try it more carefully in a few days, and, if it should turn out otherwise than as we expect, we shall inform you next week. We believe your difficulty arises solely from the impurity of the water. Boil your rain water, and then test it for organic impurities by means of permanganate of potash. You ought not to have used water which fell from the roof of a house. The "milkiness" has probably arisen from the presence of a chloride in the water.

John Ross.—As we are unaware of the state of the surface of the lens we are unable to offer an opinion on the amount you have been charged for repolishing. In suggesting a probable sum, the dealer did not thereby contract to have the work executed at that price—nay, he expressly says, "I could not fix a price." With respect to the work being better done in Paris than in London, we have made no secret of our belief that, for work of the kind mentioned, the London opticians stand pre-eminent. We may here also state that we gave, in a former number, directions by which any photographer of ordinary intelligence may remove the stains in question.

Non Compos Mentis.—We shall send your letter to the author of the article, who will, doubtless, in our next enlighten you on the points raised.

General Young (Cheltenham).—The paper has turned out well—better, indeed, than we expected. A fresh sample is being prepared, containing a larger proportion of bromide, to secure greater rapidity.

W. J. A. G.—1. The lens referred to is about two and a-half times more rapid than a larger-sized lens of the same kind that we possess. It is slow for portraiture, but not, of course, any slower than the most rapid portrait lens of the same focal length, with a stop of similar size. If the centre lens of a triple combination be removed, the front and back alone being used, it will answer well for portraits on a plate of small size. When used thus with a small stop it will copy prints of limited size with great excellency. The back lens may be used *by itself* as a landscape lens, and the front, when screwed into the back end of the tube, may also be employed alone; and the focus of these two being usually dissimilar, the size of picture produced will be larger with the back than with the front when thus used. When the small central lens is in its place, both of the others must also be used along with it. A triple lens of the kind described may thus, in effect, supply the place of four lenses. It is when in its completed condition, with a small stop, that it should be employed for architecture.—2. Etiquette demands the removal of the name if an alteration, such as that suggested, be made. The smaller of elements will be found to be one of the finest specimens of the work of the maker that he has yet produced.—3. The answer to this question may be deduced from we have said under the first head. At present, we have no accurate idea of the time occupied in taking the picture; but if we remember aright it was rather long, although not unpleasantly so.

"Home" Correspondence.—At the last moment we have been compelled to withdraw several letters in type. They shall appear next week.

The Presentation Portrait of the late A. Claudet, F.R.S.—Since writing an article which appears in another page, we have been privately informed that the presentation print in question is only a copy from the picture obtained by means of the rock crystal (or topaz) lens, to which reference is made, the original negative having been destroyed in the fire which occurred on Mr. Claudet's premises more than twelve months back. We regret for the credit of all concerned that the above fact, if correctly stated, has not been announced on the picture itself.

A Royal Presentation of Photographs.—Two pictures, which have been sent to us for examination, by Mr. Joseph Meredith, of the Vineyard, Garston, near Liverpool, are highly interesting, as evincing, among other things, Her Majesty's appreciation of the value of photography for securing faithful mementos of exceptional objects. The subject is some magnificent bunches of grapes grown by Mr. Meredith, and presented by him to the Queen, who issued instructions to have photographs of the clusters of luscious fruit taken before they were disturbed—the pictures before us being the copies graciously presented by Her Majesty to Mr. Meredith. The satisfaction derived by that gentleman from this royal recognition of his gift must, we think, have nearly equalled the just pride he felt in having matured, in mid-winter, such monster, yet elegant, clusters. They were photographed by Messrs. Brown and Wheeler, Cowes, Isle of Wight. The following is the inscription on the photographs:—"Grapes grown by Joseph Meredith, The Vineyard, Garston, Liverpool, presented to Her Majesty at Osborne House, Christmas, 1868. Photographed by special command of Her Majesty." It may be interesting to those who are connoisseurs in fruit to learn that Mr. Meredith is, perhaps, the most extensive, as well as the most successful, cultivator of grapes in the world; and beside carrying off prizes at all the leading horticultural shows in this country and on the Continent, has the honour of supplying the tables of several European sovereigns with this delightful fruit.

LONDON GAZETTE, *February* 26.

Bankrupt.

James Barry, Strand, photographer.

METEOROLOGICAL REPORT.

For the Week ending March 3rd, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 10 A.M.

Feb. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
25	20·10	52	36	36	39	W	0·02	Dull
26	30·11	53	39	43	48	WNW	—	Fine
27	30 05	52	46	46	52	W	0·12	Fine
Mar. 1	29 63	49	35	41	44	NW	0·19	Fine
2	29·15	48	38	38	39	W	0.26	Rain
3	30·17	45	29	30	33	NW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 462. Vol. XVI.—MARCH 12, 1869.

ALBUMEN AND AMMONIACAL SILVER COMPOUNDS.

In the last letter of our able Philadelphia correspondent he refers to our account of experiments with ammoniacal silver solutions, which appeared at page 47 of the present volume, and derives from the results of our experiments the conclusion that "the capacity of silver solutions to coagulate albumen appears to depend on the presence of nitric acid." This is a conclusion which may be most legitimately derived from the results of the experiments which we described upon the action of albumen on certain silver solutions containing ammonia; but we happen to be acquainted with some facts which tend strongly to show that ammoniacal silver compounds containing no trace of nitric acid also have the power of coagulating albumen. We therefore now give the experiments which seem to prove this clearly.

In our former article it will be remembered that we did not deal with the question of the cause of coagulation of albumen when plain nitrate of silver acts upon white of egg, since we proved years ago that coagulation is in this case due to the liberation of a trace of nitric acid. Our object in our last paper was to show the very marked difference which exists between the action of different *ammoniacal* silver compounds upon albumen as we find it in ordinary hens' eggs. In the experiments which we detailed it was shown that solutions (1) of "ammonio-nitrate of silver," (2) of oxide of silver in nitrate of ammonia, and (3) of oxide of silver in a minimum quantity of caustic ammonia, behaved differently towards white of egg. With solutions 1 and 2 albumen gave a precipitate which was only partially soluble in hyposulphite of soda, from which we may infer that the insoluble residue was coagulated albumen; but with 3 no precipitate was produced by white of egg until *after* the addition of hyposulphite of soda, and then a curious gelatinisation was produced, which we fully described in our former article.

It would be perfectly reasonable to derive from the results of these experiments the conclusion that the coagulation occurring with solutions 1 and 2 is due to the nitric acid present in combination with the alkali. In order to test this, we made the following experiment:—

Eighty grains of *acetate* of silver, which represent about eighty-one of nitrate of silver, were placed in about half-an-ounce of distilled water and "liquor ammoniæ" added *guttatim*, until the salt was almost completely dissolved. To this solution was now added, very cautiously, glacial acetic acid until crystals commenced to deposit, thereby ensuring the absence of any unnecessary excess of ammonia. The whole was then diluted up to one ounce by measure, and filtered off. To a portion of the solution thus prepared white of egg was added, and a white precipitate obtained. On treatment with excess of hyposulphite of soda this precipitate left a very considerable residue, similar in every respect to that obtained with a solution of ammonio-nitrate of silver of the same strength.

The result of this experiment appears to prove that nitric acid is *not* connected with the production of the coagula so frequently obtained in experimenting with the argento-ammoniacal solutions. The causes of the phenomena just noticed we believe to be of a most obscure nature. We know that ammonia precipitates oxide of silver from the nitrate and redissolves it; we may even express the composition of this compound by the formula $AgO, NO_5 + 2\,NH_3$, implying thereby that it is a mere compound of ammoniacal gas and nitrate of silver. But such a view is inadequate to the explanation of the facts which we have elicited relative to the action of albumen on such a solution, nor does it explain how it happens that fulminating silver and not the oxide of the metal is precipitated from ammonio-nitrate solution by caustic potash.

All the facts with which we are acquainted relative to these ammoniacal silver solutions, lead to the conclusion that they vary materially in constitution according to the plan adopted in their preparation; and there is really no difficulty in understanding how these variations may arise, if we remember that there is the strongest ground for believing that three different argento-ammoniacal compounds can exist, which may be represented as derived from ammonia in the following way:—

$$\begin{array}{cccc} \left.\begin{matrix}H\\H\\H\end{matrix}\right\}N. & \left.\begin{matrix}H\\H\\Ag\end{matrix}\right\}N. & \left.\begin{matrix}H\\Ag\\Ag\end{matrix}\right\}N. & \left.\begin{matrix}Ag\\Ag\\Ag\end{matrix}\right\}N. \\ \text{Ammonia.} & 1. & 2. & 3. \end{array}$$

When ammonia is largely in excess we might expect the compound 1 to be formed, when silver would be in excess the compound 3, and we should then have 2 intermediate. We have every reason to believe that, though these bodies would agree in their main features, they would differ from one another in special reactions; and it may be observed that the three solutions which we experimented with actually do so vary amongst themselves.

One observation possessing a peculiar practical bearing has been made in the course of this inquiry, viz., that solution of oxide of silver in nitrate of ammonia bears dilution to a much greater extent than plain nitrate of silver or the ordinary "ammonio-nitrate" without losing its power of coagulating the albumen. We may, therefore, employ a weaker bath of this salt in sensitising albumenised paper than of any other silver compound with which we are at present acquainted.

On a former occasion, when discussing the merits of MM. Schaeffner and Mohr's now well-known carbonate of silver paper, we remarked that it was surprising to find how little accurate information could be obtained relative to the effects of ammonia in silver printing on albumenised paper. "Ammonio-nitrate of silver" has been long used in photography, and we believe the solution obtained by dissolving oxide of silver in nitrate of ammonia has been much employed in America, in connection with the well-known "fuming process." It would, therefore, be very useful to have the experience of our American brethren upon this subject, as we appear to be now in a somewhat better position than formerly to recognise the causes of variations in effects of the several argento-ammoniacal solutions. At present our information upon the subject is rather unsatisfactory, as many operators, when describing their mode of "fuming," appear to attach far too little importance to the mode which they adopt for preparing the ammoniated nitrate of silver bath, and often treat this part of the process in a very cursory manner. If our experiments lead us in the right direction, the

preparation of the silver bath with which the albumenised film is treated prior to fuming is probably the most important point in the process, and affects in the most material way the whole of the subsequent operations.

We hope to return to this subject when we shall have had time to complete a series of comparative trials of the effects of different ammoniated silver baths upon the printing qualities of albumenised paper.

SARONY'S NEW PHOTO.-CRAYON PROCESS.

In an unpretending corner of our Journal for Feb. 26th appeared a notification of the fact that Mr. Sarony, of Scarborough, had applied for a patent for an invention designated as follows:—"Improvements in photographs to give them artistic effect, and to produce enlarged and permanent pictures from small negatives."

Mr. Sarony having been in London during the past week, we have both seen several specimens of his new style of portraiture and have received from him detailed directions by which they may be produced.

Previous to giving directions how to make the photo.-crayons, let us first of all describe the appearance presented by these pictures. They are of a size suitable for framing, viz., 14 × 10. The tone is excellent, being quite free from heaviness or smudginess; they are vignettes, and *appear* to be produced on toned drawing paper, the ground being in a variety of colours or tints. The border or margin of the vignette is formed of free, sketchily-drawn lines, and it is difficult to examine these prints without feeling that they have emanated from a skilled artist rather than being the productions of the enlarging camera, or, more strictly speaking, of the magic lantern.

How to Produce the Photo.-Crayons.—We commence by stating that they are enlargements, and are obtained from ordinary *carte* negatives. In consequence of the method of their production, no special class of negative (as to density) appears to be required, for in enumerating the advantages that would accrue from the adoption by photographers of this new style, Mr. Sarony specially directed our attention to the fact that old and dense negatives might be most advantageously employed. A negative, then, is placed in a magic lantern adapted for burning magnesium; Solomon's magnesium enlarging apparatus answers well, and is, we understand, the instrument employed by Mr. Sarony.

A plate of glass the size of the picture required is coated with a collodion containing iodides and bromides, these being varied to suit the taste and mode of working of the operator. It being of importance to have the shadows clear, the collodion must either be old or be rendered red by means of the addition of iodine. The plate is excited in a slightly acid nitrate of silver bath of from thirty-five to forty grains in strength. The plate thus sensitised is made to receive the image projected on it from the magnesium lantern, the exposure with a single ribbon of magnesium being about thirty seconds. The picture is developed by the following solution:—

Pyrogallic acid	1 grain.
Citric acid	1½ ,,
Water	1 ounce.

To this add sufficient spirits of wine to cause it to flow evenly over the plate. Care must be taken not to carry the development too far, for that would be quite fatal to the effect. Indeed the general directions which we gave when describing Disderi's process of printing on collodion by means of a camera apply here. The high lights must be composed of clean collodion containing no deposit whatever of silver. The fixing is effected by hyposulphite of soda. If the tone be too blue, it may be rendered more agreeable by pouring over the picture the following:—

Bichloride of mercury	10 grains.
Chloride of ammonium	10 ,,
Hydrochloric acid	2 drops.
Water	1 ounce.

After washing, a weak solution of hyposulphite of soda is applied. It is now washed, dried, and varnished.

A toned sheet of drawing paper is now placed behind the enlarged transparency—of course, next to the collodion film—and the picture appears as if it were taken on the paper, the glass being merely employed for a protection.

Instead, however, of a plain sheet of paper being used as a "backing," Mr. Sarony employs paper on which has been printed, by means of lithography, the peculiar sketchy crayon-like lines which give so much appearance of freedom and artistic effect to the vignette, and from which effect this peculiar style of photograph acquires its name.

Mr. Sarony having completed the foreign patents, we are placed in a position to give the above details, with which we have been acquainted for some time, without jeopardising the right he has to secure protection in other countries.

Mr. Sarony is an indefatigable artist, who has already done much to raise the art status of photography both in this country and America; and we believe that in this, the latest development of his artistic genius, he has given his photographic brethren something which, if assiduously cultivated, will greatly conduce to their emolument; for, after supplying the dozen or half-dozen of *cartes* ordered, a specimen of photo.-crayon from the same negative may be made at the outlay of a few pence, mounted on one of the patent crayon sheets of drawing paper inserted in a frame, and be thus sent home "on approbation." Mr. Sarony informs us that while he has in this manner disposed of numerous pictures he has had none returned, all his customers expressing their pleasure at having such fine, large, and beautiful works of art at such moderate prices. Of course, if the venture were *not* successful, there would be no loss worthy of any consideration to the photographer, for the crayonised paper, the glass, and the frame would serve for another picture.

Our readers in town interested in this new development of our art-science will have an opportunity of inspecting some specimens of photo.-crayons, by calling at the office of this Journal.

EXPOSURE, DEVELOPMENT, AND LIGHTING.*

Every good photographer knows the importance of these three essential particulars; would that every photographer knew how to make the best use of them. It is one thing to know, but to put that knowledge to the best practical use is an entirely different matter—so different, indeed, that the most clever manipulator never supposes but that other and finer effects may be produced than the best he has already done.

The difficulty of saying anything new—something that has not already been thoroughly discussed and, therefore, exhausted about these important matters—is nearly impossible. The marvel is how so much can be said and written on the same subject week after week without being painfully tedious; and great credit is due to our professional brethren and journalists who can, without tiring their readers, find variety in the monotonous sequence of photographic events.

There crops up occasionally an announcement that photography in natural colours has been achieved, and, more than that, made permanent—sufficiently so to aid in book illustration. I have not seen *more* than the announcement at present, but hope some day to see it an accomplished fact. Speaking of colour-photography reminds me of an incident. I was looking in at a dealer's window in the Strand, and overheard the following:—"Are not those photographs capital? They have found out at last how to photograph in natural colours [the speaker alluding to some coloured pictures of flowers], and here they are, lifelike;" in which sentiment his friends fully acquiesced, quite satisfied that the colours were produced in the camera simultaneously with the outline. But I am afraid we must wait a little longer before we shall see pictures for sale whose chromatic effects are due to the direct action of light, and are not merely coloured imitations of nature—though both are photographs in natural colours. Such an announcement considerably mystifies the uninitiated as they do the adept, until he satisfies himself of their true nature by a personal inspection.

Why so much can be said and is said on the different processes we use without being mere repetition, proves the astonishing variety of modification each department of photography is capable of undergoing. The seemingly simple operation of development is a variety in itself, full of interest to the thinker who ponders over the why and wherefore of this and that effect. It even forces a certain amount of thought from the rough and unscientific man, who only knows that the application of a certain solution to a sensitised and exposed plate will make an image "come out." If it come out perfectly opaque in the light and clean and transparent in the shadows, he is quite satisfied that he has obtained complete success—the *ultima thule*—and has landed the "right thing." It rarely happens that two photographers will, under the same circumstances and with the same materials, produce the same effects—so much depends on judgment and taste. When we review the scale of quality from the lowest commonplace to the highest and most refined production, we involuntarily exclaim—"Can judgment and taste make all this difference? Surely some secret dodge—some incomparable formulæ—helped to make these beautiful effects!" The poor iron developer is almost grudged the credit of being equal to the task, and a well-

* Read at a meeting of the North London Photographic Association, March 3, 1869.

schooled and refined judgment considered only as a help, and not as the ruling power. So anxious are we to attribute the success of others to chance and chemicals and, as some term it, luck.

The developer being such an important matter, we will give it the first consideration. When our negatives bloom out gradually and evenly, until every detail is apparent in the shadows, and the highest lights are sufficiently opaque, we congratulate ourselves upon having hit the right and most desirable formula. The proportion of each chemical bears a proper relation to its fellow, and the process throughout works harmoniously and pleasantly. The developer that will give the greatest range of tone, other things being equal, is the developer *par excellence.* Range of tone depends in a great measure on the *fineness* of the deposited silver that composes the image, and is somewhat independent of strong or weak solutions. We all know the former produces softer and the latter pictures with greater contrast; still, neither of them will produce perfect results unless the deposited metal be in a state of the most minute division—the finer the better. The colour of the negative depends entirely on the quality of the deposited silver. The finer the deposit the more non-actinic the colour; therefore, possessing the power of producing greater range of tone, if the deposit be coarse there is always a loss of detail in the shadows of the prints, the more attenuated layers not possessing sufficient force to obstruct a proportional amount of light. However they may appear on the negative, this is the reason why frequently a negative will not produce such good prints as might be expected from its faultless appearance.

I may here remark that the use of an acid sample of sulphate of iron invariably tends to produce a coarse deposit, and will never produce so great a range of tone as a non-acid sample. This kind of sulphate—the acid kind—is readily distinguished by efflorescing instead of oxidising on exposure to air and moisture.

I formerly used to advocate the employment of a great variety of developers, but have of late considerably modified my ideas on this matter. One strength of developer for summer and another for winter is nearly all that is required in general use for landscapes, portraits, or reproductions. Of course, occasions will arise when a special developer may be an advantage—then by all means adopt it; but, in a general way, one kind is all that is necessary for the copy of an engraving on a delicately-modelled portrait. I believe the difference in the subject to be copied may be equalised for development by difference in exposure.

Economy is an excellent thing, but a mistake if applied to the sparing use of the developer—especially in large work, which, of all kinds, requires a steady, copious, unhesitating application. Never mind a little waste—a great advantage will compensate for it; and, rest assured, there will be plenty of silver left to make the image. All that is required is a proportional and even deposit, which is certain, if the plate have received the right exposure, of making a good negative. Mark the difficulty of copying a pencil sketch on white or grey paper—to cover the whole of a large plate to the edges, keeping an equal intensity throughout—if the economical method of developing be adopted! But use it with a lavish hand, see that the whole plate is covered with one unbroken flow of developer—never mind the silver washing off—and you will succeed in obtaining an evenly and accurately-developed negative. The same rule applies to a picture full of lights and shadows; but in this case uneven development is not so observable, on account of the subject preventing an easy comparison of its different parts; whereas, in the first instance, any difference is very conspicuous. Once obtain an evenly-developed negative, and the intensity is readily managed. On the other hand, begin with an irregular deposit, and the after-intensifying is rarely satisfactory.

The time of exposure is of the utmost importance—more so than many feel inclined to admit who leave the development to remedy any little mistake in this respect. When a properly-timed negative is developed, it is very difficult to injure it by keeping the solution on the plate; but, should it have been either under or over-exposed, risk of fogging is greatly enhanced. If possible, do not hurry the exposure at any time, especially in bright sunlight, where not the light but the shadows require most consideration.

The axiom, "take care of the shadows and the lights will take care of themselves," is very important to recollect, but frequently neglected. There is so much temptation to expose too rapidly in sunlight that one yields to it occasionally and under-exposes. There is also much difficulty in accurately determining the strength of the shadows under the ever-varying tints of sunlight. To judge accurately of this matter requires considerable practice and a great deal of observation. Practice, and practice only, can be the teacher. "Let not the light lead you to judge incorrectly of the depth of the shadows" is a repetition, in other words, of the adage aforesaid; for its importance can be scarcely overrated, varying, as all shadows do, with the quantity and colour of the light.

Every photographer knows the more white clouds the more rapid the exposure, for the reason that the shadows are reduced in intensity by reflections. The contrasts are, therefore, less, and the exposure for both lights and shadows more equalised. It occasionally happens that every effect of light and shadow is reversed in the negative, the sunlight actually becoming the shade—an anomaly seemingly impossible, but proved a short time since by Mr. Rejlander, who, in the open air, produced a portrait in which the sunlit side was the shadow side, or, more accurately, the darkest side. In explanation, I must say that the colour of the setting sun was orange-yellow, and the light reflected from the blue sky more actinic in character than the direct rays of the sun; hence the result. If, therefore, direct light can result in the representation as of shadow in the photograph, at some period there will be a balance between the two, where a sunlit landscape, with apparently bold, strong shadows, would be represented in the photograph as entirely destitute of them—the effect being that of a gloomy day. This extreme would be rare, no doubt; but, coming, as it does, within the range of possibility, shows that extraordinary and unexpected differences may exist between the natural effect and photographic reproduction. Photographers should, therefore, cultivate the knowledge of colours, to enable them to judge correctly between the apparent and real intensity and force of light and shadow. The educated eye would tide over difficulties and not know them that the uneducated would find a rough and unsatisfactory track. Guesswork, though it may be occasionally right, is at best but a wasteful and precarious method of arriving at a result that may be attained surely and certainly, without waste of time or material, by systematic and careful observation.

There has been so much written and said about the manipulations requisite for the production of a good negative, that I will not tire you by going through a number of directions that can be read in any good work on the subject. I will merely glance at a few manipulations for which no special rules have been laid down, and that I have found to answer well in practice.

For keeping plates moist some time in case of a long exposure, or having to take the plates a distance before and after exposure, my favourite remedy is glycerine, mixed with two parts of distilled water, fifteen grains of nitrate of silver, and a drachm of acetic acid to the ounce. With this mixture coat the plate after sensitising, drain, and it is ready for use. Success depends on the preparation of the mixture and purity of the glycerine. You will say—"Of course it will;" yet many have tried, and failed to get good results.

The purity of the glycerine is the first thing to be ascertained, and it may be determined in this manner:—Place a little to be tested in a small bottle, adding thereto a few grains of powdered nitrate of silver. If the glycerine be a suitable sample it will remain for twenty-four hours without undergoing any perceptible change if kept in the dark; whereas, if impure, the silver addition will render it, almost immediately, brown and muddy. Of course, a sample of this kind must be rejected, as its use would only plunge the photographer into difficulties. Having once satisfied ourselves that the glycerine is all right, add the water, silver, and acetic acid; place the whole in the sun for a few days, or until there be no further deposit; filter, and the preservative is ready for use, and will last in good working condition till used up. I have some in first-rate condition now that has been made and frequently used for the last two years.

For very long exposures I prefer to wash the plate with distilled water previous to the application of the preservative. I fancy, by so doing, there is less inclination to fog. I must tell you there is a gradual diminishing of sensibility, so that at the end of six hours three times longer exposure is required than during the first hour, and this is about half as long again as with the ordinary unprepared wet plate.

If re-intensification be required, pyrogallic and citric acid may be used, with the addition of twenty-five per cent. of acetic acid. This is required on account of a great tendency to stains and discolouration these plates have, if long kept. The acetic acid seems to be quite a panacea for this kind of evil. Should a plate become stained by any chance (either with or without the preserver) during re-intensification, it may be partially remedied, if very bad, and quite, if only slightly, by pouring over the thoroughly-washed plate a saturated solution of bichloride of mercury, then again thorough washing. This may be repeated several times if necessary, alternating with a dose of cyanide. Very stained and discoloured pictures can thus be rendered serviceable that would otherwise be perfectly useless.

I will not longer trespass on your patience, for, as I have already said, I do not suppose I have told you anything particularly startling or new; but if I happen to have suggested or re-suggested anything

that will be of assistance in a case of difficulty, the purpose of this paper will have been answered, and I shall congratulate myself that I have not taken up your time to no purpose. E. Dunmore.

P.S.—With respect to lighting: no special directions can be of much practical use. Refined feeling and cultivated taste are the best mentors. In portraiture, light the subject so as much as possible to hide the defects and enhance the value of the good qualities. Make the face the principal point of interest, and do not cut up the picture with too many lights on any other part of it. In landscape, let the lights and shadows help the perspective; keep them well together in masses, and do not distribute them equally over the whole of the subject. A well and cleverly-lighted picture has a charm of its own, irrespective of form or manipulation.—E. D.

A COPYING CAMERA: HOW TO CONSTRUCT IT AND HOW TO USE IT.

IN TWO CHAPTERS.—CHAP. I.

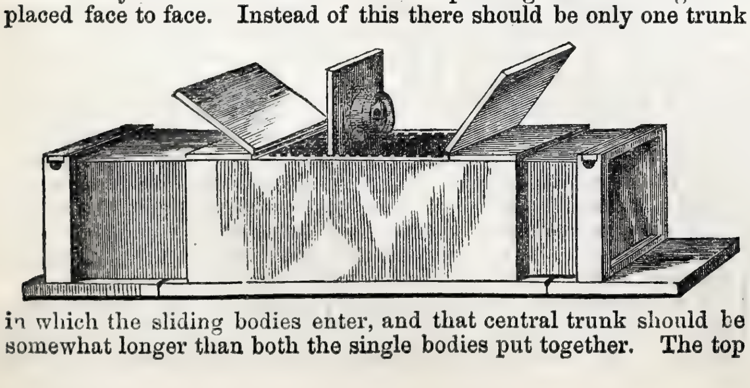
A copying camera is an exceedingly useful instrument, although comparatively few photographers possess one. A more accurate designation for the instrument would be "a camera with conjugate foci"—that is to say, a camera in which the two foci of the lens, before and behind, are to some extent included in its limits.

Many photographers imagine that their lenses possess only one focus—that at which rays from a distant object are brought to a focus. But a little reflection will enable them to perceive that there are really two foci; for, in proportion as the distant object is made to approach the camera, so does the back focus of the lens lengthen, until at a certain point of distance (twice the solar focus of the lens) the ground glass will have been so far removed away by the approaching of the object that the back focus of the lens now measures twice as much as it did when presented at a distant object. In this case the representation on the ground glass will be exactly the same size as the original, and each object (the object proper and the image on the ground glass) will stand in the conjugate foci of the lens.

Let us take the case of a lens possessing an equivalent focus of six nches. With a lens of this kind the image of the sun or the distant landscape will be brought to a sharp focus at its equivalent focus, or six inches from its optical centre. As the image or object is made to approach to the lens, so by a determinate law must the ground glass be made to recede. The one focus (the position of the object in front) has a definite relation to the other (the ground glass), these two positions representing the conjugate foci of the lens. When the object is at the distance of twelve inches from the lens the ground glass is also at the same distance, as we have just shown.

These are the principles involved in a copying camera, and in reducing them to practice no difficulty will, of course, be experienced. It is only necessary that the length of the camera be in due proportion to the focus of the lens to be used. If the copies—transparencies, for example—be required to be either the same size as the original or a little larger or smaller, the length from one extreme of the camera to the other must be four times the focal length of the lens. But to proceed to particulars.

If two ordinary quarter-plate expanding cameras were fastened together face to face, a very excellent copying camera would be obtained for *cartes*, or other pictures not exceeding that size. We have seen copying cameras thus made, and they answered very well indeed, within certain limits. The chief drawback consisted in the rigidity of the division board between the two cameras on which the lens was fixed; for, in order that the greatest possible power may be placed in the hands of the photographer, the central division should be made either to travel backwards and forwards to a certain extent inside of the cameras, or to slip down in one of a series of grooves in the sides of the body. We have said that two expanding cameras might be placed face to face. Instead of this there should be only one trunk



in which the sliding bodies enter, and that central trunk should be somewhat longer than both the single bodies put together. The top of the centre or rigid part of the camera should have hinged lids, as in the diagram, so as to allow the central division on which the lens is screwed to be transferred to any more desirable situation. This ability to shift the lens confers an immense power upon the photographer, and obviates the necessity of the camera being as long as might otherwise be desirable when the copy desired was much larger or smaller than the original.

The foregoing is an engraving of a copying camera which we have had for several years, and which, although inferior to some elegant bellows-bodied instruments that we have seen, has rendered us good service. If we wish to make a lantern transparency, by placing a negative at one end and the sensitive plate at the other it is at once done, and to any scale we desire; for if the lens-board be placed in the central division, optically speaking—the camera being closed in to the fullest extent—the image is exactly the same size as the negative. If we wish the image to be larger, we remove the central board on which the lens is fixed one division towards the negative. To get a sharp image on the ground glass, we have now to pull out the end of the camera in which it is placed—a larger image being the result. By the exercise of a little skill and judgment a considerable degree of enlargement or reduction can thus be obtained.

If a portrait lens be employed for this purpose, it is well always to have the back lens nearest to the shorter of the two conjugate foci—that is, if the picture be smaller in size than the negative, let the posterior lens be next to the sensitive plate; but, if larger, then let the front lens be nearest to it. Copying cameras *should* have the lens carrier—that is, the central division—mounted so as to slide in the body of the camera. There should also be a graduated scale, so as to permit the exact relation of the lens with either of the conjugate foci to be observed. When this is the case, the relative sizes may be determined with the greatest possible accuracy. We here make a brief extract from our Almanac of last year, which supplies the formula both in algebraic and ordinary language:—"Desiring to enlarge or reduce a picture (n) diameters with a lens of which the equivalent focal length is (f), where shall we place the picture and focussing screen respectively to have the best definition, measuring from the optical centre of the lens? Calling one focus (u), and the other (v), the answer is:—

$$1.\ u = (n + 1) f, \text{ and}$$

$$2.\ v = f + \frac{f}{n}$$

Dropping the use of symbols for ordinary language, the first formula is—1. Add 1 to the times of enlargement, and multiply the sum by the equivalent focal length of the lens. The product is the length sought for.—2. To find the other focus: Divide the equivalent focal length of the lens by the times of enlargement or reduction required, and add it to the equivalent focal length. The sum is the length sought for. The relative place of the object and image will depend upon whether we have to enlarge or reduce our model. If the former (u) be the back focus, that is the position of the image; if the latter, it is that of the object, and so with the other focus."

ON THE REQUIREMENTS OF THE WET-PLATE WORKER IN THE FIELD AS TO CHEMICALS.

II. Glass and Collodion.—*(Concluded.)*

Having now got our substratum or support clean, let us turn to the collodion. And here arises a difficulty at the outset. I am only speaking of my own practice. I do not use every collodion that is advertised, although I have used many for special purposes at various times.

As field workers, we are liable to meet with all kinds of subjects—some involving great niceties of detail, with broad masses of shadow; others having a paucity of the former, insufficiency of the latter, and a general and extensive lighting of the whole, quite independent of sunlight. Or there may, perhaps, be a dark, sombre shadow, with here and there a bright light—as in the case of interiors—causing what is usually called "halation," "blurring," or any of the multifarious names by which such markings are known; and, therefore, to meet with a collodion, or one collodion, that would be equally suitable under each of these cases, and under every kind of light and in every temperature, is to expect too much.

There are some leading points to be attended to in the selection of collodion which I mention for the guidance of those who may not have a stock in hand. The age and maturity, or ripeness, of it has as much to do with success in landscape photography as the particular sort you may select to use. One of our most eminent field workers, Mr. England, never uses any but what is two

years old; and I quite agree with him. Fineness of texture gives detail; toughness is good for manipulation; density and colour for the after purposes of printing; and half-tone for beauty. Some collodions will be found to give one of these points in excess, to the loss of the others—*i.e.*, all density and no half-tone, and *vice versâ*.

You *must* have some age—that is, you ought to lay in your stock of collodion now before you proceed to take views in May, thus ensuring a perfect settlement of all the particles of iodides and bromides which may be in solution, and which would cause white specks in your finished negative. A longer time would be better, decanting into a clean bottle before use. Should you, in manipulation, find it getting gelatinous, from loss of ether and alcohol, the addition of a little fresh will be found advantageous. If you desire increased detail at the sacrifice of density, add a little bromide of ammonium—a quarter to half-a-grain to an ounce; this will give fluidity as well. Always keep it in a dark, cool place; temperature has much to do with the getting of fine pictures.

In taking trees or an interior, to get detail and texture as well as half-tone and atmosphere, a long exposure, comparatively speaking, is needed. A very sensitive collodion would here be out of place, because in the development you would have stains and an obliteration of the details from the overlapping, as it were, of the atoms of silver one upon the other, and a very fair chance of fog all over the plate; thus you would use the normal collodion, with, perhaps, half-an-ounce of plain added per ounce. This gives, also, keeping properties, and prevents stains. It works slower but more evenly, and, therefore, requires a longer exposure or action of light to bring it up to its maximum or fitness for development; for it must always be remembered that, throughout, there must be perfect balance and harmony if you desire success.

Again: suppose you have to take an interior, with a large eastern window of white glass, such as may be met with at Newland Church, in Gloucestershire, only a few miles from Monmouth, of which I send a picture to the Editors (I mention this specially because it has already puzzled many skilful operators). Here the same remarks apply, but the circumstances cause greater difficulty. To get extreme detail close under the window without blurr, fog, or halation was considered an impossibility, yet here every portion of the picture is in keeping, even to the marking of the diamond panes of glass; while the wall, up to the roof of the chancel arch, even though in comparative darkness, has a fine gradation. Neither is there any blurring or fog against or near the other windows. The exposure was for an hour and a-half. To effect this, a very old sample of mixed collodion was taken, and diluted with half of plain. The smallest stop that the lens worked with was used for the first twenty minutes of the exposure; then the lens was capped and the largest stop turned on for the remainder of the time. No one was allowed to walk about in the building during the exposure, so as to prevent the disturbance of any of the rays of light coming direct from the object to the plate. As in the case of wind in landscapes, it will be found that this has a material effect as to the item of density. It was taken in November, the sun was shining brightly, and the time of day was about 10 30 a.m.

On another occasion it fell to my lot to take the interior of a vaulted cellar in Chepstow Castle. Here the light was admitted only from a small aperture; the exposure without any stop was an hour and a-half. The collodion was arranged as before mentioned, and, on coating, it was allowed to set well. On development it came up sluggishly; but after a little coaxing (not my usual plan), I obtained a fair picture, with good detail. The walls were green with moss.

The bath made as described in a recent communication contributes largely to these effects as to keeping the plate moist and permitting of a perfect penetration of the silver to all parts of the film, thus preventing oyster-shell markings and drying of the plate.

Clouds, reflecting large masses of light and shade, are effectively rendered by a modulation of collodion, and a larger stop than usual may be used, with, of course, increased roundness—the smaller stop being compulsory to keep back the light. Thus, in working landscapes, if there be clouds, they are always obtainable even with exposures of a minute and a minute and a-half, with only the ordinary stop.

The temperature of the weather has much to do with the obtaining of fine negatives, and exercises as important results upon the collodion as upon the rest of the chemicals. Thus, in the extremely hot weather of last year, collodion prepared even as stated above was too rapid in its action, and no amount of plain added to it could reduce it, for you may get "below par" even in this. Hence mother wit had to step in and invent some plan to obviate the difficulty; so I had a little cover made to go over my pourer. It is of zinc, and by altering its shape it may be applied to other purposes besides this—such as the keeping of butter, wine, water, and other liquids and solids. It has a lip or gutter turned up at the bottom; over the exterior is stretched a coat of cotton or flannel reaching down into the gutter, which, being wetted constantly with water, by evaporation the interior and its contents are kept perfectly cool, and collodion so treated may be used on the hottest day without inconvenience from loss of ether or alcohol. I call it the "Collodion Refrigerator."

I strongly advocate working, where possible, in summer early in the morning. Then it is still and cool, and the effects of light, shade, and atmosphere are better rendered than when obscured by the fog and heat of the sun in its midday power. One point more has occurred to me, viz., that to obtain modelling, softness, brilliancy, half-tone, and sensitiveness it is imperative that a collodion be used warranted free from methylic ether and alcohol.

The film and its working will be specially touched upon under the heads of "Manipulation," and "Development," in my next communication.

W. Harding Warner.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I note the withdrawal of Mr. Charles Heisch from the well-known and old-established firm of Murray & Heath, philosophical and photographic instrument makers. Mr. Heisch has been actively engaged for some time past as lecturer on chemistry in Middlesex Hospital, and his duties have latterly been so augmented as to compel him to retire from a more strictly commercial connection with science. Mr. Robert Murray, son of one of the founders of the firm, who has long been practically the manager of the establishment, has now assumed sole proprietorship, and I trust that he has a long career of commercial and scientific usefulness in store for him. He has the best wishes of every one who knows him.

The most noteworthy event of the past month is the Manchester Exhibition. I note the great number and variety of the prints exhibited. Exhibitions of this kind give a stimulus to exertion, and are very useful in enabling photographers to ascertain what their brethren in other places are doing. I am not aware of any exhibition worthy of the name that has not been attended by this result. For this reason, therefore, they should be encouraged, for assuredly they tend to advance the art.

The annual meeting of the North London Photographic Society (why is it called *Association?*) has passed away, and it finds some new men in office. It would be a boon to this body if they would consent to forego any honour reflected upon them by having, as their president, a man, doubtless, of scientific eminence, and one who can write the honoured letters F.R.S. after his name, but one who, probably, knows nothing about photography, has never attended a meeting, is almost unknown even by name to many of its members, whose connection with them appears to be barely and grudgingly endured by some, and not appreciated by more than one or two. It is always expedient to have in the president of a society a man of eminence; but it is questionable if in Mr. Woodward, as a perpetual and non-acting president, this Society has "the right man in the right place." Not for a moment would I wish to say anything that could be interpreted into non-appreciation of his talents; but it were well that the president of the Society were one who, like that of the South London Society, would preside at its meetings.

The South London Photographic Society had, at the last meeting, an exhibition of photo-transparencies in the magic lantern. The exhibition was under the management of Mr. How, of Foster-lane, who displayed so much skill in this matter as to evoke feelings of unbounded approbation. The cool, systematic manner in which he conducted the exhibition showed him to be well skilled in this department of photography. It is worthy of observation that every day sees the magic lantern growing more and more an almost necessary adjunct to the photographer, and it requires no special shrewdness to guess that it will be used even much more than it is at present.

The February meeting of the London Photographic Society witnessed the formal retirement of the late President and Secretary, both of whom had long been connected with the Society. The late Lord Chief Baron's first public association with photography was in connection with the lawsuit Talbot *versus* Laroche, when Mr. Fox Talbot sought to restrain Mr. Laroche from using collodion on the ground that it was an infringement of his patent, which had refer-

ence nominally to negatives on paper developed with gallic acid. At the meeting alluded to, Mr. Bing read a paper describing the nature and qualities of his new actinometer. This gentleman appears to have devoted himself for several years to the construction of a reliable actinometer, and I think he may now be considered to have secured complete success in this direction.

The photo.-crayons which were exhibited at the last meeting of this Society are a great step in advance, and reflect the greatest credit on the skill and taste of Mr. Sarony. I believe that this description of picture is destined to have a successful career. They are very effective; they cost little, are easily made, and, last—but far from being least—they will command high prices.

THE SULPHIDE OF CARBON LIGHT.

On the 20th September, 1867, in the pages of this Journal, the writer of the present article proposed sundry means for the continuous production of artificial light by the combustion of different well-known bodies—amongst others of sulphur, phosphorus, magnesium, and zinc. Although in those suggestions the proposed means by which the various lights were to be rendered continuous had only a theoretical and not a practical basis, it is satisfactory to find that, as was anticipated, such means are capable of being more or less successfully carried into effect. The apparatus for the production of a powerful light by the combustion of vaporised phosphorus the writer had the pleasure of showing in practical operation at a meeting of the members of the Manchester Photographic Society held on the 14th January. That the experiment was attended with success will be gathered from the Secretary's report of that meeting, which report was published in this Journal on the 29th January.

The apparatus, although affording a light which was considered by the Chairman, the Secretary, and the members generally to be superior in its aggregate intensity to the lime light, is yet capable of considerable improvement; and it is confidently expected by the writer that he will be able to make it yield a light, with the same expenditure of materials, three or four hundred per cent. greater than that by which the ample room of the Manchester Photographic Society was illuminated on the 14th January. There is also, as mentioned at the Society's meeting, one little source of danger in connection with the apparatus as then exhibited. This, however, it it will not be difficult to remove. After the arrangement has been practically tested in its perfect form, a description of its details, and of experiments performed with it, will be published in The British Journal of Photography.

In the meantime I would introduce to the reader's notice another piece of apparatus, having for its object the production of a chemically powerful light by sulphurous combustion.* Lecturers on elementary chemistry, especially in the earlier of their discourses, introduce several very striking experiments illustrative of the properties of oxygen gas, amongst which may be mentioned the energetic and splendid combustion of the elements iron, phosphorus, and sulphur, which latter body, however, chiefly concerns us now. When a piece of sulphur is ignited in atmospheric air it burns with a pale blue, and in daylight almost invisible, flame, slowly and steadily but most perseveringly, and yielding large quantities of sulphurous acid—a gas of a powerfully suffocating and pungent nature, which, by-the-bye, it may here be worth while to remark is condensable to a colourless mobile liquid at the ordinary pressure of the atmosphere, when cooled to a temperature of ten degrees Centigrade below the freezing point of water. When the combustion, however, is made to take place in a jar of oxygen gas, the brilliancy and beauty of the flame become vastly increased, and its colour somewhat inclined towards purple, which seems as if it were mixed in small quantities with intense blue. This, it will be remembered, is precisely the colour of those rays in the visible portion of the prismatic spectrum which exhibit actinic properties in their greatest intensity, and hence we might reasonably expect this light to be one which would prove of value for photographic purposes.

If we take a tall glass jar containing nitrous oxide gas and drop into it a small glass bulb containing a few drops of bisulphide of carbon (CS_2) and then shake the whole with violence so as to break the bulb and mix the vapours of the sulphide with the gas, we shall have resulting an explosive gaseous mixture which, upon the application of a lighted taper, will be ignited through its whole mass, producing an intensely brilliant and beautiful purple flash of flame. This flame was described by Dr. Roscoe in his lectures at the laboratory of Owen's College in 1863 as the most actinic flame then known.

In the number of this Journal issued on the 23rd February, 1866, the writer suggested that this beautiful flame might, by certain appliances named, be rendered continuous and, therefore, useful for the purposes of photography. At a later date, viz., September 13th, 1867, one of the editors of The British Journal of Photography described, with the use of a diagram, experiments which he himself had instituted

* The apparatus here alluded to was exhibited in action at the February meeting of the Manchester Photographic Society. See report. The present article was written before that meeting, but was left over from want of space.

and carried into effect, in which he made use of nitrous oxide gas (NO_2) and bisulphide of carbon (CS_2). The writer, when experimenting at a still later date in this direction, soon ascertained that the cost of producing nitrous oxide gas by the decomposition of nitric acid (HO, NO_5) by copper (Cu) was, in the absence of any market or use for the nitrate of copper (CuO, NO_5), produced far too expensive for commercial purposes. The annexed figures will show the quantity of this gas obtained from a given quantity of acid:—

$$3\,Cu + 4\,HO, NO_5 = 3\,CuO, NO_5 + NO_2 + 4\,HO.$$

Thus— $3\,Cu$ ——— $3\,(CuO, NO_5)$.

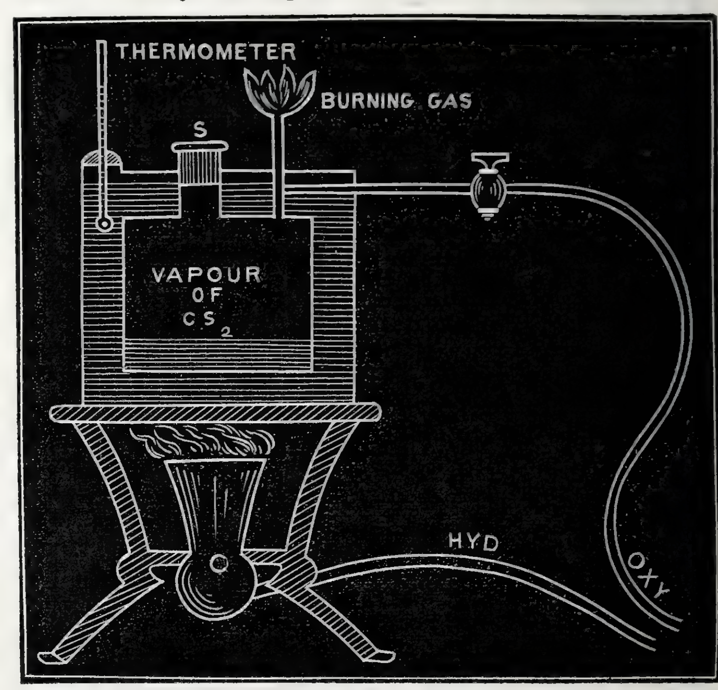
$$4\,HO, NO_5 \begin{cases} NO_5 \\ 3\,NO_5 \\ 4\,HO \end{cases}$$

NO_5 ——— NO_2. $3\,NO_5$ ——— $3\,(CuO, NO_5)$. $4\,HO$ ——— $4\,HO$.

By calculating from the above, it will be seen that 252 parts by weight of monohydrated nitric acid, together with 96 parts by weight of metallic copper, yield only thirty parts of nitric oxide. Thus one pound of nitric acid (sixteen ounces) would require for its decomposition 6·09 ounces of copper, and would yield 1·9 ounce of binoxide.

As one litre of hydrogen whose density is 1, at a temperature of 0° Cen. or 32° Fah., and under pressure = 760 millimetres or 30 inches mercury weighs ·0894 gramme, it follows that 1 litre of NO_2, whose density is 15, will, under these circumstances, weigh 1·3410 gramme. As one gramme = 15·43 grains, 1·34 gramme will equal 20·68 grains, 1·9 ounce (the amount of binoxide obtained from one pound of HO, NO_5) = 831 grains (437·5920) = 1 ounce, which, divided by 20·7 = 40·14 (say 40), the number of litres in 1·9 ounce of NO_2. As one litre is 61 cubic inches, 40·14 litres = 2448·5 cubic inches = 1·358 cubic foot, the amount of nitric oxide obtained from one pound of nitric acid, and over 6 ounces of metallic copper. Considering the nitric acid as worth 8d. per pound, and the copper twice that amount, it costs us 1s. 2d. to produce 1·358 cubic foot of binoxide, or about 10d. per cubic foot, whilst oxygen gas prepared from chlorate costing 1s. 3d. per pound costs under 3d. per cubic foot.

Hence the substitution of oxygen gas for the binoxide (which enables us to produce a flame identical with that obtained when sulphur is burnt in a jar of that gas) puts us in a position to produce the sulphur light at a comparatively reasonable cost, and it is for the production of this light in particular, and of any other light which can be obtained by the combustion in an atmosphere of oxygen of any substance whose point of ebullition is below 100 degrees Centigrade, that the apparatus delineated in the subjoined diagram is specially intended. It consists, as



will be perceived, of a can containing water, which is placed upon a stand and heated by the flame of a Bunsen's burner. This can contains within it a smaller one, which is used to hold the sulphide of carbon, whose vapour is to be used to furnish us with the desired flame. The outer vessel, which is firmly soldered to the inner one so as to keep it in its place, is provided with a neck for the introduction of the water, by means of which neck, and with the assistance of a perforated cork, a thermometer is introduced, upon the scale of which it is ascertained when the boiling point of the bisulphide is reached, and when the tension of its vapour is sufficiently great to produce flare in the flame. The thermometer used in my own experiment is one extemporised

out of a glass tube, and in which the desired movement is produced by the expansion of enclosed air. This thermometer is easily adjusted, so as to give us a large amount of motion in the indicating fluid. The inner chamber is provided with a neck, fitted with a stopper for the introduction of the bisulphide, and also with a tube for the exit of the vapour, which is burned at its upper extremity at a common bat's-wing burner. This tube is joined at right angles by another one entering it midway between the inner and the outer vessels, and which is used to furnish the necessary stream of oxygen gas. In the apparatus in my own possession the outer vessel is cylindrical in form, as indeed also is the inner one. The former is six inches in diameter and five inches deep; the latter four inches diameter by three inches deep. The neck used to supply the interior of each is seven-eighths of an inch in diameter. When in use the water is made to fill the inner vessel almost to the top, so as to prevent as much as possible the condensation of the bisulphide of carbon vapours.

After the application of the flame beneath, the thermometer is watched until it indicates that the vapour of the sulphide is issuing from the burner, whereupon a light is applied to it, and the heat is allowed to continue beneath until the flame reaches the flaring point, when it is lessened almost to the point of extinction. The oxygen gas is then cautiously introduced, upon which the flame at once diminishes in size and increases greatly in brilliance.

No apprehension need be entertained of serious consequences in the event of an explosion taking place in the tube conveying the vapour from the chamber to the burner. Such explosion, when it does take place, I have found to be confined to the tube itself and not to reach the chamber.

What the intensity of this flame may be from an actinic point of view I have not yet determined, nor have I formed any estimate of the probable cost per hour of maintaining this light. One thing is certain: its actinic properties exist in an enormously larger proportion than its illuminating properties, when compared with such artificial lights as are produced by the ignition of a cake of lime or by the passage of the electric spark. Its exact value as a source of actinism, and its exact cost per hour under various circumstances, together with the use to which in all probability it may with most success be applied, are subjects to which I hope to direct the reader's attention at some future date. In the meantime, the arrangement is offered to the photographic community as an additional means at their disposal for the easy production, and continuous maintenance, of an actinic artificial light.

David Winstanley.

[Our correspondent will see that we have made a slight alteration in the construction of his formula, since the majority of our readers are more familiar with the "old system" of chemical notation than the "new" or "unitary" formulæ.—Eds.]

PHOTOGRAPHY IN COURT.

PIRACY OF ENGRAVINGS.

At the Southwark Police Court on Saturday last, John Benjamin Walker, a middle-aged man, dressed in the garb of a butcher, was brought before Mr. Partridge, on remand, charged with selling divers copies of *My First Sermon*, *My Second Sermon*, and other copyright pictures and engravings, the property of Mr. Henry Graves, the well-known printseller and publisher, No. 6, Pall-mall, well knowing the same to be unlawfully made. It appeared that on the 10th ult. Mr. Bunnett, a carver and gilder, in the Southwark-bridge-road, was convicted for selling twenty of the printed photographs of Mr. Graves's copyrights, and fined £100 or twenty months' imprisonment. A few days after the termination of that case Mr. Graves received such information as induced him to obtain a warrant for the prisoner's apprehension.

Mr. Chipperfield addressed his worship at considerable length for the accused, contending that there was no copyright in the paintings, *My First* and *Second Sermon*, painted by Mr. Millais, as he had never registered the sale of them as directed by the Act of Parliament. As Mr. Millais had not registered, he was clearly not entitled to the benefit of the Act of Parliament, and had no right to sell his copyright till he had registered it. He also contended that the photographs from a painting could not be considered as original, therefore he thought he had raised such doubt as to entitle him to call on his worship to grant him a case for a superior court.

Mr. Partridge observed that if he had any doubt as to any legal point raised by Mr. Chipperfield he would at once grant a case for the court above; but he had not. He was, however, in doubt as to the copyright of *My First Sermon;* therefore he should strike out that, which would take off five of the cases of pirated photographs. As for the other cases, he was perfectly satisfied with the evidence, and he considered Mr. Graves was justified in taking these proceedings for his own protection. No doubt the defendant, who went about in the garb of a butcher, carried on this unlawful business to a great extent, and he should not be doing his duty unless he put the law in force. He, therefore, fined the prisoner ten pounds in each of the twelve cases, and, in default of payment, he was committed for six months.

Contemporary Press.

CARTES DE VISITE.

[Good Words.]

Now that every bookseller's window is converted into a portrait gallery, and the public demands some knowledge of the *personnel* as well as of the deeds and speeches of men of eminence and notoriety, the *carte de visite* has become such a great institution that it is worthy of some special notice. These handy little records of old familiar faces stand in the same relation to the grand portraits that grace the National Gallery and the drawing room that small change does to gold or paper money. They are the democracy of portraiture. As the sun shines alike upon peer and peasant, so when he wields the brush he is equally impartial, and you may now purchase in Seven Dials as good a picture as regards mere likeness as can be procured in the more aristocratic quarters of the town. When we reflect upon the horrible effigies the last generation of the middle and the upper portion of the working classes were satisfied with—upon the miserable silhouettes snipped in black paper on board the penny steamers—upon the "likenesses in this style four shillings," the value of the photographic portrait comes forcibly before us. But the very fidelity with which this new art copies what is set before it renders it all the more necessary that the operation should be both skilful and artistic. It does not always follow that persons in the highest station command the best portraits. It is notoriously otherwise, in fact, with regard to the highest lady in the land. There has scarcely been a good portrait recently taken of Her Majesty. This seems perfectly unaccountable; but we understand that the same etiquette which would not allow the chafing dish to be removed which burned the Spanish king except by the proper official, will not permit of the artist posing his august sitter. The best attitude, the most agreeable light, the most pleasing expression which he may select, or call forth from the ordinary sitter, is denied to him by the court rules of the lady whose *carte de visite* is the most universally in demand. When Prince Albert was alive all etiquette was banished; he himself with his artistic instincts posed his Royal Consort, and the photographer found the most delicate part of his work done for him. At present the Queen merely takes her seat, and intimates through her secretary that she wishes to be taken in a certain attitude, and the artist has nothing to do but to comply with the order. It must be evident that photographs taken under such circumstances cannot be very satisfactory. Even such as may turn out well never reach the public, inasmuch as Her Majesty purchases for her own use all the best negatives, prints from them being taken by her own photographer. There is one photograph of the Queen, crowned and with the royal robes, the history of which seemed a mystery, but the explanation of it is this:—A well-known photographer took a likeness of the Queen of Spain similarly attired, which she forwarded to Her Majesty, desiring a similar return *carte*. This is the only regal instance, we believe, of an exchange which has become so common in society.

The public does not appreciate the fact that very careful dressing is required to obtain a satisfactory audience of the sun. Sol is even more inexorable than any court flunkey in such matters. The public seems to think that the sun takes cognizance of any colour that may be presented to him, and finds out its mistake when too late. Yellow or orange may suit the brunette, and mauve, or the lighter shades of blue and grey, may harmonise with the blonde; but in the camera it is far otherwise. The yellow ray of the spectrum does not affect the silver plate, whilst mauves, purples, and blues do most actively; thus, when the printing process reverses the shades on the photographic plate, the yellow becomes black, and the delicate light colours above mentioned print nearly pure white. Thus sitters sometimes become so altered in their photographic portrait that they scarcely recognise themselves. Gloriana with golden hair comes forth with raven tresses, and the yellow rose in Rebecca's coiffure is as black as the locks they adorn. A certain class of people, again, like the sun to register their finery. Ladies who but seldom go to court wish to make the most of the occasion, quite regardless of the fact that stiff brocades, especially during the crinoline fashion, give anything but an elegant contour to the figure. There has been of late, however, a very great improvement in this respect, and all the better class photographers have learned to impress upon their sitters the value of simplicity, both as regards pose and dress.

In certain quarters of the town, however, the rage for pretence is as great as ever, both on the part of the sitter and the photographer. It will be observed that the lower the neighbourhood the more varied the amount of properties or scenic decorations to be found in the studio. Possibly the carpenter would prefer being taken working at his bench, but the photographer, who artfully prefers pleasing Jones's wife, places him upon a terrace with a far-stretching landscape as a background. Servant maids, again, are seated in splendid boudoirs, and respectable tradesmen are placed in extensive libraries, whereas the only books they feel at home with are their day-books and ledgers. All this is the mere snobbery of the art, which we rarely see practised in better class studios. A flat grey background, which throws up the figure without cutting up its lines, is now almost universally employed. Nevertheless the ignorance that is occasionally displayed by people of the better class with respect to the manner of taking the photograph would scarcely be believed.

On one occasion two ladies entered the sitting-room of a studio, and placing themselves before a mirror, after some time wished to know if the portraits were not finished, evidently thinking the looking-glass was the operating agent. In another case we heard that a young lady intimated her desire that her hair should be made a little longer; and it has been desired that even jewellery should be omitted in a portrait, the sitter making no attempt to remove it herself. One old gentleman in the country even sent up the colour of his hair to the colouring artist of the Stereoscopic Company, and called four days afterwards to inquire if the portrait was done? Young lady sitters during the present fashion of dressing the hair are not photographed to advantage, the chignon affording a very unsubstantial foundation for the head-rest.

The rage for the *carte de visite* which has lasted so long, seems at the present moment to be on the decline, or rather we should say other sizes are now becoming saleable, which formerly was not the case. The reason of the popularity of the *carte de visite* is obvious. The small size of the picture employs only the centre of the lens—its truest part—hence the clearness and the sharp definition it gives to the features; but what is gained in these particulars is lost in modelling and half-tones, which give all the delicacy of expression to the face which we see in cabinet photography and the vignette heads. These latter are generally cut out of large existing photographs, and are not taken for the occasion. The beauty of some of them, especially of the leading actresses, is pretty sure, we think, to bring the new size into fashion.

The sale of *cartes de visite* is scarcely a fourth of what it was when they first came into vogue. All our photographic albums are filled; the whole of our friends are represented; and the celebrities of the day and children now mainly keep the photographers in employment. But the sale of noted individuals and of the Royal Family is still immense. Some of the wholesale houses do an enormous business in this article.

The Messrs. Marion, in Soho-square, alone possess the *cartes* of many hundred thousand persons. This house does not photograph, but merely purchases of those who do. The possession of negatives of famous persons is a fortune to a man. Mr. Mayall, of Regent-street, who has photographed nearly all the Royal Family, has been paid by the house of Marion alone upwards of £35,000 for *cartes de visite* of its various members. The Stereoscopic Company, which photographs as well as purchases negatives of any celebrity that may be inquired after, possesses a portrait gallery which includes every known person of any distinction. It is scarcely necessary to say that any matter which brings an individual into public notice at once raises the value of his *carte de visite.* Tom Sayers's battle with Heenan sold fifty thousand of his *cartes de visite.* The gallant bearing of the Queen of Naples placed her photograph in every album in the kingdom. Many a man, through some accidental circumstance, wakes up and finds himself famous, and in two or three days his *carte de visite* is staring at him from every window in town. If any illustrious person is reported ill, there is an immediate inquiry after negatives, and as the pigeon holes of Printing-house-square are always kept well supplied with biographical sketches of statesmen about to depart this life, so the photographic printer anticipates their death by keeping a large supply of *cartes de visite* in hand. We scarcely know whether a statesman would be pleased or shocked at such an anticipation of his decease. It may not be pleasant for any man to know that others are eagerly making a market out of such an event; but then, on the other hand, it must be highly flattering to know that when he has gone hence and taken with him the original, he has left so many copies behind. Whether it was that Lord Palmerston had, during his lifetime, discounted his popularity, or because of any reaction which has occurred with respect to his memory, we know not; but it certainly is an undoubted fact that his *carte de visite* is no longer called for, while those of many of his contemporaries, now deceased, are still in very fair demand. Thus, Cobden is still largely sold in the market, possibly because he represented a principle which is dear to the hearts of his countrymen. Next after royalty, the photographs of statesmen, we are told, sell the best; but even the most eminent of these are local in their sale. The politics of our leading men may be even guessed by the district in which their *cartes de visite* sell. Thus, Bright sells largely throughout the north, whilst in the west he is never inquired after. Next to statesmen, the largest demand is for actresses, especially operatic singers. When Jenny Lind was on the boards her *carte de visite* sold very largely, but nothing like that of Adelina Patti, which has quite astonished the photographers themselves. The Messrs. Marion alone have sold, within the last three years, fifty thousand copies of the portrait of this popular singer. In France, also, there is a very large demand for actresses and singers, but for no other persons of eminence. Our neighbours seem to care nothing for their statesmen, great men of letters, artists, or great religious teachers. Their homage, as indicated in this particular instance, is often of a sensual nature, and many of the photographic pictures which disgrace the windows of the sellers of photographs are published either in Paris or in Brussels.

The sale of clergymen of the Church of England is also very large, especially of those whose names have been brought prominently before the public, such as Keble, Pusey, Neale, Mackonochie, and, of course, the leading bishops. We have spoken of a photograph of Dr. Pusey, but this is not strictly accurate: he never would have his *carte de visite* taken, although pressed to do so, and, on one occasion, was offered a bribe of a hundred pounds for a charity with which he was connected. The *carte* we see of him in the windows is from a sketch taken surreptitiously whilst preaching. There is a *carte de visite* of the Bishop of Oxford holding up his fingers after the ancient method of giving the blessing, which caused some scandal at the time, and which is now withdrawn from sale; but a colonial bishop, Dunedin, now boldly stands forth in the same attitude. His see being so far distant, little notice is taken of this portrait. As a rule, portraits of dissenting clergymen are not at all in demand. Of course we except Mr. Spurgeon from the rule. It is difficult to account for this fact, unless we are to suppose that the dissenting element in the population, as a class, care less for art than church people and those who move in society. It cannot be that they are less attached to their pastors, or that they prize them less highly than church people in a spiritual sense.

What has become of what were once termed pistolgram portraits? An instantaneous method of securing a likeness is no doubt a great desideratum, but we question whether, with our present means of posing the sitter, anything like a natural expression would be thereby secured. The act of posing a sitter is by no means calculated to secure a natural expression. Indeed, most people enter a photographer's studio with the same flutter they do the operating room of the dentist, certainly with scarcely less nervous trepidation. In both cases the "patient"—we use the word advisedly—has to screw his courage up to the sticking point. The sight of the tooth-drawing instrument may give a slight shock to the nerves, but we question if the effect is as visible on the countenance as that produced by the photographic manipulator gently pushing back the head until it is brought up by the head rest—that terrible instrument, which sets all the lines of the face into spasmodic contractions, effaces, like the touch of death, all expression, and reduces the flexible human countenance to the condition of a mask. If the sitter recovers this touch of cold iron, the photographer's warning voice to "remain quite still" while he removes the cap of the lens and exposes you to the searching eye of the camera, generally settles the business, and renders the first negative a failure. With such instruments of torture, used as they are generally without discretion, the pistolgram would only have the effect of giving the expression at the very worst, just as the first shock has paralysed or contorted the expression. Photography, where living muscle is concerned, cannot be performed successfully at express speed. The best and most artistic operators are well aware of this; they allow the sitter to become accustomed to the sight of the instrument, just as a good groom in breaking-in a horse makes him look quietly at every object likely to make him "shy." Again: all good photographers are aware that what is termed a good taking day, such as is favourable for printing from the negative, is by no means favourable for producing the highest specimens of his art. The full blaze of the sun, however shaded from the camera room, never yields those tender half-tones which give all the charm to a really fine likeness.

Although the sitter may be in a room whose northerly aspect may wholly exclude the direct rays of the sun, yet his penetrating influence affects the whole firmament, and the effect is that the silver of the plate is affected so quickly in the higher lights that no time is permitted for the drawing of the delicate half-tone, without which a photographic portrait is worthless. Hence a slightly cloudy day yields by far the best picture. Of course we do not mean a foggy day, especially a yellow foggy atmosphere, such as we get in November; on such occasions the photographer cannot work, the whole face of nature being reduced to the tone of the room where he manipulates his negatives, in which yellow fog is simulated by yellow blinds. In the majority of cases the very clear definition of the picture gives a hardness which is not agreeable, and which the human eye never shows us. The iris is continually in motion, becoming larger or smaller to accommodate itself to the amount of light or to the distance at which objects are viewed. A certain softness is the result, which ordinary photographs do not give. We may illustrate what we say with reference to the hard outlines of some photographs by the effect they have when viewed in the stereoscope compared with the natural objects they represent. Stereoscopic pictures always look like hard clay models: they lack all the softening effects of the atmosphere. Stereoscopic views are particularly unpleasant, to our mind, for this very reason—atmospheric perspective is wanting in them; and although the different objects seem to be round, yet those parts situated on different planes seem as though they were but flat surfaces placed one before the other, just as the fly side-scenes at a theatre seem distinct from the back scene. The late M. Claudet, who who was really a scientific manipulator, perceived this error in ordinary photography, and patented a method of giving softness to his portraits, which rendered them like fine mezzotints. This he did by means of a movable lens in his camera. A very slight movement broke up the almost metallic sharpness of this outline (which, we repeat, we never see in nature), and gave most agreeable portraits. The colour, again, of the photograph has a great deal to do with its pleasant appearance. A cold, grey portrait, which some photographers seem to admire, is not nearly so agreeable as those of deep chocolate colour, so full of warmth in their shadows. Mr. Ernest Edwards, who has given us such a fine portrait gallery of our medical men, has appreciated this fact; so did Silvy, who a few years ago most certainly stood at the head of all our photographic artists as a taker of *cartes de visite*, but has now retired from the profession.

ANDREW WYNTER.

(To be concluded in our next.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 17th	Edinburgh....................	Hall, 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

THE monthly meeting of this Society was held on Tuesday evening last, the 9th inst., the chair being occupied by the Rev. J. B. Reade, F.R.S., Vice-President.

The SECRETARY acknowledged the receipt of some volumes from the Commissioners of Patents in America, and of prints from Kew Observatory showing the spots on the sun during the last few days in January; after which he read a short paper by Mr. Woodbury describing the leading features of the process of printing invented by him. As we have recently had some articles on this subject we need not here recapitulate the details of the process, beyond stating that since it was first introduced many difficulties had arisen which, by continued experiment, had been successfully overcome. Although improvements had been made in matters of detail, the process was in principle identically the same as when he first published it. By varying the proportions of the bichromate in the gelatine film, the operator acquired the power of preparing moulds from a flat and feeble negative, which would yield a forcible print, and, in a similar manner, soft prints from hard and intense negatives. In conclusion, attention was directed to a large collection of works printed by the process by Messrs. Goupel, of Paris, who employed it extensively.

Mr. Woodbury being absent in Italy, Mr. Smith, Secretary of the Photo-Relief Company, was in attendance with an assistant, and practically demonstrated the method of producing the prints, the specimens being handed round among the members.

Mr. HENRY COOPER observed that since he last saw the process worked a great improvement had been effected, viz., the substitution of a film of collodion on which to sustain the gelatine relief instead of the talc or mica originally employed. It was obvious that by using mica the size of the picture must be very limited on account of the difficulty of procuring it in large sheets, whereas with collodion films there was p ractically no limit to the size.

Mr. LE NEVE FOSTER, referring to a statement in the paper that eight hundred impressions could be obtained from each block, said that it was rather a small number to be got from a block. A wooodcut, which was printed by direct pressure, yielded a very large number of prints compared with an engraved copperplate, which had to be rubbed after each impression; and, as the Woodbury prints were made by direct pressure, he could not understand how the number was so limited.

Mr. SMITH explained that, although they had not yet attained to the limits of production by a plate, having from some plates obtained a thousand prints—there was a little cleaning of the surface now and then required, which was done by a soft cloth with oil, and this oiling of the surface had a tendency to damage the most delicate portions of the plate.

Mr. BOCKETT inquired if they could not make use of a harder metal than lead from which to print. He spoke of the well-known experiment practised by school-boys, of taking impressions in lead from casts in sealing-wax by means of a firm blow, and considered that by similar means the gelatine relief might be imbedded in a harder and more durable metal than lead. He asked if Mr. Woodbury had tried to produce the plate in copper by means of electrotyping.

Mr. SMITH said he had, but the difficulties of backing the electrotype and preserving the surface absolutely flat, added to other objections, prevented him from continuing to use it. He further stated that as one gelatine relief could yield a number of engraved plates, it would represent upwards of ten thousand prints.

Mr. HENRY DIXON observed that he had heard it stated that some foreign government had applied to Messrs. Goupel concerning its applicability for printing postage stamps. An application of this kind would require the means of producing prints in millions rather than in thousands.

Mr. FOSTER referred to the rolling-press as a means of impressing the gelatine cast in the lead plate, instead of the hydraulic press used by Mr. Woodbury. Mr. Bradbury, in his "nature-printing" process, employed it with excellent results.

Mr. SMITH said that it was found to bend the plate in Mr. Woodbury's process, and the subsequent straightening of it was attended with great difficulty and risk of destroying the details of the image.

Mr. DAVENPORT remarked that in Bradbury's nature-printing process direct pressure was found to destroy and crush the object, which was not the case when the pressure was applied by rollers. He had seen the delicate down of the thistle impressed in a steel plate. Rolling pressure permitted a harder plate to be used than direct pressure.

Mr. SIMPSON said that Mr. Woodbury had made numerous experiments in arriving at a decision respecting the best kind of plate from which to print. Electrotypes he found to require continual oiling in order to make them deliver the ink properly, but the peculiar unctuous surface of the lead now employed rendered it the best metal for the purpose, as it delivered the ink with so much freedom; hence if harder moulds were even readily obtainable, they would not be so good.

Mr. BLANCHARD considered that it was remarkable how, from such a rough and ragged surface as the gelatine moulds sent round for examination possessed, plates could be obtained which yielded such exquisitely delicate prints. He proposed that the metal blocks themselves, from which certain prints had been taken, should also be sent round for examination. This was done.

After some remarks by Mr. Henderson and others,

The CHAIRMAN, while thanking Mr. Woodbury and Mr. Smith, said that the process had spoken so eloquently for itself that it left him nothing to say on its behalf.

Mr. JABEZ Hughes exhibited a number of photo.-crayons by Mr. Sarony, of Scarborough, and at some length described the nature of these pictures. As we have a descriptive article on this process in the present number, it is not requisite to here report Mr. Hughes's remarks in detail. In conclusion he said that the pictures bore the appearance which characterised chalk drawings. The backing paper supplied the hatching lines with which artists terminated the bottom of their drawings. There was no necessity for confining the picture to the head and bust, for it might be made a three-quarter or a full-length figure, or even a landscape, and, instead of the hatched drawing paper for a background, a drawing in colours or even an engraving might be substituted. While the desire for *cartes* had fallen away the desire for *photographs* had not, and it would be well for professional photographers to supply the public with pictures of this kind, in order to revive failing trade.

Some discussion here took place concerning the novelty in the process described by Mr. Hughes, Mr. A. L. Henderson stating that paper backings had long been applied to collodion pictures.

Mr. HUGHES defended the originality of the invention, and explained wherein lay the features which distinguished it from others.

Mr. ENGLAND considered that the fragility of the glass was an element to be considered in estimating the durability of the pictures.

The pictures were handed round among the members, and inspected with much admiration and interest. A vote of thanks was awarded to Mr. Sarony for the exhibition of the pictures, and to Mr. Hughes for his descriptive remarks.

The next meeting will be held on April 13th, when Mr. Brown, of Woolwich Arsenal, will give a lecture on the nature, manufacture, and properties of gun-cotton, illustrated by experiments.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

THE annual meeting of this Society was held on the 3rd instant,—Mr. G. W. Simpson, Vice-President, in the chair.

After the minutes of the previous meeting had been read, the following gentlemen were admitted as members, viz., Mr. J. W. Smith, of Brigg, and Domingos Pinto de Faria, of Oporto.

Mr. Dunmore then read a paper on *Exposure, Development, and Lighting.* [See page 120.]

Mr. J. COOPER having inquired concerning a statement in the paper relative to the printing qualities of the negative being dependent upon the size of the atoms of silver composing the image,

Mr. DUNMORE said that some developers would give a finer deposit than others, and those that gave the finest deposit made the best printing negatives. With a brown oxidised developer a cleaner picture was sometimes obtained, but when everything was in the best condition he considered a new developer to be better than one that was old.

Mr. HILL said that when the bath and collodion were right he had found a developer containing five grains of iron to the ounce yield fine and delicate pictures.

Mr. BELTON observed that the very delicate image obtained by the primary development was often quite lost by the subsequent intensification.

Mr. HILL inquired if there was anything now being said about the addition of gelatine to the developer. He had tried the formula published by "Clericus," and with good results.

Mr. COOPER had also tried it, but found it to be slow. He had also tried glycerine in the developer, but found it to cause pinholes in the film.

Some conversation here ensued on the properties of glycerine when imperfectly purified, and on the good qualities of Price's glycerine—the readiness with which it was decomposed by nitric acid, and even by a solution of nitrate of silver containing much free nitric acid.

Mr. HART recommended Mr. Shave, who had once had some glycerine which turned out very badly for photographic purposes, to try the next sample possessing the same characteristics by means of lead, and observe if it turned of a brown colour. If it did so it would indicate the presence of a sulphate.

Mr. DUNMORE observed that the fine bright green crystals of protosulphate of iron did not answer so well for developing purposes as other samples of inferior appearance.

Mr. Hart said that the sulphuric acid could be got rid of in those crystals by spreading them out on a dish and exposing to the air until they became brown. They must then be dissolved, and, after being filtered, acetic acid was added. This, he considered, would make one of the best developers for negatives.

Mr. Belton said that, having been under the impression that the subject for that evening's paper was plain paper printing, he had accordingly brought with him for exhibition some results of his trials in that direction. The paper was quite plain, and no organic matter had been used by him in order to keep the picture on the surface. The salts employed in the preparation of the paper were those in common use, although in different proportions. In one picture, which was of a somewhat warmer tone than the others, there was some barium, but not so in the others. The papers had been excited on the usual bath, and the toning and fixing had also been effected in the same manner as if albumenised paper were employed. He was still experimenting in this direction, and he hoped that before long he should have a paper which would be quite waterproof.

The various prints exhibited by Mr. Belton were admirable examples of plain paper printing.

The Secretary then read the following

ANNUAL REPORT.

Your Committee, in presenting their report of the proceedings of the past year, have no striking facts to announce nor startling discoveries to chronicle; but if there has been an absence of exciting events there has been a continuance of the steady prosperity which has hitherto attended the Association, and they think they have reason to be satisfied with it. The meetings have presented the same agreeable features which are characteristic of these gatherings, and which it is the earnest desire of the Committee to maintain, as it renders their duties not only light but exceedingly pleasant. The following is a statement of the subjects which have been brought before the Association:—

The first meeting was occupied by a discussion on glass, followed by an exhibition of portraits taken with a limited amount of direct light, producing very beautiful results.

The second meeting was devoted to a paper by Mr. Bockett, *On Some of the Changes that Take Place in Photographic Materials and Chemicals After a Lengthened Disuse.*

The third meeting took into its consideration the best means to be adopted to secure the presentation photographs for the year, which resulted in a competition for the supply by some of our best artists, the pictures by Lake Price, N. K. Cherrill, and O. G. Rejlander being selected.

At the fourth meeting Mr. N. K. Cherrill read a paper *On the Relation Between Intensity and Tone,* which caused a prolonged and interesting discussion.

The fifth meeting was devoted to the examination and discussion of prints by Woodbury and enamels by Henderson.

The sixth meeting was taken up with the consideration of printing on plain paper, illustrated by Mr. Bedford; by prints on the "wrong" side of albumenised paper; and on transparancies for the lantern, exhibited by Mr. J. T. Taylor; and the new mezzotint photographs by Mr. Carl Meinerth, exhibited by Mr. G. W. Simpson.

At the seventh meeting, Mr. W. W. King's paper *On Neglected Art Subjects for Photography* was read, snd profusely illustrated with photographs by Bedford, Collings, and himself; and a short paper by the Secretary on *Artificial Light and Development Printing,* in which he introduced the subject of a new light to be produced by the combustion of zinc.

And at this, the last meeting of the year, the election of officers will, as usual, take place.

The Committee desire to express their thanks to the before-mentioned gentlemen, who have so kindly assisted them.

It is with much pleasure that the Committee find that the selection of photographs for the year has met with such general approval by the members, and they deem it but just that the thanks of the Association should be accorded to the gentlemen who supplied them.

The financial statement is satisfactory; and, although the balance in hand is not so large as it was last year, it should be borne in mind that a portion of last year's balance was due for photographs which had not been charged to the Association in time to pass the accounts.

The Committee have to regret the decease of Mr. J. A. Barber, who was one of the promoters of the Association, and for many years served on the Committee. He was a valuable member, and his extensive chemical knowledge was always at the command of any member who applied to him for information.

Lastly: they deem it not out of place to request that members will kindly remember that the year commences with the 31st March, and that the new Committee will be greatly aided in their duties by an early payment of subscription, which enables them to decide upon the number of photographs which will be required, and to apply as large an amount as possible towards that object.

The Committee now retire from office, and trust their efforts to promote the efficiency of the Association have not been in vain.

The report having been unanimously adopted,

The Society next proceeded to the election of committee and officers for the ensuing year, the following being chosen:—*President:* Charles Woodward, F.R.S.—*Vice-Presidents:* J. Cooper, A. Goslett, G. W. Simpson.—*Committee:* W. W. King, W. Bedford, J. C. Belton, E. Dunmore, F. W. Hart, W. Morley, Thos. Ross, W. Shave.—*Treasurer:* D. W. Hill.—*Hon. Secretary:* J. Barnett.

After votes of thanks to Mr. Dunmore for his paper, to Mr. Belton for the exhibition of his pictures, and to the retiring officers and committee, the meeting separated.

Correspondence.

Foreign.

Paris, March 9, 1869.

When I concluded my last letter I expected to begin this with a *resumé* of the work on the photographing of colours, the preface of which I gave to your readers; but I must beg them to wait a little for this *resumé*, and to kindly follow me whilst I ask their attention to a subject which seems to me of more immediate interest. The few lines from the *Gaulois* which were placed at the end of my last, in which it was announced that Adam-Salomon was photographing the dead Lamartine, will serve to introduce my theme—the companionship and friendship of these two artists.

On Saturday last an engraving from the photograph taken under such sad circumstances was published in *La Chronique Illustrée*, and, melancholy though it be to look at, yet the traits of a sculptor's hand in the pose, and of an artist's taste in the arrangement of the accessories, are visible. With his head raised upon a pillow, and reposing upon an embroidered handkerchief, with a black cross upon his breast and a calm expression upon his features, lies Lamartine. The kind hand which posed him was numbered amongst the friends of the illustrious man, and Adam-Salomon and his wife were with those who were present when Lamartine breathed his last. "The great artist," says *La Chronique Illustrée,* "wished to possess an imperishable *souvenir* of the poet, from which, doubtless, his marvellous chisel will soon retrace to us his image. It was for this reason that the photograph was immediately taken."

Some few years ago Lamartine lost his wife, and it was his friend Adam-Salomon who, wishing to "render death immortal," offered to him a magnificent statue of his lost one, in pure white marble. The following letters from the two artists will give a little idea of the friendship existing between them, and of their respective characters:—

"Monsieur, and Illustrious Friend,—I have just finished the funeral statue of Madame de Lamartine, hoping that you will kindly have it placed in your family vault at Saint Point. I am happy to have been able to consecrate to the memory of this good woman a pious homage of admiration and respect. This expression of profound sympathy will be, I am sure, sir, understood by your heart. It is better to be associated with the mourning of great men than with their glories. Their griefs belong to those who love them; their glories belong to everyone." "Adam-Salomon."

"My dear Salomon,—I cannot tell you with what sentiments I accept the two presents of the heart which you are so kind as to offer me—the statue and the letter. I await your return to go and contemplate before you this pious pledge of friendship and immortality. Your letter will serve for the inscription for the pedestal of this monument. That holy woman merited by her enthusiasm for the arts this *souvenir*, worthy, they say, of the greatest artists. She will be proud of it in heaven, as I am on earth. You illustrate my grief as you have for all time illustrated my affection for you and for Madame Adam-Salomon." "Alph. de Lamartine."

Lamartine wished to testify his thanks to M. Adam-Salomon by some present, and the latter expressed his desire to have a collection of the works of the poet, which were at once sent. So much has been written respecting the merits of Adam-Salomon as a photographer that I am glad to have this opportunity of writing something which will show his merits as a man and the estimation in which he is held as a sculptor. One writer, remarking upon this statue of Madame de Lamartine, says:—

"M. Adam-Salomon, to whom we owe this beautiful statue, which is comparable by the sincerity of its inspiration with the excellent works of the middle ages, has shown in it once more by the qualities of style, by the extremely rare happiness of expression, that, although equal to the artists most worthy of the name, he knows how to be at once master and disciple—master of the material which he submits to his manipulation, and faithful and intelligent disciple of nature, whose secret voice he listens to, and whose divine language he translates into visible and sensible signs."

Another writer says:—

"The sculptor full of sentiment, Adam-Salomon, raised this funereal statue himself, which makes all who see it weep, and those who hope it makes them smile."

Lamartine was buried in his family vault at Saint Point, near to Macon, and Adam-Salomon was one of those who followed his friend to his last resting place.

I need hardly make any comments upon the foregoing. The friendship between two great artists is a noble friendship, each bringing the treasures of his art to comfort, please, or console the other. No jealousy, no littleness—both disciples of the same master, both drawing their inspiration from the same source. One is gone to learn still more, the other is left to teach us further. The "twilight of his life" crept over Lamartine ere he fell asleep, for his faculties were obscured. His friend the sculptor and photographer is yet in full vigour, and I hope that what has been written will raise him still more in the esteem of his admirers and friends, and advance him in the opinion of those who could see but "little in him." One feels that our art is raised by having such a disciple, and that again it may be said to us—"Go and do likewise."

A meeting of the French Photographic Society was held last Friday, when some remarks were made upon the carbonate of silver paper. These remarks were evidently not made with care, as a little account of them will show. M. A. Chardon stated that he had been using the carbonate of silver paper, that several of his negatives became yellow in consequence, and that, therefore, he did not appreciate the new paper. M. Schaeffner, who happened to be present, brought out that M. Chardon had used liquid ammonia and not the carbonate, and that it was very evident that his paddings of blotting-paper had become damp with it, and that thus the varnish which contained gum benzoin had been affected. It was very unfair to condemn a process when other manipulations were used than those especially prescribed. The *critique* of M. Chardon amounted to a war upon ammoniacal fumigations in general rather than upon the special case in question. If dry blotting-paper be used there is no danger of spoiling the negatives, and the negatives should always be well washed from all soluble salts before being varnished. M. Chardon has not been successful with his ammoniacal fumigations because he has not gone the right way to work in using them; but the experience of photographers on both sides of the Atlantic demonstrates the value of this mode of operation.

The committee of the French Photographic Society beg all intending exhibitors to send in as soon as possible the account of the space they will require.

With the following fact for the benefit of those who use the oxyhydrogen light I conclude this letter:—The rapidity of the flame in the mixed gases is thirty-seven yards per second. Hence with a tube between the jet and the gas-bags of say two yards, the flame may run along from one to the other in the eighteenth part of a second, not leaving much time to "clear out." R. J. Fowler.

Home.

TAPIOCA PAPER PROCESS.

To the Editors.

Gentlemen,—I find, in No. 458 of The British Journal of Photography, my name mentioned in a paper read by Mr. John Barnett, at a meeting of the North London Photographic Association, in connection with a process I am quite familiar with, but which has never been published, I believe, under my name.

The "tapioca process" for developed prints, as described in the said paper, has been suggested by Mr. E. Sellbach, of Crefeld, six or seven years ago, and is a process used in Germany in most of the studios that are furnished with a solar camera. I have never seen the red patches described by Mr. Barnett. Red spots are sometimes formed on the salted paper, but disappear in the nitrate bath.—I am, yours, &c.,

Elberfeld, Feb. 28, 1869. E. Liesegang.

THE OXYHYDROGEN LIGHT.—EXPLOSIONS AND THEIR PREVENTION.

To the Editors.

Gentlemen,—It appears that I omitted to say in my communication on the use of my double oxyhydrogen fine bore jet that when the second jet was to be used, the first being already lit, the oxygen ought to be cut off first before the small tap is turned on, otherwise the gases will snap in the nozzle, unless it be done very quickly. It will invariably do so when turned off, whether done quickly or slowly.

A gentleman whom I have supplied with a burner of that description writes and complains of this. It might have been deduced from the law I pointed out in my first communication, namely, that the gases must issue from the orifice at a greater rate than the flame can travel backwards. If it do so a snap in the jet is impossible; if it do not it is certain to take place. Now, when the little tap is turned slowly on, the gases being already mixed in their most explosive proportions, it follows that at first they can escape but slowly from the orifice of the jet, as the tap has only just begun to be opened. If it be done quickly the tap is fully opened before the gases arrive at the orifice. When the gases are shut off from this burner after having been burning it will always snap, because the tap being closed, and the burner full of the mixed gases, it must do so for reasons before mentioned. The way is, if you want to double your light to produce an effect, or owing to your picture being dense and requiring it, to dissolve off your previous picture by turning the oxygen off slowly. Then turn the little tap of the second jet, when of course hydrogen alone issues from both jets. Now turn the oxygen slowly on again, precisely as you would with the single burner, and you will have a glorious light. It is most useful in practice, and has great effect in the last piece.

It is hardly necessary for me to say that the consumption of gases is double while the two burners are going, and would require nearly a pound of chlorate of potash, instead of half-a-pound, to yield the oxygen necessary for a two hours' exhibition, if the two jets were used all the time. I never use both all the time; the light is quite sufficient without it—better by far than any blow-through jet or oxycalcium burner that I have had.

I use an oil flask now for making the gas—one that will hold five ounces well—using a Bunsen burner to heat it. While that is distilling I rub up another five ounces of chlorate with its one-eighth of black oxide of manganese, and place it in another dry flask. I keep several ready, mouth downwards, in a rack. They seldom crack, and if they do the charge is more seldom lost, for the gas does not escape through; but it should never be used a second time. The side jets of the Bunsen burner alone should be used, and the flame ought not to touch the glass by half-an-inch or more. It is done in about ten minutes. There is no danger from bursting here, and the gas gets a chance of being washed, which it does not when done at one operation in a metal bottle over a coal fire. I have not had a tap set by corrosion since I gave up the iron bottle.

There is a notion about that the use of the black oxide of manganese is to prevent the chlorate from giving off its oxygen too fast. This is not the case; it is for the reverse object. Chlorate of potash, by itself, requires a bright red heat, and no glass will stand it, for it melts, and the gas is given off very slowly. How such an opinion could get into print I cannot imagine. My flasks do not get even a dull red heat. The particles of chlorate melt at the moment they give off their oxygen, and solidify immediately afterwards, but the mass is never liquid.—I am, yours, &c., T. S. Reeves.

Exeter, March 6, 1869.

THE MANCHESTER EXHIBITION.

To the Editors.

Gentlemen,—In Mr. Winstanley's report of the exhibition and *soirée* of the Manchester Photographic Society, I am represented as being an exhibitor of collodio-bromide stereo. pictures. I beg to inform you that the only pictures I exhibited at the Society were vitro-enamels.

I am not aware where the enamels are that were exhibited by M. Camarsac at Manchester last year; but if they are the same, or like those exhibited by his agent, in Regent-street, they are all highly worked up *à la* Salomon; in fact, if they were worked up as well as Salomon's, it would be rather a difficult matter to discover it, on account of the vitrification softening and blending together the fine touches, unless a plain proof of the negative were also shown. The enamels exhibited by me were absolutely untouched.

By correcting this mistake you will greatly oblige,—Yours, &c.,

A. L. Henderson.

49, *King William-street, London, March* 8, 1869.

MOONLIGHT EFFECTS IN PHOTOGRAPHS.

To the Editors.

Gentlemen,—A friend who has just returned from the Continent has brought back with him, among other curiosities and rarities, a number of photographs which profess to have been taken by moonlight. In one of these, a *View in Dieppe*, the effect of moonlight is so admirably imitated as to deceive the majority of those who look at it. The exercise of a little reason prevents my accepting these pictures at their own estimate, for it is very evident that, even by a process a hundred times more rapid than wet collodion, the exposure would still be one extending over some hours, whereas in these prints the exposure must have been instantaneous. Can you, or any fellow-reader, give me a clue to the manner in which these pictures have been produced? Whoever would do so would confer a great favour on,—Yours, &c.,

Temple, March 10, 1869. J. G. Knight, M. A.

[The method by which "moonlight" views are produced is as follows:—Let the subject be lighted by direct sunlight, and let the sun be in front of the camera, or nearly so. Then expose so rapidly that the shadows will be very much under-exposed. This, in general terms, is the whole secret. If there be rippling water in front, some very beautiful effects may often be obtained.—Eds.]

THE VELOCIPEDE APPLIED TO PHOTOGRAPHY.

To the Editors.

Gentlemen,—I wish you would get the velocipede you sometime ago hinted of having, in order that I might have the benefit of your advice relative to the selection of a suitable one for out-of-door photography. My camera is a large one, 15 × 12, and although it is both compact and light, I find that, with its three double dark slides and stand, it is distressingly heavy for me to carry for a few miles. Now, I believe a velocipede would come in exceedingly handy for my purpose. But I suspect that those French ones, of which I have seen many rattling about the roads in Paris and its neighbourhood, would be quite unsuited for my purpose, as they appear to be incapable of being moved slowly along, while standing still when on one of them is an impossibility.

Are there not velocipedes constructed with three wheels? If so one of them, I expect, will be better adapted for the photographer's use than those known as French. Kindly inform me if you know of any that would suit the purpose of myself and some friends. We desire to have such as are quite free from all danger of toppling over, are suffi-

ciently strong to support a man of thirteen stone and a camera of large size, with a tent and kit of chemicals, if need be—not ugly enough to be an eyesore to an amateur mechanic, and not expensive enough to deter from indulging in a long-coveted luxury. If, Messrs. Editors, you can put me in the way of procuring a suitable locomotive machine to answer our purpose, you will render a great favour to an

March 10, 1869. OLD SUBSCRIBER.

[A "three wheeler" is undoubtedly the best, for the reasons alleged in the letter.—EDS.]

EXCHANGE COLUMN.

I will exchange a background and two side slips (ornamental) for a stereo. camera; bellows body preferred.—Address, J. DUNCALF, 97, Claughton-road, Birkenhead.

For a certain number of photographic views or art studies I will exchange a good stereo. camera and lens by Rouch.—Address, J. A. GRANT, at Rev. Dr. Butler's, Harrow.

A pair of three and a-half inches double combination stereo. lenses, by a British maker, will be exchanged for a pair of longer focus card lenses, French or otherwise.—Address, B. WYLES, Chemist, Bourne.

For a Vogel's view lens, short focus (which takes any size, from *carte* to a whole-plate), I would give a Ross's portrait lens, No. 1 size, for *cartes*, or, if preferred, two cameras—one for double *carte* size, with two dark slides, the other a good bellows camera, whole-plate size—and a strong, handsome, iron camera-stand.—Address, J. S., 65, Crouch-street, Colchester.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

W. D. Sanderson, Manchester.—Landscape, *The Nun's Bridge.*

☞ *Correspondents should never write on both sides of the paper.*

R. STARK.—Just received; but too late for reply in the present number.

H.—On the death of Mr. Thurston Thompson the "school" was virtually broken up, and has now ceased to exist.

J. H. STANLEY (Houston, Texas).—The ALMANAC has been forwarded, as requested. The Journal has been despatched regularly. The postage has been lowered to one penny in this country after the invoice was forwarded. The overplus has been placed to your credit.

E. WOODCOCK.—Under the circumstances stated, we ourselves should have no hesitation in taking the photographs. Circumstances, says the proverb, alter cases. Still, you should have from your employer a letter in which he guarantees to assume all responsibility. The engraving you name is copyright.

C. R.—We shall place your letter in the hands of a skilful physician, whose reply we shall give in our next. We would in the meantime urge the immediate discontinuance of a practice which, sooner or later, will cause death. We believe that the notion which leads to arsenic-swallowing is quite a mistaken one.

R. V. A.—The line is caused by the stoppage of the flow of varnish at that particular place, and the varnish being too strong attacks the collodion. Many kinds of pyroxyline are soluble to a great extent in strong alcohol, and strong varnish applied to collodion made of such pyroxyline will dissolve it more or less. The remedy consists in your adding a few drops of water to the varnish, which will thus be deprived of its annoying tendency. It is probable, also, that you heat your negatives too strongly before varnishing. Respecting the interiors, if you forward them to us before the first of next month we shall take care that your object is attained.

A. A. (Edinburgh).—Having submitted your letter to a competent legal authority we now inform you, first, that no photographer has a right to exhibit in public a photograph of a lady contrary to her wishes; nor, secondly, can he sell her portrait without her express permission to do so. We remember some time ago hearing of a case tried before a magistrate in which a photographer sued a gentleman for breaking his show-case and removing or destroying a portrait therein exhibited. The defence was that the portrait was that of the gentleman's wife, and that the photographer had exhibited it without permission, and had also, if we remember aright, failed to remove it himself upon being requested to do so. The case was decided against the photographer

J. H. M. (Gibraltar).—1. A better substratum for the collodion film than that which you propose is—first, a very weak solution of India-rubber in benzole; or, second, albumen very much diluted with water—say one part of white of egg to twenty parts of water. A substratum of wax is generally preferred when it is desired to *remove* the film from the plate.—2. Assuming that the stains are, as you suggest, Prussian blue, they may be removed by means of a solution of oxalic acid.—3. In reply to this query we would recommend coating the film with an aqueous varnish, such as gelatine, albumen, or gum arabic, which could afterwards be removed when required by immersing the plate in water. We have known unvarnished negatives to keep good for years when properly washed and carefully packed.—4. From a thin, delicate transparency it is possible to make a negative which, although necessarily inferior in some respects to the original negative, may, notwithstanding, be much much more useful. For example: a friend of ours has a negative so exceedingly brown and dense as to require two whole days to print. By means of a dried collodion plate a transparency was obtained, and from that transparency in turn was secured a good rapid printing negative full of detail.—We have forwarded the letter to the Pantascopic Company, as requested.

R. P. YEO.—Your letter only has been received up to the time of our going to press. The matter will receive attention.

"POURQUOI."—1. Acetate of silver.—2. The pose of the boy is excellent, and he is effectively lighted. The background is also a good one in itself, but it quite spoils what would otherwise have been a charming little picture. The two vertical lines are glaring and obtrusive, the boy being wedged in, as it were, between both; the light, which is *supposed* to be admitted by the window within a few inches of the boy's head, is opposed to that by which he is really illuminated; the vertical background lines referred to are not parallel, arising, probably, from the axis of the lens not being at a right angle, or nearly so, with the background; lastly, the figure is too near to the background, which is thus in too sharp focus. Let everything be kept in subordination to the figure or principal subject.

Miscellanea.

DAMAGES.—Mr. Richards, a photographer, of Blyth, has been awarded £500 damages for injuries sustained in a collision which occurred on the Blyth and Tyne Railway. It was stated that since the accident Mr. Richards had been unable to follow his employment.

REMOVAL OF PRINTERS' INK FROM PAPER: UTILISATION OF OLD NEWSPAPERS.—M. Jouglet asserts that he can so cleanse printed paper as to make it suitable for receiving a fresh impression. He states that by immersing the printed sheet in a slight alkaline solution the ink disappears, and leaves the sheet of a pure spotless white.

COPYING OLD WRITINGS.—M. Niepce St. Victor gives a process for copying very old writings, which may be useful, if successful. Ordinary copying paper is to be used, but, instead of mere water, it is to be wetted with a thin solution of glucose or honey. On coming out of the press the paper is to be exposed to strong ammonia, which, it is said, will bring out clearly writing which is barely visible.

CASKET FOR ENAMELS.—Mr. E. Mander, of Birmingham, has recently submitted to us a small leather casket which he is manufacturing to meet a want in a suitable mode of mounting photo.-enamels. The case or casket in question is exceedingly elegant in its design and neat in appearance, and for oval portraits, no matter how produced, it cannot fail of proving very attractive. They are manufactured to suit one, two, or three portraits.

NEW CARBON PRINTING PROCESS.—Mr. J. R. Johnson, of the Autotype Company, has shown us some specimen carbon prints produced by a new process patented by him a few weeks ago. The pictures have all the delicacy and gradation of the finest silver prints, and the process is one so simple in its manipulations that photographers will be certain to appreciate it. The details are to be published in the course of two or three weeks, and amateurs and the profession are to be treated liberally.

NICOL'S PRISMS.—The Nicol's prisms, mentioned so often in the recent papers of Professor Tyndall, are expensive to obtain of any size. They are made of a crystal of calcspar, cut across diagonally, the two sections being afterwards joined together by means of Canada balsam. It has recently been discovered that a prism, possessing the same optical properties, may be made by constructing a vessel of glass, and inserting a thin plate of calcspar across the diagonal, the vessel being filled up with bisulphide of carbon. If this be so, Nicol's prisms of considerable size may be made cheaply, since blocks of calcspar of large size are often met with.—*Mechanics' Magazine.*

LONDON GAZETTE, *March* 9.

SCOTCH SEQUESTRATION.

A. W. FRASER, Inverness, photographer, March 16, at Inverness.

METEOROLOGICAL REPORT.

For the Week ending March 10th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 10 A.M.

Mar. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
4	30·18	47	29	32	36	W	—	Fine
5	29·96	54	35	41	43	W	—	Dull
6	30 14	46	38	38	41	N	0·01	Dull
8	29 98	45	30	33	34	SW	0·02	Snow
9	29 56	44	32	34	36	N	0.01	Dull
10	29·46	43	34	33	36	E	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 463. Vol. XVI.—MARCH 19, 1869.

PLATE CLEANING.

In the paper by Mr. Phipps, *On the Cleaning and Preparation of Glass for Dry-Plate Work*, which we published at page 109, that gentleman appears rather to have condemned the use of any chemical agents in cleaning glass plates which have been previously employed either in wet or dry-plate work. He prefers to use mechanical agents, such as tripoli and plain water—the latter either cold or hot.

We can only suppose that Mr. Phipps's experience of different chemically-cleansing liquids for old glass plate has been but small, otherwise he would not have condemned them because soda solutions have not afforded him satisfactory results. Our own experience is that, when plain water and a fine rag are not sufficient to get a plate into good condition, a chemical agent can be most advantageously employed; but of all such liquids caustic soda or the carbonate are undoubtedly the worst. As Mr. Phipps truly remarks, they act more or less upon the glass, more especially the caustic alkali, and for this, amongst other reasons, it is better not to use alkaline solutions at all; and of the acid liquids which have been recommended for the purpose commend us to Mr. M. Carey Lea's well-known solution of bichromate of potash containing sulphuric acid. This is a most energetic cleansing liquid, as it not only softens the film on the glass, but tends to oxidise and remove any organic matters which may be present in the minute scratches on the surface of the plate. This organic matter, if left on the glass, would give rise to markings and insensitive points in the sensitised film.

Some persons object to the use of the acid bichromate of potash solution for the purpose above indicated. A good and often a very useful and energetic substitute is to be found in the permanganate of potash. As the most convenient form in which we usually obtain this reagent is the now well-known Condy's fluid, our readers may be glad to know that a powerful cleansing bath may be prepared by its aid. If we take eight ounces of Condy's fluid, and add gradually to it with constant stirring two fluid ounces of oil of vitriol, we thus obtain a solution or "pickle" in which we can soak plates for a short time, and so disintegrate their films as to render them easily removable when rubbed with a soft rag and held under the water tap. As we already know, the permanganate is an oxidising agent of peculiar power, and, in virtue of this property, is able effectually to remove all traces of organic matters which might otherwise escape removal from the plate.

Whatever plan be adopted—whether bichromate of potash or permanganate be used, or nitric acid—it is always well to avoid leaving the plates in the cleaning mixture longer than is necessary to remove the films which it is our object to get rid of, since different kinds of glass vary much in their power of resisting the action of strong acid solutions. All glasses are more or less attacked by contact with caustic alkaline solutions, but few specimens of good English crown or patent plate are attacked by the acids unless contact be unreasonably prolonged; but, since some few varieties are attacked by acids, it is well not to leave our plates longer than is actually necessary in the cleaning solution. At the same time, our own experience shows us that but very little care is really necessary even in this particular, as we very rarely meet with a plate which cannot easily bear even several hours' contact with the bichromate cleaning solution.

A DELICATE TEST FOR NITRIC ACID.

It is sometimes necessary for us to ascertain when nitrate of silver has been removed from a film which we desire to wash free from the salt. In most cases the detection of the silver by means of a chloride is the best mode of finding when all the soluble nitrate has been removed; but other cases may arise in which it would be desirable for a photographer to be able to detect the nitric acid as well. Again: it may be necessary to determine whether a paper or tissue prepared by a secret process contains the silver which it may carry as nitrate of the metal or not. It is, therefore, well to be armed with a convenient and useful test. And here an observation of Herr Braun steps into our aid. This gentleman has utilised the well-known reaction of nitric acid on a salt of aniline—a body now largely employed in the manufacture of the various shades of mauve, magenta, &c. When a solution containing nitric acid or a nitrate is added to a solution of aniline in excess of sulphuric acid an intense red colour is developed, owing to the oxidising action of the nitric acid on the aniline. The production of this colour constitutes Herr Braun's test for nitric acid, and as we have used the test we can vouch for the great delicacy of this beautiful reaction.

The aniline test solution is obtained by adding, first, two drachms of ordinary oil of vitriol to two ounces of water, and when the acid and water have been well mixed dropping in twenty minims of common commercial aniline. The latter completely dissolves on agitation, but occasionally, when the oil of vitriol employed is not free from nitrous compounds, the test liquid presents a reddish colour. This red tinge may, however, be very easily removed by shaking up the test liquid with a little freshly-ignited animal charcoal. On filtering, a perfectly bright, colourless liquid is obtained, which keeps well.

The mode of employing this test is simply as follows:—A small quantity of pure oil of vitriol is placed in a little white capsule, or on a white plate, and half its volume of the aniline test solution is added to it, and the whole stirred with a glass rod. This rod is now cleaned and dipped into the solution which we desire to test for nitric acid, and then drawn through the test solution on the white plate. If nitric acid or a nitrate be present in the liquid which we are testing, a fine red streak will make its appearance in the sulphuric solution, following the track of the glass rod which we move through the liquid. This reaction is very delicate, and serves to indicate the presence of exceedingly minute quantities of nitric acid and nitrates, and, being very convenient in application, it is likely to prove useful in cases where the photographer may not desire to go to the trouble of employing the ordinary chemical tests.

We must add here that other oxidising agents are capable of producing a red tint with the aniline solution as well as nitric acid; but, since such bodies are not often met with in the photographic operating room, there is no likelihood of error creeping in on this account. The permanganates and chromates give colour reactions with the aniline; therefore, when these salts are present—and the colour of a solution usually indicates this sufficiently—the aniline test for nitric acid and nitrates cannot be applied.

ON THE COCOA-NIB DRY PROCESS.

It is an acknowledged fact that, amongst the substances which have been used with success in the preservation of the sensitiveness of dry plates for photographic purposes, the most efficient are those which contain nitrogen.

In some of these this element presents itself in such wise that the aggregate body may be assumed to exist as a compound of nitrogen and hydrogen, combined with a complementary organic group from which the ammonia has, in a theoretical point of view, been eliminated. In most of the cases the ammonia can actually be liberated by familiar chemical devices, and the writer, considering the matter as worthy of research, was induced to examine a considerable number of such bodies, usually denominated vegetable bases, in relation to their conduct as connected with actinic reactions.

Amongst these the familiar substance referred to in the heading of this paper was tried, and with a degree of success which may be presumed to justify another addition to the already extended list of preservative agents.

The object of this paper is purely practical; but it may be stated that, after a prolonged and careful study, the writer feels justified in the deduction that *all bodies which contain ammonia in the condition alluded to are more or less efficient when applied as preservative agents.*

Of these, however, some are rare and costly preparations; others are highly poisonous, and should never be handled by persons unaccustomed to chemical manipulation; whilst coffee and the substance alluded to are almost always within reach and perfectly innocuous, the latter having the advantage of simplicity, as well as a property in relation to the mechanical condition of the collodion film which will be alluded to in the sequel.

To make the description of the process as brief as possible consistent with perspicuity, it is not considered necessary to repeat the precautions and conditions of success which are common to all dry processes. These have been so ably condensed in The British Journal of Photography and Almanac that the student will have no difficulty in refreshing his memory. We proceed, then, to our description.

The fresh cocoa-nib is to be powdered, and to twenty grains of this powder is added one fluid ounce of distilled water; the two are to be intimately mixed and allowed to stand digesting for an hour.

It is found better to use the water cold, as, by the use of hot water, an oily emulsion is formed.

The fluid is to be filtered, and two drops of glycerine with the same quantity of glacial acetic acid added and well mixed; this forms the preservative fluid.

The mere infusion of cocoa-nib answers perfectly, but it decomposes very rapidly, and after a few hours in the heat of summer becomes useless. The addition of glycerine has a great tendency to check this action; and the further addition of acetic acid gives great clearness and beauty to the picture eventually obtained.

The plate is to be coated and sensitised as usual, and very thoroughly washed—at first with distilled water, or, at any rate, water containing no matters which precipitate silver solution.

After a second washing the preservative fluid is to be poured over the plate several times, so as to permeate every portion of the film. After slight draining the plate is again well washed and placed in a suitable position for drying; the last operation being to expose it to a good heat, as in the collodio-albumen process. All these stages must of course be carried on in a room from which all actinic light is excluded.

Comparative experiments have been made with plates washed and unwashed, the former proving far more rapid and certain and developing cleaner than the latter.

The exposure need be very little, if at all, longer than in the ordinary wet collodion process; at the same time over-exposure, within reasonable limits, is of little import, and can easily be dealt with in the development.

According to the writer's experience, no anxiety need be entertained of the film slipping from the glass; and in this respect this process has an advantage over the coffee process.

Development.

1. If the exposure be full, use pyrogallic acid two grains, water one ounce, glacial acetic acid four drops, with the same quantity of a weak solution of nitrate of silver.

2. If slightly under-exposed, pyrogallic acid three grains, bromide of potassium two grains, ter-phosphate of soda five grains, water one ounce. When the faint image with all details has come out, resort to Case 1.

3. If much under-exposed, pyrogallic acid three grains, bicarbonate of ammonia two grains, water one ounce, and intensify as above.

4. If sufficiently exposed, but in diffused light without sunshine, as in dull days or interiors, the following is the appropriate developer:—Solution of basic acetate of lead two drops, saturated solution of gallic acid ten to twenty drops, water one ounce, glacial acetic acid drop by drop until the precipitate of basic gallate of lead be redissolved, weak solution of nitrate of silver two or more drops, as necessary. Pour on the washed plate, which should be kept in motion. When the details are fully out wash carefully, and, if necessary, intensify with the following:—Pyrogallic acid two grains, citric acid five drops of a saturated solution, formic acid two drops, nitrate of silver solution two drops. Watch carefully, for the tone of a negative so developed is very non-actinic, and the plate may easily be over-developed and the shadows smothered.

It may here be remarked that Mr. M. Carey Lea's discovery of the greatly increased energy of the gallic acid developer by the addition of the salts of lead does not seem to have attracted that attention which its merits deserve.

In every case the plate, after exposure, must be thoroughly moistened and carefully washed after each process. In Case 4, the acetic acid must not be added in larger quantity than necessary for the object specified, as in all dry processes an excess of acetic acid is very apt to loosen the film, especially when acted on by tannin or coffee, which renders even a porous film contractile.

The fixing may be accomplished either with hyposulphite of soda, sulphocyanide of ammonium, or cyanide of potassium. If the first be used, the washing must be performed with caution, as it is of course essential to use sufficient water to remove every trace of the hypo. salt; and in this, as in all other dry processes, the collodio-albumen perhaps excepted, the film undergoes a severe trial in the various manipulations. If the cyanide of potassium be resorted to, the solution should be as weak as possible for the end to be accomplished—the removal of the iodides and other haloid salts not acted upon by light. In both cases slight motion or a repeated application of the dilute fixing solution aids the operation.

The collodion for this and most other dry processes is improved by a minute addition of castor oil and pure glycerine, one drop of each to the ounce of collodion.

I have also found a small quantity of chloride of much use, particularly the muriate of morphia, half-a-grain to the ounce.

These additions only to be made when the sensitising bath is free from nitric acid, but contains a small excess of acetic acid.

George Kemp, M.D., *Cantab.*

A COPYING CAMERA: HOW TO CONSTRUCT IT AND HOW TO USE IT.

IN TWO CHAPTERS.—CHAP. II.

Almost every day sees increased importance attached to transparencies; for in the "last thing out" (by which we mean Mr. Sarony's photo-crayons), in processes of photographic engraving, photolithography of a certain kind, photo-enamelling—not to speak of its most popular application, photo-lantern slides—transparencies are a *sine quâ non.*

The most obvious use of the copying camera, described last week in our first chapter, is to effect a practical solution of the problem—from a given negative to produce a transparency or positive having any given relation as to size, tone, and density to the original negative.

The size of each—the negative and the transparency—is, of course, limited by the dimensions of the camera; but even this may be most successfully overcome by a method we occasionally adopt. Premising that the camera already described is of a size which admits only the dark slide of a quarter-plate camera, we may describe how from a small original we obtain a copy of considerable size.

That end of the camera containing the dark slide is altogether withdrawn, and the front end of a Kinnear bellows camera for plates of the size of fourteen inches is inserted, the lens of the latter camera being previously removed. If light now be transmitted through the negative, and the adjustments for size, together with the focussing, have been properly performed, the image on a plate of *carte* size will be found to be so magnified as to fill the fourteen-inch ground glass. The arrangement described is not only a simple and inexpensive, but also a very excellent, one for producing the Sarony photo-crayon pictures. As in the production of these pictures a lens of somewhat short focus is most advantageously employed, and as quarter-plate portrait combinations with a back focus of four and a-half inches are generally preferred, we shall subjoin the distances at which the ground glass of the larger camera must be from the negative, in order to pro-

duce from a *carte* head and bust an enlarged transparency of the Sarony size, which, as we stated last week, is fourteen inches.

We shall therefore assume that a lens of six inches equivalent focus (the usual focus of lenses measuring four and a-half inches from the back combination) is that which is to be employed in the copying camera, and that it is desired to enlarge the head and bust of the small negative up to suitable pictorial dimensions as a vignette on a 14 by 10 plate. Let the size of *that portion* of the original to be vignetted be assumed as one inch, and that of the desired enlargement as six inches, which is the size of the head and bust of one of Mr. Sarony's photo-crayons now before us: the degree of enlargement is, therefore, six times. To secure this the lens, measuring from the optical centre—not from any one of the glasses—must be a distance of seven inches from the negative and forty-two inches from the focussing glass of the fourteen-inch camera. The small negative and the large ground glass will each be in the conjugate focus of the lens.

If instead of a degree of magnifying of the image to six times, as described above, it were desired to reproduce an image in a similar way from a larger negative—the number of times of enlargement being say four times—then with the same lens (that of six inches equivalent focus) the distance of the negative from the lens would be seven and a-half inches, the plane of the enlargement being now reduced to the distance of thirty inches from the lens. By the simplest rule of arithmetic it will be seen that in the former case the distance between the negative and the sensitive plate will be forty-nine inches, and in the latter thirty-seven and a-half inches.

Instead of a portrait combination a good single achromatic landscape lens is preferred by many for this purpose. In our copying camera we can adapt landscape lenses respectively of four and a-half inches and five inches in focus, the definition in both cases being very excellent indeed. In order to meet the requirements of those who wish to enlarge *à la* Sarony, by means of the copying camera and their stereoscopic lenses, we shall here extend the table of dimensions we have given above (the same scale or number of times of enlargement being assumed), so that those who have a landscape lens of the focus of either four and a-half, five, or six inches may not have to waste their time in calculating what length their cameras must be. We may here state that, for practical purposes, the optical centre of a plano-convex achromatic landscape lens may be considered to lie on the rounded surface, and at its centre. Measured from this place, therefore, as the optical centre, the negative and the large sensitive plate must be placed in the following relations:—

Times of enlargement.	Focal length of Lens.	Distance of Negative from Lens.	Distance of Sensitive Plate from Lens.	Distance of Negative from Sensitive Plate.
	Inches.	Inches.	Inches.	Inches.
6	4½	5¼	31½	36¾
	5	5⅚	35	40⅚
	6	7	42	49
4	4½	5⅝	22½	28⅛
	5	6¼	25	31¼
	6	7½	30	37½

Although we have hitherto specially alluded to portrait combinations and single landscape lenses for copying, there is no doubt whatever of the great value of the lenses of more modern introduction—the triplets, doublets, and rectilinears—for copying purposes. If these be employed they should be selected with a narrow angle, as no pencils are transmitted at any considerable amount of obliquity, and narrow-angle lenses work with much greater rapidity than their wider-angled friends, which necessarily must be employed with a smaller diaphragm.

When transparencies are to be produced in the copying camera the negative may be lighted in several ways. Pointing it to a bank of white clouds is one way; to a sheet of white card placed at an angle of 45° or thereabout, and illuminated by the sun, is another; a third way is to place a sheet of ground glass outside of the negative and direct the camera towards the sun; still another way is to illuminate either the cardboard already described or the ground glass just alluded to by a strong artificial light, such as the magnesium light; and, lastly, by a condenser placed outside of the negative, and a strong stationary light placed in its focus. This latter will, of course, be seen to be just another way of describing a magic lantern.

In developing transparencies, let not the fact be lost sight of that it is possible to obtain a softer picture—that is, one having less absolute density—by means of pyrogallic acid than by iron. Those who are familiar with dry-plate operations know that when a plate is developed with plain pyrogallic acid solution, the details may all be brought out with so little density as to render it difficult to see them. With this fact before us, we conclude by a word of caution to those who mean to practice large transparency work for backing with crayonised paper—beware of density.

SOME REMARKS UPON MR. MACBETH'S PAPER, AND ON THE MUTUAL REACTION OF PICTORIAL ART AND PHOTOGRAPHY UPON ONE ANOTHER.*

My first remark upon Mr. Macbeth's paper must be to express the very great pleasure I received in hearing him deliver the second portion of it, in seeing the many clever and beautiful illustrations with which it was enforced, and, latterly, in studying it in the condensed form under which it appeared in The British Journal of Photography. The paper was characterised by so much clearness and accuracy that really very few points offer themselves for any discussion; in nearly all the more important topics taken up we must heartily go along with him.

But amongst so many ideas put forth there must, of course, be some in which many of us cannot thus fully concur, and I may be permitted to make some show of a stand against them for the sake of the discussion. I find, however, that if the Society grant me a hearing, I shall have most to say after turning the tables upon the artists, and come to discuss the question *not* of how photographers may be improved by studying the works of the artists, but of how far our *art-science* may have an influence in instructing them, and putting some reasonable limits to their flights in search of the picturesque.

The first matter I shall take exception to is, that artists appear to consider it necessary that all pictures should be *picturesque*. It would be difficult to define what the picturesque really is, but I take it for granted that its presence implies the existence of certain harmonious contrasts as between lights and shadows, ruggednesses and smoothnesses, graceful curvatures and stiff sturdinesses, points of deeper interest and action relieved by spaces of subdued quiet, distant haziness arrayed against strong-drawn proximity; we must have broken-up skylines and vigorous variety, and there must be an absence of stiffness and general tameness, and of all ill-balanced or formal distribution of the objects. To hear art-critics discourse, it would appear that the absence of almost anything of all these should condemn a picture. But what is a picture meant for? Is it not frequently intended to give us true impressions of peculiar scenery—of the dank, green levels of Holland; of the tame expanses of the rolling prairies of America; of the desolation of the sandy desert everywhere bounded by the horizon almost lost in the sunny sheen? And would true impressions of such scenes be conveyed by a picture rendered picturesque by the introduction of objects that should break up that eloquent sense of monotony which the bare transcripts would possess? And so of other characteristics—the tameness, the coldness, the barrenness, the harshness or the stiffness that distinguishes the picture may be a true rendering of the feeling of the scene.

I must, however, do our author the justice to quote, from page 50 of The British Journal of Photography, a remark that shows he does not go the length that some artists appear to do in sacrificing to the picturesque. He says:—"In composition many painters take great liberties with distances, particularly middle distances," and he speaks of the danger of overdoing this, and of the disappointment felt in visiting, after seeing such a picture, the real scene. But I shall have more to say on this subject towards the close of my paper.

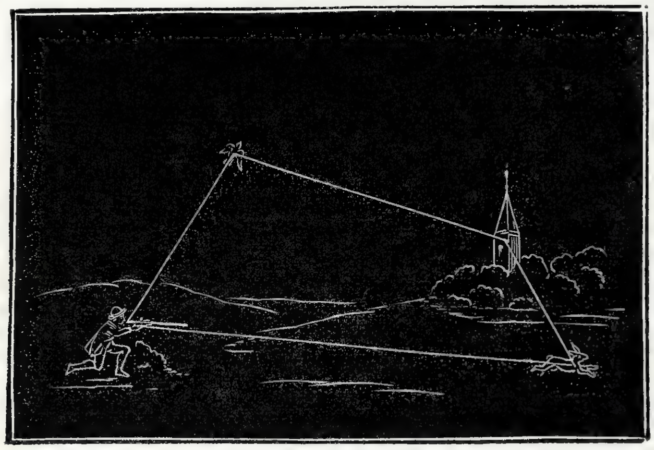
Mr. Macbeth lays great stress upon the so-called *forte* points of the picture. Now, I do not believe in the existence of any very fine geometrical instincts in the eye of taste, and I think sufficient might be found in the published paper to refute any such claim for nicety. By diagram No. 5 we are taught that points situated one-third or one-sixth of the height or breadth from the horizontal or vertical boundaries of the picture have some peculiar power in giving significance to objects placed on them. But, turning to diagram No. 7, we find that the hare and the church are at the respective distances of one-ninth and two-ninths of the width from the side; and the sportsman and church cannot be said to occupy positions one-sixth and one-third of the height from the bottom, but are decidedly above these levels.

I believe that this mode of mapping out the picture is a mistaken attempt to construct an empiric rule for what is observed to frequently satisfy the eye, but that the true art consists in avoiding formal stiffness, and placing the leading objects so that lines joining them will form an irregular figure placed unstiffly on the canvas,

* Read at a meeting of the Edinburgh Photographic Society, March 3, 1869.

and generally also so as to balance upon a diagonal. And, further, I find that in well-arranged picturesque effects the general masses and objects of interest are distributed in a manner so as to balance one another around one or other of the diagonals.

The tendency of the eye to group leading objects together in the form of polygons is felt when we look at the stars. We conceive them to be placed at the angles of triangles, squares, and irregular figures; and, acknowledging this tendency, we should endeavour to avoid any too regular triangular or other form. In diagram No. 7 the leading objects are placed thus, constituting an irregular figure of four unequal sides, and disposed in a manner free from stiffness.



Mr. Macbeth's Diagram No. 7.

In nature we do meet with stiff and geometrical lines and forms, but we soon become instructed to regard these as the result of natural laws. The globularity of bubbles, the roundness of the moon, the accurate curve of the rainbow, the horizon of the sea, cease to arrest our attention as departures from the unstiffness of inanimate nature. And, under similar education, we receive with pleasure the moderate accuracy in the vegetable, and the greater exactness of form in the animal, kingdoms. But any stiffness or geometrical forms that have not thus become known to us are apt to startle and somewhat displease our æsthetic sense. I may instance the flight of a flock of wild geese. The first time a person witnesses the peculiarly-formed figures in which these birds arrange themselves, he feels puzzled, and does not accept it as natural, being so totally different from what he has been led to expect from his former experience of the familiar sparrows or crows. And I am not sure but that there is a half-understood feeling of mysterious æsthetic discomfort in looking at the glories of the midnight sky. At the first glance we regard the stars as strewn at random on the heavenly vault with as free a disposition as would be assumed by a thousand pebbles thrown from the hand; but when we see figures so geometrical as that formed by lines joining the principal stars in Orion, we experience an uncomfortable feeling, arising from our ideas being out of harmony with the facts.

And so of pictures. We expect to find in these natural arrangements free from unnecessary formality, and if they disappoint this expectation or offend our sense of fitness they cannot but displease. And we must guard against dogmatism; the elements of beauty and pictorial effect are infinite in their variety of bearing upon the human mind. We may all step forth to look at the same picture or the same scene in nature, but we do so each with his own preconceived ideas and prejudices—some the result of his art education, others springing from a less doubtful source in his untutored sense of the beautiful, others, again, dependent upon associations, or the absence of any association with such scenes; and the result is what we may witness any day in an exhibition of paintings—the diversities of taste and partialities displayed. What to one is uninteresting, flat, and unprofitable, may prove a source of keen interest and pleasure to another. But although under such conditions no painter can please all, he may, by attention to the better-established canons of his art, avoid offending any.

Allow me now to say a few words upon the shapes of pictures, and the height of the horizon, &c., in these. At page 51 of the Journal Mr. Macbeth recommends the length to the width of the picture—when suitable to the subject, of course—to be as the diagonal to the side of a square, or as the square root of two to one; that is, as 1·4142 to 1. This is a very pleasing proportion, and not uncommon for landscapes, and it is one which I have often desired might be adopted for drawing and printing papers, since it has the following peculiar property:—If we take a sheet of paper cut to this proportion in its sides, we may double it and halve it, and halve it again and again, and the resulting forms will always have the same proportion between their sides; and if the eye be pleased with it on one scale, it will be so with all its subdivisions of quarto, octavo, &c.

But the boundaries of a landscape should be chosen to suit the subject, and its greatest extent may be placed either horizontally or vertically. There is this rule, however, which I would offer for the consideration of the Society as almost always satisfactory in moderately wide pictures, and is particularly convenient for photographs, viz., that the horizon should be at a distance from the top equal to half the width of picture, and that the amount below the horizon just so much as may be worth giving or pleasing in its effect. Where this depth below the horizon comes out decidedly less than one-quarter of the width, and no objects run up into the sky at the sides, I would frame such a picture with an arched top to cut off the sky corners. It will be found that there is something very natural and pleasing in being able to describe a semicircle within the picture around the central point of the horizon. Many pictures, to my taste, are injured by cutting off too much of the height of the sky; and I differ from Mr. Macbeth in thinking that the same feeling attaches to the position of the head in a single subject portrait. If the person be of average size I should take the eyes as the height of the horizon, and allow a height above them equal to half the width of the picture; that is, when the head is in the centre line of width. For shorter persons or children more should be allowed, and the idea of tallness will be conveyed by reducing the distance between the head and the frame. Referring to Mr. Macbeth's diagram No. 8, I think it will be the general opinion that the frames of the kit-cat and half-length sizes encroach too much upon the head at top, and produce an uncomfortable appearance of confinement, or as though the person were cowering under too low a ceiling or doorway.

In the exhibition at present open in Edinburgh there are abundant examples of this unsatisfactory effect. I may note Nos. 563 and 372; and, as examples of what I think a better practice, I may give the catalogue numbers, 586, 189, 450, 474, and 621. Among the landscapes No. 220 would, in my opinion, have been greatly improved by a very large addition of sky height. Contrast the airy, unconfined character of Mr. Macbeth's diagram No. 6, in which the height above the eyes is exactly half the width of the picture, with the lowering effect of the kit-cat size in diagram No. 8.

Towards the end of his paper, at page 51, Mr. Macbeth, perhaps inadvertently, speaks of *false* perspective being produced or made to appear by including objects too near to the camera. On this I must beg here to hang some remarks upon the nature of strained perspective, and some of the strange fruit it has borne in the practice of artists.

The knowledge of the fact is now pretty well spread—at least, among photographers*—that a picture of objects at different distances from the spectator is only properly and accurately seen when the eye is placed at one particular point; from any other point the perspective or projection is incorrect in the impression it is capable of conveying. Now, it is perhaps fortunate that the eye is really not very critically sensitive to inaccuracies of this kind, or the imagination enables it to make wonderful allowances; but still, when it is outraged by too enormous a demand, it at last rebels, and plainly tells us the picture presented to it is an imposition. Thus, the object *fig.* 1, in diagram No. 3, is too exacting. It professes to be a drawing of a square slab, but the eye will not acknowledge this when looking at it from an ordinary distance. There is nothing really incorrect in the perspective, but in the way we are looking at it. If by the aid of a powerful convex lens we get the eye very near to it (three-fourths of an inch would be the correct distance, but we do not need to be particular), it subsides by the aid of the imagination into the conventional square block. But, unfortunately, this easy mood of the eye has its drawbacks, for if we desire to convey the idea of a lozenge-shaped block under so-called quiet perspective, we would find it impossible if the idea of a square first got into the mind. The block, *fig.* 2, should also look drawn out if viewed at a greater distance than one and a-half inch. So much for the critical power of the eye.

But perhaps the most striking cases of the bad effects of strained perspective—*i.e.*, of viewing the picture from too great a distance—are those in which objects of known relative sizes are placed at different distances. Thus, in a photographic portrait of a person sitting with a leg outstretched towards the camera—if this be taken, say with a lens of five inches focal length, and at but a short distance off, the effect, as seen in an ordinary view, will be ridiculous; the leg will appear what would be popularly called a "mile too long," and the foot out of all proportion to the head. Now, although

* See The British Journal of Photography for 1861, Dec. 2 and 16.

the perspective is objectionable from its results, it is not inaccurate. The inaccuracy is in our way of inspecting it. Let us by means of a lens place our eye a little less than five inches from it, and all the proportions will resolve themselves into those of the person seen in the near position in which he was presented to the camera; and if we make an enlargement of this *carte* picture, so as to be twelve times greater in its dimensions, this enlargement would appear quite right if viewed from a point only five feet distant. It must not be understood that I approve of taking pictures in such a manner as to require such precautions in viewing them. I only wish to illustrate the effects, and to show that the perspective, although very objectionable, is yet not inaccurate.

I wish now to carry you a little farther with me in this question of strained perspective. I wish to point out what influence it has had upon our artists in leading them to depart from truth of drawing.

Mr. Macbeth has indicated to us how much photographers may gain from the experience of artists in their study and practice of the production of picturesque and pleasing effects; but it is satisfactory to know that a reciprocal benefit may be bestowed upon the fine arts by the correcting influences of photography. All professions, when not controlled in some degree by external light and influence, are apt to raise useful crotchets to the dignity of infallible dogmas, and to prescribe rules which may be too readily accepted by the public through the unreasoning respect often entertained for the opinions of experts.

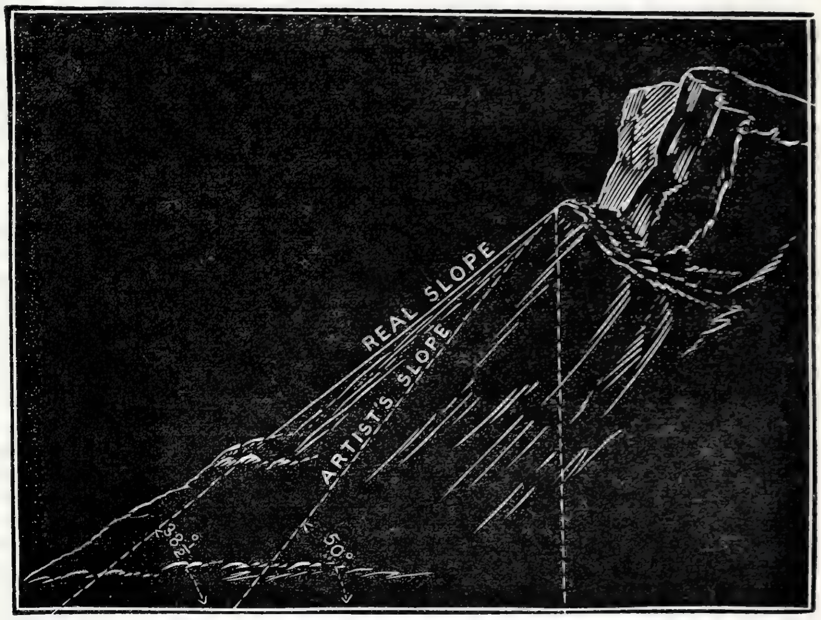
Artists do not necessarily object to the effect of exaggerated relief which strained perspective gives. Perhaps they may be excused being satisfied when they hear a representative of the public exclaim, as he gazes at a picture three, or it may be ten, times too far removed from him—"Oh! see how wonderfully that foot stands out of the canvas!" The mode of exhibiting pictures compels us, in most cases, to examine them at too great a distance; the effects are to exaggerate the relief or the size of the nearer objects, and to add to the distance or reduce the dimensions of the distant ones. Now, this has its drawbacks. The distance often contains the very heart of interest in the picture—very often a range of noble hills; but, these, through the effects of the strained perspective, tend to become dwarfed and insignificant. Now, what does our artist do? Why he simply becomes a traitor to truth of delineation—he makes his distant hills thirty, fifty, or, it may be, one hundred per cent. higher than in reality; but, as he does not wish to exclude any of the range, he does not simply magnify their dimensions, he only adds to their altitude! Consequently, the angles of their slopes are far too steep and bold, but then he congratulates himself on the success of his art in raising them out of the insignificance into which the false position of the critical spectator had thrown them. Thus he knowingly rushes into an elaborate deception in order to correct the results of the ignorant mistakes of the public.

But the march away from accuracy is not easily stayed. He has begun in the background, where by a dogma of his school he is allowed much license; but the distance reacts upon the objects nearer at hand, and the eye, which has become accustomed to falsely-exaggerated steepness in the sides of the distant hills and cliffs, demands a corresponding boldness to be imparted to the nearer declivities. And once the desire of accuracy being thus destroyed, he does not hesitate to depart from the truth in other directions; he re-groups the objects; he exaggerates the atmospheric effects of the distance; he neglects well-known features of the view; and, having taken any amount of license with shade and outline, he, of course, is not going to be fettered in the department of colour. But with that, unfortunately, photographers have nothing to do.

In drawing my illustrations of what I mean, I shall chiefly speak of two pictures of the modern school. It would have been preferable to refer to those of a bygone age in order to avoid any thoughts of the individual artist when it is only of the art we wish to speak. But I must plead my ignorance in apology for making use of the works of painters of the present day; and if I point out what—viewed under the light which photography sheds—I must consider blemishes in these works, it must be understood that I speak against some of the principles of the art and not against the artists, otherwise than as representative men in their profession.

The first picture, then, to which I beg to direct your attention is the engraving of *Loch Lomond*, after Mr. Samuel Bough. The engraving is one of the illustrations to *Rob Roy*, published during the past year by the Association for the Promotion of the Fine Arts in Scotland. In it you should mark the range of hills in the distance, including Ben Lomond. Along with this, in lieu of a photograph—not having been able to procure one—I place a sketch taken from nearly the same direction, and I am confident that the declivities of the hills shown in the sketch are not *less* than the reality, but, most probably, more steep, since, though the sketch was made with a view to careful accuracy, the tendency is always to that of exaggeration of the altitudes. Now, compare the sketch with the engraving, and see to what an extent the professional artist has carried the principle of exaggeration of the distant altitudes and declivities; this appears to be little short of one hundred per cent.

The next picture I shall refer to is the painting by Mr. Walter Paton, in the present Exhibition of the Royal Scottish Academy (No. 793), entitled *Edinburgh, from the Echoing Rocks*. This is a most charming production; but it will serve to illustrate how readily and, perhaps, unnecessarily the artist departs from correct delineation, and how careless he becomes of details, even in a highly-



SALISBURY CRAIGS, EDINBURGH.

finished picture. I shall not, however, detain you by pointing out more than two matters for remark:—First, that of exaggerating the boldness of the slopes. The notable slope of the *debris* forming the grand base to Salisbury Craigs has been instanced by an Edinburgh professor as a splendid example of the angle of repose; but I am afraid, if we employed this angle as given in Mr. Paton's picture, we might be led into some grievous engineering blunders. The true slope of the bank, as seen from the Echoing Rocks, forms an angle of thirty-eight and a-half degrees with the horizon—or, to be sure of not exaggerating, say thirty-nine degrees; now, as shown in the painting, it measures fifty degrees, and, instead of the wondrously sharp straight line, the artist has given us a somewhat arched one.

Then, as an example of carelessness of details, the almost perpendicular cliff seen against the sky presents, from the Echoing Rocks and many other points, a very marked representation of a somewhat comical human face and paunch. I believe this has sometimes, very disloyally, been named George the Fourth. Almost every citizen of Edinburgh must know this face, and would naturally look for its faithful delineation in Mr. Paton's picture, but he would look in vain. There is not the slightest approach to it, and the rugged character of the rocks is softened down in a very uncharacteristic manner.

There is one other example of the tendency to exaggerate distant objects that I should like to notice—it is the treatment of the moon. You are all aware that the diameter of the moon subtends an angle at the eye of very little more than half a degree. To give you a familiar idea of what that means, I hold up my thumb at arm's length, with my head erect. On closing one eye I find the thumb (a somewhat broad one) covers an angular space of 2°, or say equal in breadth to four moons; the moon is, therefore, a very small object, and in a full view—that is, one comprehending an angle of 60°—its average size would only be the (1-109½ say) $\frac{1}{110}$th part of the width of the picture, supposing the moon near the centre of view.

The moon varies in angular size, but this will be always within the limits of $\frac{1}{100}$ and $\frac{1}{120}$ of such a width of picture. Now, what are the sizes of the moon shown in paintings? Always greatly more than this. As an extreme example I may point to No. 500 in the Edinburgh National Gallery. This appears to be not a *bit* of a picture, but a full view of 60°, yet the moon is shown of about $\frac{1}{15}$th of the

width; this would make it 4° in breadth, or about seven and a-half times larger than natural.

I have indicated some directions in which the productions of the artist and of the photographer come into collision, and we cannot doubt that in time the truthfulness of the photograph must prevail in converting the artist from some of his sins—not that I think his conversion will be easy, but when public opinion is educated by photography to put more value in correctness, the artist must follow its leading. R. H. Bow.

ON THE PRODUCTION OF PHOTOGRAPHS IN THE NATURAL COLOURS OF THE OBJECTS REPRESENTED.

I.

In this article I propose chiefly to give a concise *resumé* of the researches of M. E. Becquerel upon this subject, as the results he has obtained are, I believe, the best that have yet appeared; and the mode of investigation with which he has pursued the subject is, to my mind, the most philosophical that has been adopted. I would not do injustice to the researches of M. Niepce de St. Victor, and the other chief workers in this branch of science, and, where necessary, I shall introduce their researches. I do not know that I shall have anything new to say on this subject; but I think it is well that it should be periodically placed before the photographic public, in the hope that some day new investigators will enter this interesting field of research. M. Becquerel took the matter up just twenty years ago, when the following were about all the facts known which related to the question:—

Several operators had noticed that chloride of silver took different shades of colour according to its mode of preparation, or according to the colour of the light acting upon it.

Seebeck had remarked that chloride of silver became of a red tint under the influence of the red rays.

Sir J. Herschell had observed that paper prepared with this salt of silver and exposed to the action of a strongly-concentrated spectrum, received this sort of impression—the red being brilliant, but of a brick-red colour; the yellow was wanting, and the green was very dull, inclining to black.

Robert Hunt had obtained red tints on papers prepared with chloride of silver.

It was also known that ordinary chloride of silver which had been coloured violet in the light took a red tint when *heated*, which was exactly like that observed under the influence of the red portion of the spectrum. The question was, therefore, Was it not likely that the latter was owing more to the calorific than to the actinic rays? M. Becquerel inclined in the commencement of his studies upon this subject to the theory that the red colour was owing to *calorific* action; but he afterwards relinquished it. These effects of colouration cannot always be obtained, and M. Becquerel devotes a short page in his work on this subject to the consideration of the action of light upon chloride of silver prepared in various ways, in order to lead us to the *best* way of preparing it for the reception of the colours of the image projected upon it.

Chloride of silver obtained by precipitation in a test glass, and spread upon glass, porcelain, cardboard, &c., as soon as the spectrum is projected upon it only commences to discolour in the ultra violet or invisible rays, and that very slightly, and nothing at all is seen under the visible rays. But if a perfectly pure chloride be used without any excess of nitrate of silver, and *which has been previously exposed to luminous influence*, the results are very appreciable. In the violet portion of the spectrum the tint becomes more and more intense, and like that produced in diffused light; in the red portion a slight rose tint is observed; but there is no effect noticed in the yellow or green portions of the spectrum, except a feeble decolouration. If the chloride of silver be obtained on the surface of paper by plunging a sheet first into salt water and then into solution of nitrate of silver, so that there shall be an *excess* of the latter, the effect under the spectrum is *not the same*. If the paper has *not* been first exposed, the action under the spectrum takes place under the ultra violet rays only. If the paper *has been* first exposed, it becomes sensitive from the blue to the red from the "action of continuation," and the effects of colouration are weak and sometimes not perceptible. From these experiments M. Becquerel concluded to prepare the chloride of silver *directly* by acting upon a sheet of silver by chlorine. There were several ways of doing this:—

1. Exposing the silver plate to chlorine gas.
2. Dipping the plate in a solution of chlorine in water.
3. Substituting chlorine water by solutions of chlorides (bichlorides of copper, iron, &c.), or hypochlorites (of soda, lime, &c.)

A plate prepared by the first process became of a grey-white colour, and upon projecting the solar spectrum upon its surface no distinct phenomenon was visible, a slight grey tint in the violet showing some chemical action. The action of light on a plate prepared with chlorine water was very different. The plate thus prepared is covered with a grey-white film like the first; but upon throwing the spectrum upon it for a few minutes, and examining the plate in daylight, the "*souvenir* of a spectrum" was visible, the colours corresponding exactly with their places in the image of the spectrum that had been projected upon the plate. This plate was replaced in its position for the spectrum to continue its action, but the effects *disappeared*, and nothing was left but a grey tint, which spread over the whole portion which had been acted upon by the light. M. Becquerel deduced from these facts that it was probably owing to the presence of *subchloride of silver* that the colours were produced; that is, that the chloride of silver, containing one equivalent less of chlorine than the white chloride, was probably the salt upon which it might be hoped to obtain the natural colours of images projected upon its films.

With this view of the subject he adopted process No. 3 for obtaining his deposit of chloride of silver, and he was enabled to produce all the colours upon plates prepared with these solutions. The composition of one of the best of these was published by M. Becquerel in 1848, and it is as follows:—Take some sulphate of copper and common salt; place them in excess in a glass with a certain quantity of water; a double decomposition takes place, and bichloride of copper is formed. One ounce of this solution is mixed with one of a saturated solution of common salt and six of water. The plate of silver is plunged into this mixture, where it rapidly becomes covered with a violet tint, owing to the formation of a slight film of chloride of silver. This plate thus prepared is sensitive to the *chief* colours of the spectrum. Other chlorides, such as those of potassium, strontium, &c., can be substituted for the chloride of sodium, but the result is the same, and "the *base of the alkaline salt has no action* upon the compound of silver formed." I find this sentence, which I have put between marks of quotation, is not found in the memoir presented by M. Becquerel to the French Photographic Society in 1857; and it appears in direct contradiction to the theory and experiments of M. Niepce de Saint Victor, published in 1851, when he announced that the connection between the colour-giving properties of chlorides corresponded to the colours given by them to the flame of alcohol. M. Becquerel having published the sentence in 1868, is probably certain of his facts on this point.

The plates of silver employed in these processes should be of great purity, and should be well polished and cleaned before being used, for the slightest trace of dirt is shown as the operations advance. This process, simple though it be, does not allow the formation of films of chloride of silver of *different thicknesses*, which is very desirable and even necessary for the best results. M. Becquerel has, therefore, given up the processes just described, and follows one by which he can obtain a film of any desired thickness. The advantages of this method of procedure will be evident to all who read the description, and its beautiful precision and exactness constitute it one of the best examples of a scientific photographic process.

It will have been observed that the result of all the different processes we have described is the production of a film of chloride of silver, either upon paper or upon a plate of silver. But although the substance produced is *chemically* the same in every case, the effects of white light upon it are very various. Almost all the chlorides of silver change to a grey-white or to a violet tint when exposed, with the exception of that which is obtained by the immediate action of the bichlorides (process 3); this film, which is of a violet tint, becomes white under the influence of white light, or, at least, of a lighter colour than the parts which have not been exposed. This chloride of silver is more rapidly impressed than if it had been prepared in any other way, and still *all* the colours of the spectrum cannot be produced upon it. This difference in the action of light upon *chemically identical* chlorides of silver is presumed to be owing to different *molecular conditions* of the silver compound, and it is found that, by the aid of heat and light, plates which have been prepared in various ways can be brought to similar states or conditions.

This allotropic condition of bodies possessing the same chemical composition is by no means rare. Phosphorus, which in its natural condition is waxy, and highly inflammable at a low temperature, when subjected to heat in a peculiar way becomes a red mass, which is pulverulent, and is inflamed with difficulty. Sulphur is generally seen in fine powder, or in sticks, very brittle. When heated it melts and becomes liquid; when still further heated it becomes pasty; then a greater heat produces volatilisation, and still the sulphur retains its chemical nature whilst passing through these molecular modifications.

I think that we may take a hint from these facts with respect to chlorides of silver, and not limit our researches in heliochromography to merely experimenting upon new compounds, but extend our trials to investigating the joint effects of other forces than actinism upon them in modifying their *molecular* condition. Thus, it may be that a plate prepared with some silver salt will not yield any image at a temperature of 60°, whilst a magnificent result would be obtained at a temperature of 150°. A plate exposed to an electric current may be more sensitive than one in ordinary conditions. A precipitate produced in a hot, concentrated solution may have very different properties to one produced in a cold, dilute solution, though the absolute chemical composition of the two may be identical. Something of this sort has been observed with regard to iodide of silver precipitated from solutions of different densities. I have enlarged a little upon this point, as it is one of importance in pursuing the study of the production of photographs in the natural colours of the objects represented.

Another point to be attended to is the *rapidity* with which the film of chloride is produced. A film which is produced *slowly* gives an impression, under the influence of the spectrum, in the portion beyond the violet rays—*i.e.*, under the influence of the invisible rays. This should not be the case, and is not with plates well prepared. This fact can also be adduced in support of the theory that it is the *subchloride* of silver which is best adapted for these operations; for, if the chlorine liberated by the action of the light has time given to it to act upon the subchloride it transforms it into ordinary chloride, which is sensitive to the extreme rays of the spectrum like the compound produced by precipitation.

Another argument for this theory is found in the fact that when the prepared silver plates are plunged into a solution of ammonia, even before exposure to light, they impart to it a portion of chloride of silver which is dissolved, and a white powder is left on the plate, which reaction is analogous to that which is manifested when chloride of silver, which has been altered by the light, is acted upon by liquid ammonia.

I think that we now have our way prepared a little for entering into the practical details of the process which has given the *best results* in heliochromography, and which I must reserve, with an account of the experiments upon processes on paper, for a future article. R. J. Fowler.

SPIRIT OF THE AMERICAN JOURNALS.

From a communication in our Philadelphia contemporary, by Mr. Wilson, of Aberdeen, we give the following extract:—

"*Camera.*—I have latterly used a sliding bellows-body camera, which takes plates 7 × 4¾, with two sliding fronts—one for single lenses when taking negatives the full size of the plate, and one for a pair of stereoscopic lenses, the flanges of the latter made to fit half-a-dozen different sized lenses, by means of which are fitted on all the lenses except the largest pair. The box closes up to two and a-half inches and draws out to eight and a-half, and it can be turned on end when taking upright views. It has, also, a removable centre division, which can be taken out when full-sized plates are used.

"*Lenses.*—With the camera I use, for full-sized plates, a triplet of about eight inches focus, a pair of view lenses, single meniscus, eight inches focus, one pair six inches, one pair four and a-half inches, one pair doublets three and a-half inches, and one pair doublets two and a-half inches. These I carry in leather cases, slung on a leather belt, worn over the shoulders like a shot belt.

"*Chemicals.*—All my chemicals are put up in sixteen-ounce bottles, and packed in baskets made for the purpose—a large one for carrying a stock, and a small one for holding sufficient for a day's work. The latter when filled contains three sixteen-ounce bottles of sensitising bath; one of developer; the glass bath and dipper in a wooden case; eight two-ounce bottles of collodion; three two-ounce bottles of glacial acetic acid; one six-ounce bottle of cyanide solution; one dropping bottle; one six-ounce bottle of crystals of sulphate of iron; one two-ounce bottle of crystals of cyanide; a small glass funnel, one gutta-percha funnel, a plate-holder, a small portfolio holding filtering paper, a dusting-brush, chamois leather, and two towels. All these, although they take long to describe, go into a handy basket, which my assistant easily straps on his back and balances by the camera in front of him. So that when we start to the field or mountain, I have the tent and camera stand in one hand, my plate-box, containing twenty-four plates, in the other, with the lenses in their cases over my shoulder, whilst my assistant carries the chemicals on his back, balanced by the camera and two tin cans, one within the other, in one hand. When we arrive at a point where we intend to work, I immediately unstrap the tent and set it up, whilst my assistant collects a few stones to keep it steady; and, whilst I am arranging my bath and chemicals in the tent, my assistant runs to fill his cans with water at the nearest source. By the time he returns I am ready to coat a plate, which I always do inside the tent, and, as the plate is getting ready, I place my camera ready to receive it.

"If it is a subject we are attempting which can be taken instantaneously, I use my six-inch focus lenses with a five-eighth inch stop, and expose by removing and replacing the cap of the lens as quickly as possible; but if it is a subject requiring a long exposure, I make a guess for the first plate, and, from long habit, generally succeed in hitting it pretty exactly.

"Some days when, owing to the variation of the intensity of the light on the amount of shadow in the views, I have begun in the morning with an exposure of ten seconds, I have ended in the afternoon with one of three minutes, without losing a plate from either over or under-exposure during the day. In spring the actinic property of light appears to be very active, and it is only then that I have succeeded in getting passable instantaneous pictures. Early in the season views of buildings may be taken with a small stop, in from two to ten seconds, and landscapes, with trees, in from five to fifteen seconds; but by the month of August and September I find from thirty to sixty-six seconds are required for most landscape views, and instantaneous exposures are of no use except for clouds and water only.

"The plate being exposed, I get myself shut up in the tent, and develope in the usual way, by dashing on the solution as quickly as possible, and moving about the plate to prevent stains. If it is an instantaneous view, all the details should come up slowly and distinctly; but I keep on moving the plate for two or three minutes, so as to get all that I can up before washing off the developer. This I do carefully and slowly, and as the negative in this stage is very thin in deposit, I pour from my dropping bottle a small stream of nitrate of silver along the side of the plate, and let it flow over the whole surface before dashing on a fresh dose of developing solution, keeping the plate moving as usual. When this has acted for a minute or so, I wash it off again very carefully, and repeat the process, sometimes three or four times if necessary, until the requisite printing density is attained; then, after a slight washing, I bring it outside the tent, wash thoroughly, and fix with cyanide of potassium.

"If the plate has had a long exposure, with a small stop, I find one redevelopment generally enough, but if my plate looks too thin after fixing, I sometimes take it into the tent and redevelope a second time. The cyanide, however, must be well washed off, otherwise there is danger of getting a reddish deposit upon the shadows."

A plain paper printing process, by M. De Constant, of Lausanne, is thus described by himself:—

"Choose a good stout arrowroot paper for the purpose; employ a neutral silver bath of eight per cent. strength, and, when the paper has been sensitised and well dried, subject it to the action of ammonia vapour for ten minutes or a quarter of an hour; print very deeply, and tone with an old alkaline gold bath, somewhat weak, for it acts very rapidly, and the prints are easily overtoned; the hyposulphite solution may also be rather dilute, as the image, being upon the surface of the paper, is rapidly fixed. When the prints have been washed and dried, coat them with a tepid solution of gelatine of seven or eight per cent. strength, applied by means of a soft brush. Finally, varnish them with a very fine brush, from which the hairs are not likely to become detached. The varnish which I have found most suitable for this operation is that of M. Sœhnée, of Paris, which I mix in the proportion of three parts of the positive varnish to one part of the negative. The last operation must be performed lightly and carefully, to prevent the formation of air-bubbles; it increases the brilliancy of the photograph, which may be modified at will, and contributes much to the permanence of the print. It is perfectly astonishing to how great an extent this process may be substituted for that of albumen, and how useful it is for producing prints of hard negatives, wrinkled faces, and landscapes with strong contrasts."

Mr. John C. Brown communicates the following paper:—

"*Curious Deposit of Metallic Silver in the Nitrate Bath.*—Quite recently I had occasion to examine the contents of a box of photographic apparatus which had made the tour of the Continent from the Atlantic to the Pacific Ocean, returning *via* the Isthmus of Panama, after an absence of about three years, part of which time—from February, 1867, to January 8th, 1869—the box had remained securely packed and unopened.

"Nothing of any particular interest was expected to be found in the battered remains of what had once been a complete outfit, but after unpacking various damaged articles, I discovered a 4-4 negative bath made of hard rubber, with a cover secured by two iron clamps. Although not a prepossessing-looking article, I examined it carefully, and found a large quantity of metallic silver which had deposited on the top of the bath, also in the joint under the cover. After some difficulty the top was forced off, and all the sides of the bath were in the same condition, covered with a beautiful growth of metallic silver, extending from the top three or four inches downwards, resembling delicate fern-like shapes of sparkling silver. The bath had been placed upon its side, so that the solution of silver, by the motion of travelling, must have been continually in contact with all its interior parts, as the bath still contained six ounces of nitrate of silver of decided strength, smelling strongly of alcohol and ether.

"The deposit of silver was quite thick, requiring the application of a file, chisel, and sand paper to remove it entirely.

"In the bottom of the bath was found several crystals of brilliant metallic silver over one-quarter of an inch long, which had probably broken off when the cover was removed.

"In seems difficult to account for this large deposit of metallic silver. Can it be that electric action produced by the iron clamps would have reduced the nitrate of silver?"

PHOTOGRAPHY IN COURT.

HORSBURGH *v.* CUMMINGS.

On Tuesday, the 9th instant, in the Outer House, before Lord Ormidale, John Horsburgh, photographer, Princes'-street, Edinburgh, raised this action of damages against Michael Cummings, chemist, and proprietor of the Alloa photographic studio, on the following grounds:—Andrew Ross, who was an apprentice of the pursuer in the year 1867, assisted him in executing photographs of Abbotsford, which were afterwards presented to the Queen on the occasion of her visit to that locality. The defender engaged Andrew Ross in November, 1868, inserted advertisements in the *Alloa Advertiser*, by which he "respectfully intimates that he has engaged as operator at the above establishment (the Alloa photographic studio) Mr. Andrew Ross, who has had above five years' experience in Mr. Horsburgh's, Princes'-street, Edinburgh, and had the honour of taking the views of Abbotsford, presented by Mr. Hope Scott to Her Majesty on her visit to that locality in 1867." The pursuer alleged that this advertisement was false, and injurious to his interests. The defender maintained that the advertisements were inserted for the purpose of improving his own business and not hurting that of the pursuer, and that the pursuer could sustain no injury through the advertisement, and that the action was irrelevant.

The Lord Ordinary (Ormidale) has sustained this contention of the defender, and dismissed the action, and has added the following note:—This is a novel and peculiar action as it at present stands, in reference to which the parties failed to cite any precedent having any resemblance to it. Neither could the pursuer state under what category or class of cases it fell to be ranked. He did not say that it was an action for slander of character, or of title, or one for injury to property, or for damages otherwise on the ground of culpa or negligence, or breach of contract, or obligation; all he said in argument and all he has put in issue is, that the defender had falsely, and in the knowledge of the truth, stated that Andrew Ross had taken certain photographic views which had been taken by himself, to his loss, injury, and damage. As the record at present stands, the Lord Ordinary does not see how any issue can be granted. The defender says that the statements complained of were made "for the purpose of improving or making the reputation of Ross as a photographer, and of benefiting the defender's business." The pursuer, no doubt, adds that they "were calculated to injure the pursuer's reputation, feelings, and business as a photographer." But he does not say that such was the object or purpose of the defender. The pursuer nowhere says that the statements complained of are calumnious, or that the defender, in making them, was actuated by any *animus injuriandi.* The Lord Ordinary, therefore, cannot hold that the pursuer's case, as it now stands, is sufficiently relevant. At the same time, the Lord Ordinary can very well conceive that, by some additions to the record by way of innuendo, the pursuer might be entitled to an issue or issues. For example: the pursuer might make statements to the effect that, while the defender knew that the pursuer had taken the photographic views in question, and that he had assumed the credit with the public of having done so, he (the defender) had, by the advertisements complained of, not only represented that the pursuer had not taken the views, but had dishonestly attributed to himself the credit of having done so, to his loss, injury, and damage. Or the pursuer might make statements to the effect that, by the advertisements complained of, the defender meant to represent the pursuer as having falsely held himself out to the public as the person who had taken the photographic views in question, to his loss, injury, and damage. But although the pursuer was allowed an opportunity of making alterations or additions, he declined making any either to the effect now suggested, or to any other effect. The Lord Ordinary, therefore, felt that, according to the views he has of the pursuer's case as it stands at present, he had no alternative but to dismiss it.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 25th	Oldham	Hare & Hounds Inn, Yorkshire-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The usual meeting of this Society was held on the 11th instant,—Mr. T. Sebastian Davis, Vice-President, in the chair.

After the reading of the minutes of the previous meeting, Mr. Sarony and Mr. Cobb were admitted members.

Mr. J. T. Taylor exhibited some photo-crayons by Mr. Sarony, and explained the method by which they were produced. The pictures were handed among the members, and created great interest. Mr. Sarony was present at the opening of the meeting, but had to leave before the subject was brought forward.

Mr. Henderson, alluding to this, said that had Mr. Sarony remained he would have asked one or two questions, which, however, he would ask Mr. Taylor instead. First, was the process patented?

Mr. Taylor said that it was.

Mr. Henderson then asked wherein lay the originality or novelty of the process by virtue of which a patent had been obtained.

Mr. Taylor believed that the novelty lay in the application of a sheet of drawing paper containing certain crayon-like lines and hatchings to the back of a transparency, enlarged or otherwise, the paper not being placed in optical contact with the transparency. He further said that he understood Mr. Sarony's principal design in patenting the application was to keep the process select and in the hands of such photographers as would not make portraits in that style at very low prices, which the simplicity of the operations and the small cost of the materials would otherwise enable them to do.

Mr. Henderson asked if the pictures before them were produced from ordinary printing *carte* negatives, or from thin negatives taken for the purpose.

Mr. Taylor believed that they were all produced from ordinary printing negatives. Indeed, one point which Mr. Sarony had specially dwelt upon was the fact that, after supplying as many *cartes* from a negative as were required, an enlargement could then be made in the manner he had described, put into a frame, and sent home on approbation, the chances being that it would be kept. Even if it were not kept the loss to the photographer would be trivial, for the same glass and fittings could be used again and again.

Mr. Henderson said he had recently had much practice in the printing of transparencies, and he could not see how such softness could be obtained from an ordinary printing negative.

Mr. Taylor said that a delicate picture could be obtained even from an intense negative, provided pyrogallic acid were used for the development; it would be more difficult to effect this if iron were used.

Mr. Blanchard said that Mr. Sarony's negatives were rather thin, and marvellously clear.

Some discussion having arisen concerning the tones of the pictures,

Mr. Henderson liked the tones, but thought it would be better to have the command of a warmer tone, which was difficult to get by reflected light; for anything that would tend to warm the tones would increase the density of the picture and mar the effect by reflected light.

Mr. Blanchard observed that the collodion could be thinned, so as to allow for the after manipulations requisite to improve the tone.

Mr. Henderson said that, theoretically speaking, Mr. Blanchard was right, but practically the difficulty was great and almost insurmountable. With a thin collodion they got halation, and, if the proportion of iodiser were increased, they got density.

Mr. Blanchard considered that there could be no difficulty in getting either a warm or grey tone. A fine warm tone could be obtained from bichloride of mercury and sulphide of ammonium.

Mr. Foxlee spoke of the greater facility of getting a warm tone by transmitted than by reflected light.

Mr. Blanchard said that the paper behind not being in optical contact with the picture, the tone was due partly to transmitted and partly to reflected light.

Mr. Blanchard then tried the effect of placing a piece of paper in optical contact by wetting it, when the beauty and vigour of the picture were greatly destroyed.

Mr. Hart considered the pictures so good that if the tone were altered in any way it would mar the effect, for, in his opinion, Mr. Sarony had hit the exact thing.

Mr. Howard said they had got all the vigour which was aimed so much at in lithographic work.

Mr. How considered that the beauty of the pictures was only matched by the simplicity of the mode of their production.

Mr. Werge, Mr. Fitch, and others having expressed their admiration of the crayon photographs,

The Chairman said that, looking at the pictures which had evoked such a great amount of interest, and knowing that no new effect was ever brought to such perfection without much labour and pains, they as a Society had to express their gratification with them, and their thanks to Mr. Sarony and Mr. Taylor in connection with their exhibition.

The Chairman said that a subject had been selected from the question box for discussion that evening, the question being—*Whether is the Wet or Dry Collodion Process the Best for a Landscape Photographer to Exclusively Employ?* He called upon Mr. J. T. Taylor to open the discussion.

Mr. Taylor said that the subject was one on which, from one point of view, but little could be said, and yet, from another, might open up so many questions, that the time at their disposal would not suffice to have them elucidated. Which was best—the wet or dry? What were their several specialities? What advantage had one over the other? And which of these specialities could compensate for the loss of other

features? The best process was that in which there was a preponderance of advantages for the purpose the photographer had specially before him. In the two great divisions of photography, wet and dry, as in optics, there was no gain without a corresponding loss. He would, first of all, state the case on behalf of the wet. There was the greatest rapidity attainable in photography—the pleasure or satisfaction of seeing and knowing for a certainty what one has got, implying the facility for taking several views of the same subject, each, if necessary, varying in pictorial or chemical treatment, so as to enable the artist tc retire from the spot replete with negatives of every class required. In his operations, the wet-plate worker could lay to heart and reduce to practice the precept in the nursery rhyme—

"If you don't at first succeed,
Try, try, try again."

That was the wet process in its holiday dress. The dry process implied freedom from tents or other cumbrous impedimenta. The apparatus was reduced to a minimum, the photographer discarded all unpleasant thoughts concerning the state of his chemicals or the chances of failure, and concentrated his whole energies upon the one idea of selecting and composing his view. Knowing that his plates and chances were limited, he selected his views with special care; with him it had to be a dead shot. The knowledge of his limited sphere of experiment engendered habits of care and thoughtfulness in composing his pictures, and led to the acquisition of a degree of skill and tact that would not otherwise have been obtained. This was a point to which he invited special attention. He assumed that the photographer was quite a master of his process. He then proceeded to "pit" the wet against the dry. In the field the wet was cumbrous, sloppy, and troublesome; the dry simplicity and pleasure itself. In the field and away from home, more than at any other time, did the bath get disordered. He had last summer seen a member of the Amateur Field Club with one leg of his tent tripod deranged, his tent being supported on two legs and tied to a tree. On that occasion, as if acting in sympathy with the mechanism of the apparatus, the inveterate tendency of the bath to give nothing but foggy pictures impressed upon the artist the soundness of the adage that misfortunes never come singly. The troubles of that day made a convert to dry-plate work of the friend alluded to. But when everything went right, then the wet process had the advantage. Its rapidity was a feature not to be lightly estimated. Were a landscape to be taken with figures, were rocky cliffs or sea beaches to be taken with breaking waves, were a street to be taken with its busy traffic, were rapidly-drifting clouds required to be arrested in their course—where would dry plates rank in comparison with wet? Some years ago he was in the Orkneys, and although he had dry plates, he much regretted the want of a portable tent, by which he could have secured sea views of a charming kind. In preparation for a similar trip he had had a small but very complete portable tent made, in which he could operate with plates $7\frac{1}{2} \times 5$. He purposed using this in addition to dry plates, for (and here was his answer to the question of the evening) to secure the best possible results both wet and dry plates should be employed. Dry plates were said to have been got as rapid as wet. He had obtained them very nearly as much so; but in proportion as rapidity was increased so were drawbacks, difficulties, and uncertainties. Concerning quality, he did not think that in delicacy or atmosphere one process had much, if any, advantage over the other. Dry plates had generally yielded hard pictures; this arose from under-exposure, over-intensification, or the deception arising out of the non-actinic colour of the deposit, especially when albumen played a part in the preparation. He anticipated much from the process of Mr. Russell M. Gordon, because from the absence of that deceptive element the photographer would be better able to appreciate the true actinic density of the negative, which in this respect is similar to that by the wet process. The difficulty of carrying about a tent had been happily met by some of their members, who had wheels (which could be removed at pleasure) attached to their tents. Velocipedes were suitable for carrying photographic luggage, and they possessed the advantage of also carrying the photographer himself. He once saw and envied a gentleman dash past him on the road on one of these vehicles. He (Mr. Taylor) had his camera only, and was proceeding at the rate of four miles an hour. The gentleman in question had a large and heavy-looking tent in addition to his camera, and went easily and jauntily forward at the rate of ten miles an hour. He had thrown out those several ideas on the subject in the hope of inducing a discussing on one or more of the topics referred to.

The Chairman, in thanking Mr. Taylor for his observations, spoke of the importance of having a convenient method of transporting the tent and apparatus from place to place. The addition of movable wheels to a tent he considered as highly advantageous, and he described the mechanical arrangements he himself had adopted. At the request of the members he promised to bring his tent for exhibition at their next meeting.

Mr. Blanchard suggested that all their members should do the same.

Mr. Howard said that the question before them for discussion was one of the most important that had been introduced. The dissatisfaction of amateurs with the wet had led to the introduction and perfection of the numerous dry processes in existence, and they had laboured most strenuously in those dry processes, the stimulus being the difficulties attendant upon working wet collodion in the field. He had worked much with both wet and dry processes, and had arrived at the conclusion that such good results could not be obtained by the dry as by the wet process. In photographing a simple landscape with figures, as well as in obviating other little circumstances, such as the movements of foliage by the wind, the wet had decided advantages. The want of actinic power in the green subjects necessitated a long exposure to obtain them properly; short exposures for landscape work, with dry plates, were rarely very successful. The question of wet-plate work for out of doors had yet to be discussed and practically carried out by amateurs. Were they to devote their earnest attention to it he believed that they would improve the apparatus very much. Their tents were still more heavy and cumbrous than they might be, and, in connection with that, a waterproof covering of silk might, he thought, be advantageously introduced, and which might be made to fold up like a map. With respect to transport, wheels were necessary on the tent of the photographer who wished to work the wet process with advantage and enjoyment.

Mr. Foxlee said that a knapsack was a good form in which to carry a tent.

Mr. Howard further remarked that on looking over the portfolio of a dry-plate photographer the first thing that struck one was the absence of all life, that being the consequence of the long exposures required. Wet plates would have to be used by every person who wished to achieve success. He also thought that if there were more speciality in the works of photographers—that is to say, if each were to devote much of his attention to a certain branch of operation—it would be more satisfactory, and would conduce to eminence.

Mr. Blanchard was glad that the question had been introduced. He entertained very positive opinions in favour of wet-plate photography. His first out-of-door negatives were taken with wet plates and pyro. development in a cumbrous tent. Fothergill then having introduced his process, he tried it, and his troubles commenced. He was well aware of the many excellent works that had been produced by dry plates—by the collodio-albumen process in Manchester, by the process of Mr. Gordon (who was ahead of them all), by England, Howard, and others. He had, however, to say that in spite of the beauty of England's dry-plate views, his wet ones were still better. When the exposure of a landscape exceeded a couple of seconds they got a peculiarity which was not true to nature; and if this were the case with an ordinary landscape, how much more so would it be in the case of extraordinary subjects, such as those showing effects of wind, motion, waves, &c. Having tried both, he would much rather work the wet than the dry process. Such subjects as architecture could, of course, be well obtained by dry plates.

Mr. W. H. Price said that when an amateur combined, during an occasional holiday, the pleasure of seeing the country with taking photographic reminiscences of the places and scenes visited, there could be no doubt that the dry process afforded very great facilities when compared with the wet. As an amateur, one did not usually ride the photographic hobby to such an extent as to sink all other enjoyments when abroad. For securing a few pictures around London, he might take his tent and thus get a number of very fine negatives; but the case was quite different when he went on his annual trip. To enjoy travelling, and not make one's self a slave to photography, a dry process was indispensable. What though the views thus obtained were not absolutely faultless, in the eyes of those by whom they were taken they would be beautiful, and recal the reminiscences of the trip. With a tent, they must go in for photography alone, and to a great extent sacrifice the pleasure they would have in seeing the country in which they travelled.

The Chairman said it was quite certain that all could not be expected to arrive at the same conclusion on the question. If the very best and most natural effects were wanted in a landscape, such as cattle feeding, &c., better and more varied results could be obtained from the wet than from the dry process; but for securing with comfort mementos of a trip in the country, the dry process was indispensable, and he was pleased to see a growing advancement in the perfection of dry processes day by day and week by week.

The meeting was then adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 11th inst.,—the Rev. Canon Beechey, M.A., President, in the chair.

The minutes of the previous meeting were read and passed. In reply to a question,

Mr. Young said he would have the *soirée* accounts ready for presentation at the next meeting.

The following resolution was then passed:—"That the thanks of this Society be tendered to the many gentlemen, both members and non-members, for their numerous and excellent contributions to the *soirée* exhibition."

Mr. Thomson said he unfortunately undertook to be showman at the recent exhibition, and considered the remarks of Mr. Winstanley in the report were not fair towards him. He (Mr. Thomson) had made the best of the information supplied to him. Many of the slides were sent in without even the name of the subject; and, in consequence of the great

number of transparencies shown, he had not adequate time to give a full description in instances where he could have done so.

The Secretary said Mr. Mercer (a member) had kindly presented the Society with a ballot box for the art-union drawing.

Mr. Coventry promised to read a paper at the next meeting.

A considerable portion of the evening was occupied with matters of no interest to non-members of the Society.

The thanks of the meeting were voted to Mr. Mercer for his present, and to the President for his services in the chair.

EDINBURGH PHOTOGRAPHIC SOCIETY.

This Society met in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 3rd instant.

After the reading and passing of the minutes of the previous meeting, the following were elected members of the Society:—Mr. Robert Matheson, Mr. H. J. Matheson, Mr. A. Kerr, and Mr. George Lorimer.

Mr. R. H. Bow then read a paper entitled *Some Remarks upon Mr. Macbeth's Paper, and on the Mutual Reaction of Pictorial Art and Photography upon One Another.* [See page 133.] He exhibited a series of sketches, paintings, and engravings in illustration of his theory. In the course of the discussion which followed the reading of the paper,

Mr. W. D. Clark stated that in his own experience, and in that of all photographers who had worked much in hilly or mountainous countries, there was always felt a great disappointment as to the effect on the ground glass of such scenery; and he believed that, as a whole, artists, whatever might be the true angular measurement of the altitude of mountains, gave the truest effect of such scenes. He had no doubt that of the two pictures of *Loch Lomond* that which was engraved was by far the more like the scene. Artists considered it necessary to choose picturesque points of view, and did not believe in mathematical points of taste. In conclusion, he could say that he had worked with lenses of nearly every focus from six to twenty inches, and never could get the photograph to render the scene as it appeared in mountainous districts.

Mr. James Ross stated that whatever Mr. Clark might think and feel about his own pictures, for his part he would prefer them ten times over for truth of representation.

Mr. W. H. Davies, in reviewing the argument, said that it was possible both sides were true to fact, inasmuch as the photograph represented the scene as it really appeared to the mechanical eye; but men did not see with the lens of the eye alone—the mind, the imagination also, came into play. They knew the vastness of the mountain, and that helped the mind to play tricks with the artist's hand as he painted. After all, it came to be a question which gave the truest look of nature in circumstances where the imagination was appealed to, and he believed the artist did.

In summing up the debate,

Mr. Macbeth said he was much indebted to Mr. Bow for bringing forward his objections to the views he had endeavoured to inculcate; but, as the principal object he had in view was to promote inquiry, he had been so far satisfied, and no doubt many of Mr. Bow's arguments were founded on strict mathematical truth. But there was much to be said on both sides of the question, and he hoped that would not be the last opportunity the Society would have for discussing those important principles which, in fact, lay at the foundation of all truth of representation. The question—What is truth? has been often asked and seldom answered in this direction. Their Society should try to answer it.

After the discussion was closed, a comparative trial of the lantern sent by Mr. Samuel Highley, of London, and that used by the Society was commenced. Owing, however, to the difference in power, the question of relative intensity of light and consumption of gas was remitted to a committee to report upon. Messrs. Ross and Pringle exhibited, by means of both lanterns, a large number of very beautiful transparencies from their portrait and figure subjects, which were much and deservedly admired and applauded. When the lantern exhibition had concluded, the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

At the ordinary meeting of this Society, M. Balard occupied the chair.

After several presentations to the Society had been made,

M. Blanquart-Evrard drew the attention of the Society to some proofs which were printed between 1851 and 1855, and which had undergone no change whatever.

M. Soulier offered to the Society several carbon prints on films fixed on glass, and called the attention of the meeting to an alteration in one of them, and which he had previously observed in proofs of this kind. This one had been enclosed between two glasses before it had become quite dry, and when the gelatine had not been rendered perfectly insoluble. The result was that, the gelatine being partially dissolved, a portion of the black held in suspension was allowed to spread. This was an express indication of the necessity of rendering gelatine perfectly insoluble and submitting the proofs to a complete desiccation—no very difficult matter, and which sufficed, according to M. Soulier, to ensure their enduring for any length of time.

MM. Davanne and Girard announced that they had separately made some experiments on the carbonate of silver paper of MM. Schaeffner and Mohr, and that they had obtained satisfactory results; but they intended to continue their experiments, and begged some of their colleagues to join them, in order to make the experiments as numerous as possible, and MM. Schaeffner and Mohr took this opportunity of placing specimens of their paper at the disposal of all the members.

M. Romain Talbot presented to the Society, in the name of Herr Liesegang, a sample of papyroxyline.

M. Davanne said he had experimented with this product, and he had found that it dissolved without leaving any residue.

M. Briois said that the preparation of pyroxyline of paper had been long in use with the manufacturers of chemical products, and that the papyroxyline had no character of novelty.

M. Romain Talbot observed that the preparation had, he knew, been manufactured long ago; but he believed that this was the first occasion of its being manufactured on a large scale.

M. Duchemin described to the meeting the processes by which he obtained the reproduction of photographic images on glass enamel without transfer or collodion. He performed all the necessary operations, and printed in a few minutes, with the aid of magnesium light, a positive, which he vitrified afterwards in an enameller's oven, in the presence of the members.

The meeting, having passed a vote of thanks to the contributors, shortly afterwards separated.

At a subsequent meeting of this Society, M. Balard again occupied the chair.

A letter was read from MM. Geymet and Alker, respecting M. Poitevin's reclamation in regard to the practical demonstrations made by them in enamel photography. They stated that if any one could have made a reclamation it was M. Camarsac, who took out a patent in 1854. They had taken no lessons from M. Poitevin. If he invented the means of making enamel photographs, he had not published them. They found out the means they have published, and which have been successful, but they lay no claim to the principle. M. Poitevin might claim a right of priority as regards the perchloride of iron for enamels, but they did not stand in need of this substance. His patent, moreover, indicated no manipulations. As to the question of alkaline bichromates, it should be borne in mind that sixteen years before M. Poitevin published his process the photographic properties of these salts had been known and applied. There was no question of enamel in the first patent of M. Poitevin for the application of bichromated gelatine, and any one like himself might form a process from the first observations made by Mungo Ponton on the bichromate of potash. They stated their object to have been to direct attention to the enamel process, which had been too much neglected, and to hasten progress by facilitating research; and they had had the satisfaction of seeing that it had become the order of the day. For the future they did not intend to notice any future reclamation, but they reserved to themselves the priority of publishing the manipulations they had practised at public meetings.

M. Poitevin stated that M. Lafon de Camarsac was undoubtedly the first that had published a process for producing photographic proofs on enamel, but his process was based on the bitumen of Judea; he had never published any other, and certainly had never spoken of the employment of the bichromates. He (M. Poitevin), on the contrary, in his patent taken out in 1855, took care to speak of their application to the making of vitrified images on glass or porcelain; and although he had not published it, he had taught numerous pupils for years past a mode of operating similar to that of MM. Geymet and Alker.

At the end of this explanation, the Society expressed a desire that the discussion should not be prolonged.

After reading a further letter from MM. Geymet and Alker, and an explanation from M. Duchemin respecting the communication made by him to the Society,

A note from M. Belbeze was read respecting the dry tea process, in which he stated that amateurs in dry collodion might employ tea as an excellent preservative. It had great fineness and gave beautiful tints. The faults were so few that he had not yet seen one on the numerous negatives he had made. The clouds and sky were invariably good. It had the sensitiveness of tannin, or, rather, of collodio-albumen. The development was very rapid.

After some further business, the meeting separated.

Correspondence.

Foreign.

Paris, March 16, 1869.

I will begin at once with the review of the book on the photographing of colours, the preface to which I introduced to your readers a fortnight since. M. Charles Cros (is this an Englishman of the name of Cross?) says:—"The methods I propose are founded upon the processes already known in photography, and upon the equally well-known physical properties of the luminous rays; and it is precisely because each of the

elements of the idea is experimentally given, and because the arrangement alone is new, that it has not been necessary for me to assure myself of the possibility of the result by experimenting." This is rather cool, for it is well known that theory and practice do not *always* dovetail, even when "they should." This author starts with the proposition that "colours are essences, which, like figures, have three dimensions, and consequently necessitate three variable independents in their representative formula." I do not know that we are absolutely bound to take this for granted, and still less for truth. Let that pass, however, and let us, for the sake of getting along, grant it. The conclusion that is drawn from this assertion is "that if one had an instrument for measuring colours, as the thermometer measures temperatures, it would be necessary that it gave three distinct numbers for each colour, in order to express the relations of the shades among themselves." But supposing we have no such instrument—how then? M. Cros promises to give the description of how to make an instrument for the "numerical analysis of all the mixed tints" in a "future publication." Meanwhile we must get on as well as we can without this chromometer, and when we see a painting we must reckon it up in this manner:—"Divide the painted surface into a number of little squares—the smaller the more detail is required—and note, by means of three numbers for each square, the various tints." Well, but supposing we do not wish to spoil the painting by dividing it into "little squares;" then I suppose we must wait for the chromometer.

We are then asked by our author—"What is it which is registered by a photographic apparatus?" and we are answered—"The white, the black, and all the intermediate grey tones." A single "numerical linear scale" would be enough to classify and design each of the terms of this series of black and white. In a photograph, therefore, there will never be the necessary elements for the "integration" of the tints represented by a painting, unless—and here we begin to have a hope that something may be done—unless we take three separate pictures, each giving the variations in the intensities of one of the three elements of colours. What are these three "elements of colour?"—red, yellow, and blue. We must, therefore, take three negatives of the painting—one representing all the points more or less red, the second all the yellow or colours containing a portion of yellow, and the third a negative of all the blues. This, perhaps, under the circumstances, would be the most developed. Well, these three negatives—supposing them to be of uniform tints—would express, in black and white and grey more or less deep, the respective quantities of red, yellow, and blue contained in the painting; "*therefore*," we should have the whole of the data of the painting, "but not for its reproduction for immediate view." "In a word, the *analysis* of the picture is made in respect to colour, but not the *synthesis*." These are the two portions of the problem to be resolved, and we will consider, first, the three processes for the "*analysis*." The first which "occurs to my mind," says the writer, "consists in *sifting* the rays by means of coloured glasses." The first negative is taken through a red glass—"only the red rays will pass." This, I think, remains to be proved, and what is red glass will be a very natural and proper inquiry. "In reality, white light will pass too," says M. Cros, and "the red rays will only be the maximum, but this does not alter anything of the theoretical or practical parts of the question." May we be here allowed to doubt or even differ. Supposing the negative obtained, it ought, according to our author, "to express, by its variations of opacities and transparencies, the qualities greater or smaller of red which there is on each point of the picture." The same with respect to the second, or yellow negative, and the third, the blue negative.

Now, then, for a piece of practical advice to photographers:—"The unequal photogenic activities of the different rays should be compensated by proportional intensifying of the sensitive baths and developers and by the time of exposure;" and a piece of news for theoretical photographers:—"The feeble chemical activity of the red and yellow rays is explained, up to a certain point, by the fact that the sensitive substances are generally yellow or red, and therefore reflect instead of absorbing these colours. The equality of the actinic powers on different substances may be restored by colouring the sensitive surfaces blue or green. For this purpose may be used iodide of starch, soluble indigo, salt of uranium." I am glad for the "credit" of the man that he puts in a "perhaps" before enumerating the substances which may be used. Neither his practice in recommending the intensification of baths, &c., nor his theory will be swallowed by those who know more about the subject than the author.

There are difficulties to be surmounted, we are candidly told. For example: the coloured glasses of commerce are, perhaps, too deeply coloured for using in first experiments. We should commence with glasses nearly white. It would have been more to the purpose if M. Cros had devoted more time to experimenting on the best tint of glass and less to suggestions, which are neither practical nor theoretical in the best sense of the words. These glasses must be very "limpid," without bubbles and defects, and perfectly flat. They "might be" replaced by coloured glasses, made by spreading varnish over the plates, or *even over one of the lenses* of the combination. Coloured liquids "might also, perhaps," be used; and we are coolly told "there is here a whole series of delicate experiments." Lazy man! why not make some of them, or have them made, before inflicting upon us such meditations, which are very like young night thoughts? We will skip over the second method of analysis, and glance at the third, which consists in taking successively three negatives with an ordinary photographic apparatus without any modification, except in taking care to light up the painting or objects to be reproduced—with a red light in the first place, then with a yellow, then with a blue. (Kindly give us a receipt for a pure *blue* light.) Oh! this is the way—I thought we should have to burn blue and red Bengal flames, &c.—"the different colours are taken from a spectrum, or obtained by means of coloured transparent media." I see now, but not how to light up my picture with blue light, especially if it be about two feet wide; the cost of the apparatus for producing a spectrum the blue of which should light up my picture would be very great. "This third method cannot be applied to any reproduction made in the open air." We shall have to intensify our baths pretty considerably, then, to get the trace of a picture, I fancy, under the circumstances we are restricted to. "However," says the writer, "the relative ease of putting this process into practice renders it precious for scientific and industrial reproductions." Too precious to be of much use, like zirconia at present—"perhaps."

I have only accompanied your readers through about half this book, and I feel they are wearying of it already. It is all in the same wild strain; but if anyone wishes it, I will go through the book and give a full review of it. Let anyone who desires it write to your office at once, and let his wishes be made known in the pages of this Journal. If the French chaff us about the crude ideas of Mr. McLachlan, we have our revenge now, I fancy, for these ideas are really not only crude but raw.

A bookseller here has started a good idea. He puts a photographic portrait of the author on every book which he places in his window. I fancy it will prove a good speculation—both increasing the sale of the books and the portraits. One always likes to imagine "what manner of man" or woman the author is whose works we read, and especially if the works are our favourites. A doll shop—and you know the Parisian dolls are got up "regardless of expense," and in the latest fashions—has photographs of the dolls the proprietor sells, in their costumes, pasted on the back of his little address cards. The photographs are about $1\frac{1}{2} \times 1$ inch, and the card a trifle larger. I have three before me—one representing a lady doll, in promenade costume, followed by a little poodle; another, a fancy *dollesse* on the back of a sheep; another, a doll in very simple costume, and her hair down in plaits.

I have just received an invitation to a dinner, in which "*viande de cheval*" and its preparations will be the *specialité*. A photograph is mounted on the card, representing an equestrian and appropriate design and motto, and I am told that "the meet is at 7 and the covers will be drawn at 9." So much for very theoretical photography, and some very practical applications of the art. R. J. FOWLER.

Home.

SARONY'S PHOTO-CRAYON PROCESS.

To the EDITORS.

GENTLEMEN,—Like many others, I feel not a little interested in Sarony's new process. I am not so much interested in the question of the absolute novelty of the process as in the stimulus which its introduction just at this time is calculated to give to photography. Be it new or old, patentable or not patentable, it is a good thing, if I am to judge by the specimens I saw at your publishing office; and in saying so I speak the sentiments of three other professional artists who accompanied me on that occasion.

Since that time I have devoted all my spare time (and some also that I could not well spare) to the practice of producing enlarged transparencies, following as nearly as possible the directions given by you in last Friday's Journal. As I had not a magnesium lamp at hand I tried it with the oxycalcium lime light of my magic lantern, using the lantern just as it stood, with only one exception, namely, removing the tube with the object-glasses, which were not achromatic, and substituting in their place an ordinary quarter-plate portrait combination.

Selecting a clear and thin negative, I received the focus on a sheet of white cardboard, and, when the plate was sensitised, I removed the card, and substituted for it the collodionised plate. The light being very good, I only exposed fifteen seconds, and was, on my first trial, rewarded with a sharp and beautiful transparency which required no toning. When varnished and superposed on a sheet of drawing paper it looked really beautiful; and I believe that, if placed on a paper containing the crayon lithographic hatchings peculiar to the process, the effect would be quite as good as those I saw in your office. Of course, I mean to go in for the new process, now that I find I can succeed so satisfactorily.

My object in thus writing my experience is to encourage those who may be appalled by fears of the difficulty of working it out, for, up to Friday evening last week, I had never before made an enlargement of any kind.—I am, yours, &c., PHOTO.

Brixton, March 17, 1869.

To the EDITORS.

GENTLEMEN,—In claiming for Mr. Sarony the merit of being the first to place an engraving or a coloured sheet of paper behind a photograph

on glass, Mr. Jabez Hughes, at the last meeting of the London Photographic Society, claimed somewhat too much.

As one who has written a manual of photography, Mr. Hughes surely is not ignorant of the fact that Mr. Ashton, of Manchester, and Mr. Urie, of Glasgow, both hold patents for the same things, and extracts from which I shall send you, if you desire to see them. The patent of Mr. Urie has long since expired; but that of Mr. Ashton, I understand, is still in force. In the face of these, then, it is scarcely wise in Mr. Hughes to make such sweeping and utterly groundless claims for Mr. Sarony.

The process may possibly be useful to professional photographers; but, if Mr. Sarony has really included in his claim the points above noted, I fear that his patent, whatever it might otherwise have been worth, will be found invalid.—I am, yours, &c.,

March 15, 1869. ONE WHO WAS PRESENT.

[With respect to the above we may observe that Mr. Urie's patent, so far as we remember, applied only to backings for collodion positives, with the view of giving an effect of relief to the figures; and Mr. Ashton's patent, which, we think, has now expired, had reference solely to transparencies produced by Mr. Woodbury's process. What Mr. Sarony's patent really embraces will be ascertained from some remarks to be found in our report of the meeting of the South London Photographic Society in the present number.—EDS.]

PRINTING WITH THE CAMERA ON GLASS.

To the EDITORS.

GENTLEMEN,—By your last issue I find that Mr. Sarony has secured protection for his new style of portrait. Please kindly inform me if that will affect me in working and selling the following:—From your published description of Disderi's process of printing and transferring on paper I made a good many of that kind of picture; but not succeeding in the transferring, and finding they made excellent pictures with paper backing on the collodion side, I finished several of them off in that way, had customers for many of them, and have made them to order frequently. I have also several by me at the present time. I do not use the formula published in your description of Sarony's method, neither have I made any ornamental backings, therefore I cannot see that the protection he has secured will interfere with my continuing to do them.

If you will kindly favour me with an answer through your valuable Journal I shall take it as a favour.—I am, yours, &c.,

Photographic Depot, Hunstanton, March 16, 1869. W. MCLEAN.

[Perhaps Mr. Sarony will kindly reply to the above.—EDS.]

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

R. P. Yeo, Plymouth.—*View of Charles' Church, Plymouth.*

Tattersall and Rogers, Accrington.—*Portrait of the Rev. Evan Lewis, B.A.*

James Valentine, Dundee.—*Portraits of Princess Elizabeth, Lady Jane Grey, Jane Seymour, and Catherine Howard, from original miniatures, the property of Mr. Wentworth L. Scott.*

CONSTANT READER (Plymouth).—Newman (Soho-square) makes an encaustic paste which will answer your purpose. There are printed directions on each bottle.

G. B. (Essex-street).—Grüne's process for burning-in photographs, apart from the transferring of the film, of which we cannot here speak, consists in toning the collodion image with bichloride of platinum, and, after applying a suitable flux, burning-in the image in a muffle.

SARONY PORTRAITS—Mr. Savage, of Winchester, in writing about these portraits, expresses his opinion that the instability of the collodion on which the picture is obtained will cause them to "go to the bad" like the old positives. We should have liked to exchange a word or two with Mr. Savage on this subject, but his letter has come to hand just as we are "closing up" for this number.

J. T. L.—Theoretically speaking, the bath will sooner become deteriorated from the presence of acetic than of nitric acid. In general practice it is found best to acidulate the bath with acetic acid for dry-plate work, and nitric acid for working the wet collodion process. The addition of sugar tends to keep the silver on the plate from crystallising during a protracted exposure. The silvery appearance to which you refer depends upon the collodion as well as upon the bath; but if you do not wish to change either, try the effect of a little citric acid or gelatine in your developer, which will then have to be made rather stronger than before.

C. R.—The medical friend to whom we sent your letter, as stated last week, has replied as follows:—"The practice of arsenic eating, while it tends to fatten, at first, the person eating the poison, does so at the expense of the hair, teeth, and eyes. The hair commences to fall off, the teeth soon become loose and fall out, while the eyes become bleary and the lids red. If the practice be continued for some time, symptoms of violent arsenical poisoning may appear at a moment's notice, since arsenic has the power of accumulating in the system in considerable quantities and killing its unfortunate victim at a blow. I would not undertake the responsibility of advising you in the matter, as you should at once consult an experienced medical man. I must, however, particularly impress one point upon you—Do not allow the practice of arsenic eating to be *suddenly* discontinued, as this often tends to the immediate development of symptoms of acute poisoning."

NON COMPOS MENTIS.—We sent your letter to Mr. Warner, who replies as follows:—No. 1. The sugar is added to the whole bulk of bath, not to one ounce or five; the quantity named is sufficient for forty ounces.—No. 2. At page 98, 19th line from top, read paragraph, which replies fully.

PHOTO.-CRAYONS.—Referring to an article on the copying camera in the present number, since writing it we have received a letter from Mr. Sarony, in which he informs us that he has forwarded to us a specimen (not yet received) finer still than any that we have seen, and executed in daylight by a simple apparatus fixed against a window, the whole enlarging apparatus not costing much above twenty shillings. A photograph of this apparatus is to be sent to all those who have licences.

PROFESSIONAL.—The difference between Monckhoven's large-sized enlarging camera and that of Woodward lies in the condensers. The condenser of the latter is a simple plano-convex lens; that of the former is also a plano-convex lens, but with the addition of a smaller-sized concave lens between the condenser and the negative. Comparing the enlargements of Collier, of Inverness, who uses only the single condenser, with those of Dr. Monckhoven, we should say that, in practice, one kind is as good as the other.

W. A. G.—1 and 2. Make a strong solution of pyrogallic acid in alcohol, and dilute with water when required for use. But why not put up a number of packets of pyrogallic acid, each containing two or three grains? This would prove the better method.—3. Plain collodion mixed with rouge, or any strong red gum, will make a good backing for dry plates for preventing halation. Coffee plates are the better for this addition.—4. We have tried it: it is good.—5. No; the black or yellow paper would have to be in *optical* contact to prevent halation. Fastening merely at the corners would not answer.

RECEIVED.—The *Silver Sunbeam*, sixth edition, and the *Microscopical Journal*. Will be noticed in our next. Also received, W. M.; H. G.; Fairplay; John Jones; T. B.; S. O.; A Daguerreotypist; D. M. (Liverpool); Inquirer; James G—— (Birmingham); Old Photo.; F. S. (Birkenhead); Leveller; Photographer; E. J. E.; R. Merton; Operator; and others.

EXCHANGE COLUMN.—In consequence of pressure on our space, we are compelled to leave over the notices of exchanges till next week.

GOOD FRIDAY.

OUR next day of publication falling on GOOD FRIDAY, this Journal will be published on THURSDAY next, the 25th instant. Orders from Advertisers and Agents should reach our Office not later than TUESDAY Evening next.

PUBLISHING OFFICE—2, YORK STREET, COVENT GARDEN, W.C.
March 19, 1869.

FIRE IN A PHOTOGRAPHIC ESTABLISHMENT.—At an early hour on the morning of Saturday last, Mr. Sedgfield, photographer, Norbiton, and his family were aroused by an alarm of fire in a cottage adjoining his residence, which is used by him for the purpose of storing negatives, photographs, &c. The fire burnt with such fierceness that, although it was raging two hours, only the building was burnt through to the roof, and the contents of three out of the four rooms were destroyed or injured in such a manner that they are useless. The contents of the other room were much damaged by the water, although they were not reached by the flames, their escape being attributable to the fact that the door communicating with the room was shut, so acting as a barrier to the flames, and preventing any draft in that direction. Mr. Sedgfield was able to save a number of negatives and other articles, which were placed in a room upstairs, before they were injured by the flames; but he has sustained an irreparable loss in the destruction of a large quantity of valuable negatives, which cannot be replaced. A great quantity of other property, including a camera worth £25, was either consumed by the flames or rendered useless. A heavy iron press, which stood in one of the upper rooms, fell through the ceiling to the room below while the fire was raging, carrying part of the floor with it. The Surbiton fire-engine arrived at a later hour of the morning, but it was not required, the fire being by that time nearly extinct. The stock and building were insured. The cause of the fire is not known, but it is supposed that it originated in one of the ground floor rooms, in the fireplace of which there had been a fire the day before. We are glad to learn that the laboratory and printing department entirely escaped unhurt; and the business will not suffer any interruption.

*** We have received numerous communications referring to the presentation of portraits of those with whose names our readers are more particularly intimate—among others, that of Mr. M. Carey Lea. We are happy to inform our readers generally that with an early number of the Journal we shall present a photolithograph of this gentleman, which is being prepared for us by Mr. Griggs, photographer and photolithographer to the East India Department of Government.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 464. Vol. XVI.—MARCH 25, 1869.

A MAGNESIUM SMOKE TRAP.

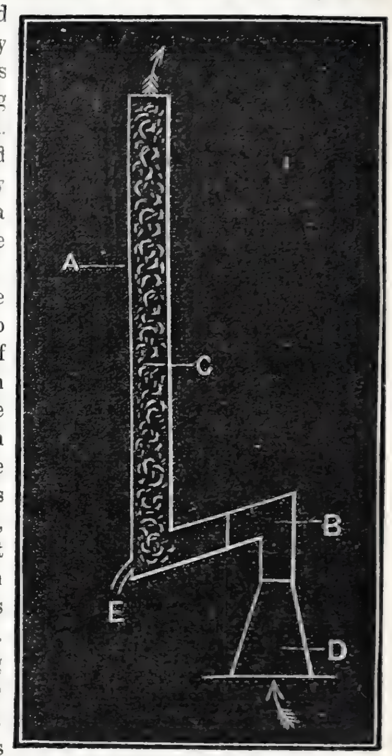
There are few who employ magnesium as a source of light for the magic lantern or enlarging apparatus who have not had occasion to confess that the magnesia smoke is a genuine nuisance. We have lately realised this fully, as we have employed the magnesium light for various purposes to a considerable extent, and with great advantage so far as the light is concerned, but under solemn protest of our organs of respiration. There can be no doubt whatever that the inhalation of a quantity of magnesia in an anhydrous and minutely-divided state into the lungs must prove injurious if long continued; and it appears to us that but little real attention can have been given to this subject, or this "smoke nuisance" would have been long since abated.

Since the details of Mr. Sarony's beautiful "photo-crayon" process have been published we have little doubt that the magnesium lamp—especially Mr. Solomon's convenient arrangement—will be employed to a very much greater extent than heretofore. Consequently, in the interests of our readers (and of our own lungs), we have set to work to devise a plan for partially removing the magnesium smoke without so complicating the arrangements of our lantern as to render it cumbrous or more troublesome to work.

Magnesium smoke may be got rid of in two ways:—First, completely, by carrying the fumes outside the walls of an apartment by means of a long tube. This is certainly a convenient and simple plan, but cannot always be adopted, as it sometimes happens that it would be necessary to bore a hole in a wall, or to have a little of an upper window sash open on a cold winter's night, in order to permit the passage of the tin tube by which the smoke is conducted into the open air. The second remedy for the smoke nuisance is to absorb the fumes by a chemical agent. This is the plan which we now propose to adopt, and which works remarkably well when carried out in the way we shall now describe. In giving the details of our arrangement, however, we must say that the general plan appears to us to be so very obvious that we can scarcely suppose others have failed to adopt some similar arrangement.

Our readers well know that oxide of magnesium or magnesia, which results from the combustion of the metal, is what is known in chemistry as a powerful base—that is to say, a body which has a strong tendency to combine with and neutralise acids forming indifferent salts. It is, therefore, only necessary to present an acid to magnesia in order to remove the latter. Now it so happens that magnesia in the finely-divided form in which we meet with it in the smoke we are considering is not easily removed by the more fixed acid; but when we oblige the smoke to come in contact with a rather volatile acid under favourable conditions, combination takes place, and our offending magnesia is removed. The mode of obtaining this object we have now to describe.

Mr. Solomon supplies with his lantern several chimneys of tin plate, and it is one of these which we convert into a magnesia trap. The accompanying diagram will facilitate the explanation of our arrangement. The tube A is about three feet long, and is connected with the chimney of the lantern D by means of the piece B. When the lantern is working the course of the smoke is that indicated by the direction of the arrows. The tube A is nearly filled with large pieces of light wood charcoal C, which must be very loosely packed in the tube, so as to avoid materially interrupting the passage of smoke through A. This charcoal is now saturated with warm *acetic* acid or very strong vinegar, and is then in a position to partially remove the magnesium smoke.



The object of employing the light charcoal is obviously to present a very large surface of acid for effecting the absorption of the magnesia; at the same time the weight of the column is very trifling. When a large quantity of magnesia smoke has passed through the apparatus, of course a considerable amount of the acid will have been neutralised; it then becomes necessary to change the acid. This is done by simply pouring fresh acid in at the top of the tube A, and allowing it to run down, thus displacing in its course the liquid below it, which runs off through the little exit tube E provided for the purpose.

It need scarcely be stated that the tin tube and the solder with which the joints are made require to be protected from the action of the acetic acid, since the latter, when strong, would ultimately destroy the tube. This may be avoided by simply coating the interior of the tube with a good layer of turpentine varnish, which protects the metallic surfaces from mischief.

We now have a few words to offer relative to the action of the magnesia trap which we have fitted to our lantern. At first but little of the smoke is condensed in passing through the arrangement, unless a more concentrated acid is used than it is convenient to employ under ordinary circumstances; but as the stream of heated air and smoke pass through the charcoal column the acid is volatilised, and the proportion of smoke issuing from the chimney materially diminished. But, although the smoke is not entirely suppressed, its unpleasant effect on the lungs is almost wholly removed, since, even when the atmosphere is highly charged with the smoke, the dry, tight sensation noticed to so unpleasant an extent under ordinary circumstances is not perceived. This advantage, gained by the use of our smoke trap, is attended with no corresponding drawback, since the draught of the chimney is not interfered with if each of the lumps of charcoal placed in the tube be not less in size than a good walnut. If tolerable regularity in this respect be ensured, a large absorbent and evaporating surface is exposed to the current of heated air and

smoke, without at the same time offering any impediment to the free passage of the latter.

We have now described our smoke trap and its mode of operation; but we hope that some of our readers will continue experiments in this direction, since, though the smoke nuisance is materially abated by our arrangement, it is not wholly suppressed.

DEFECTS IN THE COFFEE PROCESS.

Having prepared with great care a number of coffee plates at the commencement of the year, we have at various intervals since that time tried experiments with them, and the results have been of a somewhat varied character. The plates experimented upon were prepared in three different ways. One batch was preserved with coffee infusion alone; a second batch had sugar added in the proportions we have given in articles devoted to the subject; while the third batch was treated with the ordinary essence of coffee sold in shilling bottles, previously diluted with water. In the various experiments a plate of each kind was tried at the same time.

A steady light having been obtained, and half-a-dozen plates having been put carefully aside, all the rest of the plates were exposed for forty seconds each, under a fine clear negative of the west doorway of Holyrood Chapel. One of each kind was developed the same evening by two grains of pyrogallic acid and one and a-half grain of citric acid to the ounce of water. All the pictures were clean and good, and no difference in sensitiveness was appreciable. These were marked and put aside as test pictures.

A few days afterwards three other plates were developed, the pyrogallic solution being freshly prepared, as indeed it was on each following occasion. There was a scarcely-perceptible falling away in the quality of the pictures, and, although the temperature of the room and the solutions was the same as before, the image was slower in coming out. By dint of care the resulting transparencies were such as might be fairly considered good, although the one which had been prepared by the essence of coffee showed symptoms of under-exposure.

After a lapse of about six days more another set of the plates were developed. The results were curious and instructive, although by no means desirable. After long coaxing a feeble and rather dirty-looking image at length made its appearance on the plate prepared by the essence. As a picture it was quite worthless, presenting the characteristics of a plate which had received less than one-half of its proper exposure. The others were also "under-exposed," the plain coffee plate being least so.

The last set were at a later period taken from the plate box, and, without attempting to develope them at all, they were re-exposed for the same time and under the same negative as previously. The light in this case was stronger than that employed on the former occasion, so that in effect the exposure would have been equal to one-fourth longer than the plates had previously got. So much had the image originally impressed faded away that when the first plate was developed scarcely any traces of the former latent image were noticed, and the same to a less extent applied to the others.

The plates laid aside at the commencement of the course of experiments were now exposed and developed, a very fine picture being obtained on that prepared with plain coffee, a slightly inferior result accruing from the coffee and sugar, while the one prepared with the essence was much inferior.

The conclusions at which we have arrived from this experiment is that the vile compound known or sold as essence of coffee is worthless for preparing plates with, unless they be exposed and developed very shortly after their preparation; we find especially that they keep badly after exposure. There seems but little difference between the plain coffee and that containing a small proportion of sugar; but, when the plates are kept for any length of time, a slight difference is appreciable in favour of the former. Coffee plates will keep well for a considerable time before exposure; but after this event the latent image appears to gradually fade away, until at length it resists all endeavours to coax it into visible existence.

It is only right that we should state, that no attention whatever was paid to the hygrometric condition of the atmosphere surrounding the plates during their seclusion in the plate box. The experiment extended over an exceptionally rainy period, when the air was surcharged with moisture. We intend to repeat the experiment under conditions which shall ensure *perfect* dryness of atmosphere in the plate box. In the meantime, we sum up and give the following as the result of the experiment described:—Plates prepared by the coffee process have good keeping qualities, but they must be developed as soon after exposure as possible.

AN IMPROVED SUBSTITUTE FOR INDIA-RUBBER.

In the following specification is described an invention by Mr. Austin Goodyear Day, India-rubber manufacturer, which will probably exercise a great influence on what is now an important branch of commercial enterprise, and almost a necessity of our social existence:—

Letters patent have heretofore been granted to William Robert Lake, dated the 4th day of November, A.D. 1867, No. 3108, for an invention communicated to him by me of *An Improved Artificial Compound, Chiefly Designed for Use as a Substitute for India-Rubber or Caoutchouc*, and the object of this invention is to provide a compound designed for similar purposes.

My present invention consists in combining certain acids with the ingredients which compose the compound described in the specification of the previous patent above referred to, for the purpose of enabling the oils employed therein to better combine together, whereby also I can materially diminish or wholly—or almost wholly—dispense with the amount of sulphur required in the said former compound.

In practising this invention many varying proportions and combinations of the ingredients used may be adopted, but those which are best for any particular purpose will be readily determined by the workman. I will, however, state some examples of mixtures which I find to answer a good purpose.

For a compound adapted for soft or elastic rubber goods I prefer to take—when steamheat is to be employed for vulcanisation—twenty pounds of linseed oil, twenty pounds of cotton-seed oil, four pounds of coal oil, twenty-four ounces of sulphuric acid, one pound of bicarbonate of soda, one pound of nitrate of soda, fifteen pounds of coal tar, five pounds of asphaltum, five pounds of litharge, two pounds of calcined magnesia, and eight pounds of sulphur. If, however, dryheat is to be used for vulcanising I prefer the following mixture:—Twenty pounds of linseed oil, twenty pounds of cotton-seed oil, four pounds of coal oil, thirty ounces of sulphuric acid, two pounds of bicarbonate of soda, one pound of nitrate of soda, fifteen pounds of coal tar, five pounds of asphaltum, four pounds of litharge, one pound of calcined magnesia, and eight pounds of sulphur.

For what are termed semi-hard rubber goods I prefer the following mixture:—Twenty-four pounds of linseed oil, sixteen pounds of cotton-seed oil, four pounds of castor oil, twelve ounces of sulphuric acid, twelve ounces of nitric acid, one pound of bicarbonate of soda, one pound of sulphate of zinc, one and a-half pound of muriate of tin, eight pounds of coal tar, eight pounds of asphaltum, two pounds of gutta-percha, ten pounds of sulphur, and one pound of calcined magnesia.

For hard rubber goods I take the following mixture:—Thirty-two pounds of linseed oil, eight pounds of cotton-seed oil, three pounds of castor oil, one pound of coal oil, twenty-four ounces of nitric acid, six ounces of muriatic acid, one-half pound of bicarbonate of soda, two pounds of muriate of tin, five pounds of coal tar, five pounds of asphaltum, one pound of gutta-percha, and ten pounds of sulphur. In order to combine these ingredients properly together I prefer to mix the oils in an iron vessel, and then put the acids into them, stirring until both oils and acids are well mixed together. The mixture may then preferably stand from twelve to twenty-four hours.

When more than one acid is employed, as shown by preference in the foregoing examples of semi-hard and hard goods, they may be mixed first and then put into the oils, or they may be separately mixed into the oils, or a single acid may be mixed with a single oil and then all be put together.

After the oils and acids are mixed in the above or in any other suitable manner, I prefer to heat the mixture slowly to about 220° Fah., and then add the soda, and from one-fourth to one-fifth of the sulphur, at the same time gradually increasing the heat to 250°, and from this point still slowly raising it up to 300 or 350°. This range I employ as a general rule, but care should always be taken to avoid rapid or sudden heats. After the first portion of sulphur has been combined it is more easy to regulate the heat to combine the residue thereof, which may be added shortly after the first portion has been combined, and while the heat is standing at about 300°, care and time being taken to slowly mix the sulphur as the mixture will bear it. I prefer to melt the coal tar and asphaltum in a separate vessel heated to from 350 to 400°, and, if desired, the nitrate of soda and a part of the carbonate of soda (when large proportions of the latter are used) may then be mixed into the same. I also sometimes mix therewith the sulphate of iron or zinc and muriate of tin, but often I combine these latter-named ingredients with the oils before the whole of the sulphur is combined. The litharge also may be combined with the melted tar and asphaltum, or it may, if preferred, be added after the tars have been mixed with the oils. I usually prefer a temperature of about 300° for combining the oils and tars, and when this combination has taken place the gutta-percha or other equivalent resins or gums, if any be employed, may be mixed. When calcined magnesia is used I generally prefer to mix it last at about the time when the batch shows signs of thickening. Constant stirring is required while the various ingredients are being mixed, but the periods and degrees of heat will be easily ascertained by the workman according to the variations in materials and proportions which he may employ, and the character of the product which he may desire to produce.

With my improved compound I am able, by using the above specified acids freely, to wholly—or almost wholly—dispense with sulphur as an ingredient of the mixture. After the compound has been formed as described, I combine it with India-rubber or caoutchouc in the manner following :—The compound and the rubber are united in the usual way by grinding, and for soft or elastic goods I prefer to combine from one-half pound to two pounds of the compound with one pound of caoutchouc, varying between these proportions of the compound according to the particular kind of soft goods required. For semi-hard goods I generally prefer to combine about equal parts of the compound and rubber, and in so doing I add from about one ounce to about three or four ounces of sulphur, according to the particular character of the semi-hard goods desired. For hard goods I usually combine from about half a pound to a pound of the compound to a pound of rubber, and I prefer to add from two to eight ounces of sulphur, according to the degree of hardness required in the product. After the compound is thus united with the rubber I vulcanise the whole in the usual way. This improved compound is adapted to all the purposes to which the compound described in the specification of the previous patent, hereinbefore mentioned, is applicable, but under the present invention the character and quality of the product is materially improved, and I am enabled to perform the chemical manipulations of the manufacture more conveniently and with better effect.

THE LIME LIGHT WITHOUT OXYGEN.

About a fortnight since we were shown by Messrs. Darker, of Lambeth, a modified oxyhydrogen lime light which is capable of being made exceedingly useful. In it the pure oxygen usually employed either with common gas or with pure hydrogen is supplanted by common atmospheric air, which contains upwards of one-fifth its bulk of that element. The intense heat which is yielded by the combustion of a mixture of common air and common gas is known to all our readers, and this heat has been utilised in various ways, from the common Bunsen gas burner up to the assayer's furnace. It is rather with the illuminating than with the heating power of this mixture that we have to deal at present, although the one directly depends upon the other.

It is now twelve months since we published an account and description of a lamp of a peculiar kind, invented by M. Bourbouze, of Paris, known as the Bourbouze lamp. Here a mixture of air and common gas is emitted from a tube the extremity of which is covered by a cap or cage of platina wire gauze. The heat is so intense that the platina gauze becomes incandescent, and consequently yields a light of considerable power. We regret, for the sake of M. Bourbouze, that there is no patentable novelty in his lamp, at least in this country, seeing that some better forms of the same system have been known, and even patented, in England for several years, and the "iridio-platinum" gauze caps of former inventors have already been described in our pages.

It has, doubtless, occurred to many that the intense heat by which even platinum could be melted, if care were not taken in regulating the heat, would also serve to render lime incandescent to the degree necessary for its emitting that pure, dazzling flame popularly known as the lime light; and, as we have said at the opening of this article, the idea has been brought into a practical shape by Messrs. Darker. We have seen the light produced from burners of various forms, both those in which the gases (that is, atmospheric air and the common gas) were mixed before issuing from the orifice of the burner, and those in which the one was blown through the other, as in the safety oxyhydrogen jets.

In former articles on the lime light we directed attention to the fact of a good light being occasionally obtained when the jagged edge of a broken piece of lime is presented to a flame, which, from bad oxygen or other causes, would have been insufficient to cause a smooth piece to emit the same amount of light. In one of the lamps we saw tried by Messrs. Darker advantage was taken of this fact, and the lime was so broken up and otherwise arranged as to present a number of edges to the flame, several pieces having, for this purpose, been bound or caged together by platinum or iridium wires. This was modified by serrating the face of a flat piece of lime. Experiments were also successfully made with mixtures of soft lime, magnesia, and asbestos, both singly and in combination, with varied results.

From what we have seen we may congratulate the gentlemen named upon having worked out to a successful issue the problem of producing a lime light from the oxygen that is in atmospheric air mixed with common gas, the latter being under the ordinary pressure as supplied through the "mains" of the gas companies. On the uses of this light—its economy (now that the expense of pure oxygen is saved), its convenience (a pair of common bellows serving in lieu of an oxygen retort to charge the "gas bag"), and its other advantages—we shall not now speak, but will defer further particulars till a future occasion.

We may, however, mention the fact of *pure* hydrogen having been employed as well as *carburetted* hydrogen (common gas); and as this was obtained from a continuous or self-generating apparatus, the advantages thus secured to the peripatetic lecturer or the country exhibitor are very important.

THE CAMERA AND LENS.

The second most essential thing after a good light, and a successful illumination of the object, is a compound lens, so far corrected for spherical and chromatic aberration as to reproduce on the ground glass an image in which straight lines are exhibited straight, and all the parts, both in the central and peripheral portions, are clearly defined and free from spectral colours. No single lens can be practically ground and polished so as to be free from spherical aberration; which means that no lens can be constructed so that, with the whole opening, the rays both through the centre and all the way to the edges shall be refracted to one point. The focus of those rays which are transmitted through the lens near the periphery is nearer to the lens than of those which pass through the centre. Hence exist a multiplicity of foci, thus converting that which ought to be a point into a circular space, and that which ought to be a line into a rectangular or curvilinear space; hence the origin of indistinctness and haziness in the photograph—the picture is devoid of sharpness and fine definition. If the optician were able to grind lenses with ellipsoidal surfaces, then a single lens might be constructed so as to be totally free from this sort of error or aberration. This, however, is manifestly a practical impossibility. The form of lens which distorts the least—that is, which has the least spherical aberration—is the one which is well known as the *crossed lens*, whose radii of curvature are in the proportion of one to six. Spherical aberration may be corrected partly by a combination of lenses and partly by the use of diaphragms, the latter of which exclude all but the central rays, or all but the peripheral rays.

Chromatic aberration arises from the difference in the refrangibilities of the coloured rays in the spectrum, and the decomposition of white light into the coloured or spectral light, whenever it is transmitted through a homogeneous transparent medium whose two surfaces are not parallel. But the two surfaces of a lens are never parallel; therefore, every simple and homogeneous lens must decompose light into the spectral colours, of which the violet on one side is much more refrangible than the red on the other. On this account the focus of the red light will be more remote from the lens than that of the violet light. This sort of aberration, therefore, has the same tendency as spherical aberration to convert points and lines into circular, rectangular, or curvilinear spaces, with an additional inconvenience arising from the different colours, which it is well known are possessed of very different degrees of actinism. Now, when both these causes of distortion and indistinctness exist in a lens or in a combination of lenses, it is not in the power or skill of the photographer to obtain a well-defined, sharp, and actinically well-developed picture. Some sorts of glass refract light more than others. Again: some decompose light into the spectral colours differently, so that the angle between the extreme rays, the red and the violet, where the refracting angle of the prism or lens is the same but the material different, is not a fixed quantity. Combining these angular differences, the differences in the refracting powers of transparent media and the varying radii of curvature, mathematicians are now able to devise a variety of combinations of lenses which are practically free from the aberrations in question. Generally crown glass and flint glass are combined in accordance with the principles just alluded to. Such a combination corrects partially—it is a decided improvement over any single lens as regards fine definition; but what it gains in definition it loses in magnifying power. A triplet, or a combination of three lenses, properly constructed, is an improvement upon the doublet; and a pair of doublets whose radii and distances are mathematically and optically calculated, can be made to produce more correction than it is possible to obtain from a triplet. Three pairs, too, will effect more than two; but, unfortunately, whatever is now gained in focal sharpness is diminished in value by the absorbing power of the different lenses, so that when the combinations increase in number, the light which finally emerges, however much corrected, becomes more and more actinically weak. For photographical purposes, a pair of compound lenses can be constructed and adjusted so as to be practically perfect. We are indebted to Dolland for the first achromatic combination. Doublets and triplets are decidedly the best arrangements for landscape photography; whereas two pairs of doublets, adjusted at a given distance apart, or at a variable distance apart, are preferred for portraiture. The nearer the pairs of combinations approach each other the greater the magnifying power; the maximum power existing when they are in juxtaposition. When a tube is fitted up so that one of the combinations admits of motion by a rack and pinion its focal length can be thus changed, and is practically good within certain limits. With such tubes, too, it becomes an easy matter to adjust a pair of them for stereoscopic purposes.

The following rules and information will be found useful for ascertaining the comparative value of the different tubes in the market:—

To Find the Principal Focus of a Lens.—Fix the lens in a tube or aperture in the camera; then, turning the camera to the moon, adjust the slide until the image on the ground glass is perfectly in focus. Measure the distance from the ground glass to the nearest surface; then with a pair of callipers take the thickness of the lens and divide this thickness by two; now add this half to the first distance, which will be the focal distance exactly if the lens is double convex, and its radii of curvature are equal. Proceed in like manner with a compound lens; the result will be very nearly correct. Where the tube contains two pairs of combinations, a similar method may be adopted without much error. In speaking of the focal distance of a lens, or of a combination, it is customary simply to measure the space between the ground glass and the nearest surface of the last combination, after focussing the moon or the sun.

To Find the Equidistant Conjugate Foci of a Lens or Combination.—Adjust the object, as, for instance, a card picture, in front of the lens or combination in the camera, until the image on the ground glass is of an exactly equal size with the object when in perfect focus. Measure the distance from the image to the object, and divide this distance by two; the quotient will be the quantity required.

To Find the Comparative Value of Two Lenses or Combinations which Produce the Same-Sized Image of an Object at the Same Distance.—Take the difference between the equidistant conjugate focus and the principal focus of either lens; the smaller this difference the better the lens, because the focal depth or penetration is greater; that is, objects farther apart can be brought into focus consentaneously and with more facility when this difference is small than when it is large. If this difference were zero a lens would be perfect.

To Find the Magnifying Power of a Lens or Combination.—On a sheet of cardboard, in the middle, construct a circle one inch in diameter, for instance; place this sheet on a table. Insert the lens or tube into a piece of wood placed horizontally over the circle, and raise or depress it by blocks or books until the circle is seen most distinctly when viewed with one eye. Now, by a little practice, with both eyes open, one looking through the tube and the other on the side upon the paper, marks can be made on the board at the extremities of a diameter of the magnified circle; because the eye which is free can, by sympathy, see the magnified image which the other eye beholds and the pencil at the same time. After this, measure the distance between the pencil-marks, and divide this distance by the diameter of the real circle; the quotient will indicate the number of times the image is larger than the object, which number is the magnifying power.

To Find the Comparative Magnifying Power of Lenses or Combinations.—Measure the distance in either between the lens and the ground glass when the moon is in focus, or measure the size of the image; the greater this distance or image the less the magnifying power. The quotient arising by dividing one distance with the other will give the amount of magnifying power in favour of the lens, whose distance is the shorter.

To Find a Single Lens Equivalent in Power to a Compound Lens.—If a compound lens and a single lens be placed so that their centres are at the same distance from the moon or a distant object, for instance, then if they produce the same-sized picture one will be equivalent to the other.

To Ascertain whether a Combination is Corrected for Spherical Aberration.—Draw two parallel straight lines, exactly an inch apart, and two or three inches long, on a piece of cardboard. Move the slide until they are correctly in focus on the ground glass, and until the width between the lines is two inches. If this distance remains the same—that is, if the lines do not deviate from straight lines and from parallelism—the combination is aplanatically correct; if, on the contrary, the images of the straight lines are curves, the spherical aberration has not been corrected. Apply a diaphragm of small opening in front of the combination; it will be perceived that the curvature of the lines will diminish as the aperture diminishes. If with a very small aperture the lines are still curved, the combination is worthless; whereas, if the lens or combination can be used without a diaphragm, and still produces straight and parallel lines in the images, such a magnifier will be very valuable.

To Ascertain whether a Lens or Combination is Corrected for Chromatic Aberration.—Adjust the slide most accurately, so that the image of an object is very clear and distinct. Next see that the surface of the collodionised plate is exactly coincident with the ground surface of the glass—that is to say, at the same distance from the nearest surface of the lens. Sensitise the collodion film and take a picture. If, when developed and fixed, this picture is as sharp and well-defined as it was on the ground glass, the lens is achromatic; if, on the contrary, the contrast between light and shade is imperfect, and the definition and sharpness feeble, the combination has been either over-corrected, under-corrected, or not corrected at all. The actinic rays are on the violet side, whose refrangibilities are greater than those of the red rays; their focal distance, therefore, is shorter. Focus again, and after this has been accomplished draw the slide containing the ground glass outward about one-sixteenth part of an inch, insert the sensitised plate, expose, develope, and fix as before. If the picture be better than before, it shows that the actinic focus is longer than the luminous, and that the combination has been over-corrected. By proceeding in this way, it can be ascertained exactly how much the slide has to be drawn out in order to produce a picture as sharp as that on the ground glass. After this distance is found, the ground glass has to be advanced or sunk deeper in its frame by this amount, whereby the camera becomes adjusted to the tube. Should it happen that the slide has to be pushed in after focussing in order to obtain sharp definition on the collodion, it is an indication that the lens is under-corrected or not corrected at all. Where a lens requires no adjustment of the ground glass it is said to be achromatically correct, or that the actinic and luminous foci are coincident. The value of a lens in this respect is inversely proportionate to the amount of adjustment required—that is, the greater the amount of adjustment the less its value.

Other methods have been proposed to test the coincidence of the actinic and luminous foci. One consists in pasting a newspaper on a flat board, and erecting the latter perpendicular to the horizon and in front of the opening of the lens, so that the axis of the lens passes through the centre of the newspaper and at right angles to it. The operator next obtains a sharp focus upon the central parts, and afterward obtains a positive of the object. If the central parts are still in focus in the picture, the combination has been achromatically corrected; if the parts intermediate from the centre to the periphery are in focus, the lens has been over-corrected, and more so if the marginal portions alone are in focus; whereas, if the picture is nowhere sharp, it is probable the lens has not been sufficiently or not at all corrected for chromatic aberration.

A second method is to focus first in the ordinary way; then, placing a piece of violet-coloured glass in front of the lens, to focus again. If the two foci coincide the actinic and luminous foci coincide.

A third method is that proposed by Claudet, which consists in placing printed cards at short distances apart, as, for instance, of one-tenth of an inch, in grooves on an inclined plane resting on a table in front of the tube. Let there be five cards so arranged, and focus upon the middle one. If the first or second is in focus the lens is under-corrected; if the middle one is sharp the lens is unexceptionable; and if the fourth or fifth is well defined the combination is over-corrected.

For an over-corrected lens or combination the ground glass has to be set back by introducing thin pieces of cardboard between it and the ledge of the slide in which it rests; and where the correction has been defective the glass has to be sunk deeper as before mentioned.

If a combination has been thoroughly corrected, I throw aside the ordinary ground-glass slide entirely, and focus upon a piece of glass of the same size as the collodionised plate, and introduced into the selfsame aperture which is to contain the negative. In this way the collodion surface and the ground surface must necessarily coincide.

How to Buy a Good Lens.—Do not purchase a second-hand tube of any one, if you are a *beginner* in the art of photography, but throw yourself implicitly and in full confidence into the hands of a photographic house of *decided reputation*, who will furnish you with a lens and camera in perfect adjustment and in working condition. The tubes manufactured in this country by two or three different firms are not inferior to the best from abroad; and the advantage you have in dealing directly with them or their immediate agents is, that if by chance a lens turns out in any way defective, you can immediately obtain redress by an exchange. As soon as an operator is sufficiently skilled in optics and their application to the heliographic art, he will be in a condition to rely upon his own judgment, and to make his purchases where pecuniarily they are the most advantageous. The best criterion by which to ascertain whether, after purchasing an adjusted tube and camera, the actinic and luminous foci coincide, is to take the plate-holder containing a plate of glass with the slide drawn and place it upon a table, collodion side uppermost; by the side of this place the ground-glass slide with the ground surface uppermost. Placing a rigid flat ruler over either of these, it will be easy to measure the distance from each glass surface to the edge of the ruler. Where these two distances coincide there has been no need of adjustment, and the lens may be regarded as good. If the difference is well marked, I would recommend you to return the tube and get a better.

Supposing, furthermore, lenses to be aplanatic and achromatic, there exist special differences by which their relative values can be distinctly estimated. The value of such instruments depends upon the extent of picture in perfect definition which can be obtained by them, with a given opening, focal distance, and diaphragm, and on the velocity with which this work can be accomplished. If of two lenses of equal opening and equal focal distance, the one will produce as sharp and large a picture without a stop as the other can with a diaphragm, the former is very much superior, because, with much more light, the operation of actinism will be relatively quicker. In like manner, if of two lenses whose three parts, as enumerated above, are all equal, but the picture of one is considerably larger than that of the other, and in every respect as well defined, the comparative value is easy to determine. Wherever this difference in the size of the picture exists, other things remaining the same, it will be found that the lens which produces the larger picture will likewise comprehend a larger angular space containing objects. Drawing imaginary lines from the two extremities of the landscape, for instance, through the centre of the lens or combination, to the corresponding extremities of the picture, two isosceles triangles are formed with their vertical angle at the centre. This angle or opening

of the two outside rays constitutes what is denominated the *angular aperture* of the lens. The greater this angle, the other values remaining the same, the greater the practical worth of the lens. For the purposes of portraiture, the lenses in general have but a small angular aperture, and produce a picture but little more in diameter than half the focal distance. The relation between the opening of the lens, the aperture in the diaphragm, the focal distance and the diameter of the picture, as given in the *Chimie Photographique*, are as follows:—Calling the focal distance unity, then the diameter of the lens will be $\frac{1}{3}$ of this unity, that of the stop $\frac{1}{10}$, and that of the picture $\frac{2}{3}$. If the diameter of the distinct picture is equal to the focal distance, the angular aperture will be about 53°; and if this angle be 90°, the diameter of the picture will be about twice as great as the focal distance.

"OUT INTO THE WEST."

No. I.

Following the course so unfortunately adopted by Messieurs the "Three Fishers" of blessed memory, I took my way about the middle of September last to the small town of Tenby, situated, as the reader probably knows already, in the South of Pembrokeshire.

The objects of my visit were—First, to have a ten days' "out" at that pleasant place; and second, to work a little at what we photographers delight to term our art-science. For the furtherance of the latter part of my programme I took with me my camera, &c., with a good supply of dry plates, and a Rouch's tent, with chemicals, for development.

I beg to offer to the readers of the Journal the annexed account of my experiences in Tenby and its neighbourhood, in the hope that I may be the means of turning Tenbywards the steps of some of my brother amateurs when out for their holidays. And I will venture to assert, with confidence, that such of the fraternity as take their cameras into the locality in question will not be disappointed in the result of their mission.

In order that the reader and I may perfectly understand each other at the outset, I must beg leave to explain that my experience of South Wales is derived from two visits—the former of which took place in September, 1867, and the latter in September, 1868, as before mentioned.

A long, hot, and dusty journey ends with my arrival at Tenby station about 10.30 a.m. A room is provided for me at the principal hotel. My predecessor in the tenancy of that room is a German baron, with a name unpronounceable by British tongue. If he would but go away, how thankful I should be! But no; for some reason only known to himself, he obstinately retains possession of the apartment which I am led to call my own, and only vacates his post five minutes before his train (at 5 p.m.) leaves the station. In the meantime I apply to him, mentally, names uglier, if possible, than his own; and then turn out to renew my acquaintance with the town and its inhabitants.

There is nothing stirring except the wind, which is blowing furiously, and lashing the waves into foaming breakers. So rough is the weather that the fishermen cannot go out. So they adopt their usual alternative—that of leaning over the very low wall which bounds the road leading to and overlooking the little harbour. In this position the honest followers of the craft of St. Peter look as if they were "making backs" at leap-frog. But they are only smoking their pipes, and discussing the sea-going merits of their boats, which are moored below, and which are chopping about restlessly on the little waves in the harbour, and seeming very anxious to get loose from their fastenings.

I am at once recognised and most cordially received by the fishermen. "Would I like to go out for a sail then and there?" "Nice breeze!" I suggest that the breeze is a trifle *too* brisk for me, and that my sail must be deferred to some more suitable day.

Perhaps this will be the best opportunity for giving the reader a few particulars about the town and neighbourhood. They shall be brief, so that this narrative may escape being tinged with a guide-book complexion.

From the learned men who give their views in *Guides to Tenby* I learn that the old name of the place means "the precipice of fishes;" and, of course, if their be anything in names, Tenby might be supposed beforehand to be a favourite haunt for the finny tribes, which furnish us with an important item of food. Such is, in fact, the case, this town being a very well-known fishing station. But at present it is not my intention to descant upon fishes or fishermen; but my purpose is to give a short description of the situation and appearance of Tenby, noting its photographic aspects as they come round in their turn.

The town is situated on the shore of the fine Bay of Carmarthen, which is about twenty-five miles across. It has a most commanding position upon a high and narrow strip of land projecting into the bay. The views across the bay are fine. Caldy Island and St. Margaret's Island are distant about two miles. Lundy Island, in the Bristol Channel, is plainly visible in fine weather from places near Tenby; but it is *eclipsed* from the town itself by Caldy Island, which is directly in the line of view which would take in Lundy Island.

Seen from the pier (which acts as a breakwater in enclosing a snug little harbour), the town is extremely pretty. The small semicircular bay which immediately faces the principal promenade is bordered by a very steep and rocky bank planted with trees and shrubs. From this point, or rather from the weighing machine just above, two or more exquisite photographs may be taken. At intervals along this bank flights of steps lead up to the promenade. This latter is a broad street, having houses only on one side, the other side being occupied by pretty, little, well-kept gardens, which take up the small space intervening between the road and the steep wooded slope before mentioned. Across the harbour and pier, from the promenade, there is a hill, on which are interesting ruins of an old castle, and a very handsome statue of the late Prince Consort.

Extensive remains of the old town walls still exist, and offer materials for good photographs. On the Pembroke road, just outside the town, there is a beautiful railway viaduct, which affords at least two excellent subjects for the camera. With a gentle hint that the view from the North Cliff will supply about two more good pictures, I shall dismiss this part of my subject.

The bathing accommodation is very good, and the sands are extensive and beautifully hard and dry. As for the "Tenbyites," I may safely say that the visitor, whoever he may be, will not be disappointed in them. They are most agreeable people, in all respects. They do not speak any Welsh; on the contrary, their English is very correct—much better both in grammar and intonation than that spoken in many English counties. In fact, the people of South Pembrokeshire are not Welsh at all, but the descendants of some Flemings who settled in that locality in the time of Henry the First. They are totally different in appearance and manners from the ordinary type of Welshmen, and greatly superior in both respects. So marked is this difference that the English visitor sees it immediately on crossing the border of this "little England beyond Wales"—*Anglia Transwalliana*, if we choose to express ourselves in high-flown terms.

But I cannot proceed to other topics without expressing my great sorrow that these excellent people have contracted two very bad habits. Firstly: some of the women wear huge conical hats, of a size and shape positively frightful. Secondly: the people have adopted a plan of applying thick coatings of snowy whitewash to the houses and outbuildings. Roofs and walls are alike daubed over with this wash; the result is that the houses look at a distance like large cubical masses of chalk. The *picturesque* element in the landscape is totally ruined by this detestable process. The photographer, of course, loses every atom of half-tone when he attempts to take pictures of objects so treated. Let us hope for a speedy reform in these two particulars.

Having thus treated of Tenby proper and its people, I will ask my reader's attention to the records of my few little excursions to places of interest in the neighbourhood.

Lydstep and Manorbier.—Lydstep is distant from Tenby about two miles, and Manorbier about three miles. I drive over to the first-named place. The road lies through Penally, a very pretty village, but not marked by any particular feature. Here are barracks, which are generally occupied by a few soldiers, who come over from Pembroke Dock in small detachments to practice shooting; or else for change of air. I don't quite know which.

At Lydstep there are very remarkable caverns; and rocks, whose "cleavage" or "dip" has been made nearly vertical by some great convulsion of nature. The caverns are close to the sea-beach, and so situated as to be only accessible at very low tides, and then only for about an hour at a time; hence my photographing here is a race against time. But I get one or two pretty good plates, and then beat a hasty retreat, for the tide is coming in with great rapidity.

On to Manorbier—a place which seems dear to the souls of the "Tenbyites," and whose honoured name is ever on their lips. It has a castle, in which I quite fail to see anything at all remarkable. Let the reader picture to himself four perfectly plain walls, twenty feet high, so disposed as to enclose a moderate-sized rectangular castle yard. Let him further imagine that this structure has a tower at each corner, and that the whole is destitute of every trace of ornament; he will then have an excellent idea of Manorbier Castle. However, I take one picture of this disappointing place; and then the rain interferes in earnest to prevent any further waste of plates on the subject. The church would make a better photograph; but, as the state of the weather forbids further work, I pack up my things and return to my hotel. Let me remark, *en passant*, that the Pembrokeshire churches have remarkably high and narrow towers, which are said to have been intended as means of defence from enemies in troublous times.

Carew.—This place is about seven miles from Tenby. As I hear great accounts of its splendid castle, I will make it the object of my next expedition. Chartering the same little carriage, with the gallant piebald cob which took me to Manorbier, and luckily finding a gentleman bound, like myself, for Carew, I form an alliance for the day with the gentleman, and the carriage becomes, for the time being, our joint investment. We pass the village of Gumfreston, which is pretty, and affords good materials for photographing.

Arriving at Carew, our first attention is paid to a very old stone cross, which stands in the village by the road side. It is richly carved, and has some inscription which we try to decipher; but as many learned men have been before us in the field, and have always failed to make "head or tail" of the inscription, we give up our investigation, having satisfied ourselves that the objects represented in the carvings do not in

the least resemble anything celestial or terrestrial which we have ever seen. Baffled as we are in our scientific inquiries, we can yet take a photograph of the cross. This we do with great success.

Next we turn our attention to the castle, which we find to be a magnificent old place. My friend adopts a fine stroke of policy by giving our gratuity to the old woman who guards the castle *immediately on our arrival.* Of course, on receiving her fee, the old lady at once loses all interest in us, and spares us the infliction of hearing her thousand-and-one "cunningly devised fables" about the castle. The reader will pardon this digression on account of the valuable hint which it conveys for his future guidance.

Three good pictures are taken of the exterior of the castle, and one of the interior. Luncheon is sent for from the village, and consumed in the castle; in fact, we have a mild pic-nic. We wait till nearly sunset so as to get a picture of the north-west view of the castle. This is the best aspect; but the view should be taken, say at four or five o'clock a.m. at Midsummer. This idea is commended to the notice of friends who are early risers ! EDWARD CHAWNER.

(To be concluded in our next.)

PHOTOGRAPHY IN COURT.

CORRUPTING MILITARY STUDENTS.

JAMES QUINTLAN, aged eighteen, of 2, Nelson-street, St. Peter's-square, Hackney, was charged at the Woolwich Police Court, on Wednesday, the 17th inst., under Lord Campbell's act, with offering indecent prints for sale amongst the military students at Woolwich. The prisoner had been previously in custody for offering similar pictures for sale amongst the cadets of the Royal Military Academy.

Mr. John W. Mulcaster (successor to Dr. Bridgman) stated that he was the proprietor of a large private establishment for the training of young gentlemen for the army. He found the prisoner on his premises offering the photographic prints above referred to for sale to his pupils. The prisoner having been there once before, and finding that he had taken some of his pupils' educational books for the pictures in lieu of money, he called in a constable and gave him into custody.

Mr. Maude inquired if any distinct charge of exhibiting the prints for sale could be proved, on which Mr. Farnfield called

Henry Somerset Hassald, a young gentleman, who said he was seventeen years of age, and a student at Mr. Mulcaster's establishment. The prisoner, who had been turned out of the premises on a previous occasion, came and showed the students a number of prints, and he (witness) gave him six books in exchange for one of them. The books were educational works which his father had bought for him prior to his coming to Woolwich.

Mr. Maude asked if he had the picture with him which he obtained of the prisoner, on which the witness, with a half-ashamed look, produced from under the folds of his coat some prints and a photograph. The prints were handed to the magistrate, who, after turning over a few of them, spoke in the most unmeasured terms in condemnation of the prisoner's conduct, in selling prints of that description to students of sixteen or seventeen years of age. He was a most dangerous person to be abroad, and he (Mr. Maude) was determined to put a stop to such scandalous practices. He ordered the prints to be retained, with a view of their being examined more minutely, and if found to come within the Act of Parliament, he promised him that he should have effectual punishment, and ordered the prisoner to be brought up on a future day.

MORE PIRACIES.

THOMAS RITCHEY, of 7, St. Swithin's-lane, and 19, Gainsborough-road, South Hornsey, was, on Thursday, the 18th inst., brought before Sir Benjamin Phillips, at the Mansion House, on a charge of unlawfully selling printed engravings and photographs of copyright works belonging to Mr. Henry Graves, publisher and printseller, Pall-mall.

Mr. Lewis appeared for the prosecution.

Mr. Boydell Graves, manager to Mr. Henry Graves, produced the copyright engravings and the copies executed by the prisoner, which were stated to be very well done. They included *The Last Kiss, The Morning Before the Battle, The Evening After the Battle, The Railway Station, The Offer, Accepted, My First Sermon, My Second Sermon,* &c. The witness said he had watched the defendant's house on several occasions, chiefly on Sundays, and had seen printing presses at work, and he had also seen the subjects that were being copied with the aid of a glass. The presses and negatives were taken by Detective Hancock. They were negatives of the subjects produced.

The prisoner said he desired to state that although he had thirty presses he only printed a few of Mr. Graves's subjects. He alleged that the case against him had been exaggerated, and that if the penalty asked for were inflicted it would be death to a man of his age. The majority of the subjects he copied were, so far as he was aware, not copyright; and, so far from being a wholesale dealer, he earned barely enough to support his family.

Mr. Graves said twenty-six copies of his subjects were seized, and eleven were in the presses. There were also copies of other publishers' subjects.

Morris Fleischhacker, a picture-frame dealer in Whitechapel, deposed to purchasing from the prisoner, between the 8th and the 17th of March, between twenty and thirty pirated copies of Mr. Graves's copyright engravings and photographs. There were two sizes, the price of the small size being 1s. 6d., and that of the large size 3s. each picture.

The case was adjourned till Monday last, when the prisoner was again brought up before the same magistrate.

The evidence for the prosecution having been completed,

Mr. Chipperfield, in defence, contended that Mr. Graves had no right to the pictures; and said that on a future occasion he should call the artists who executed them, for which purpose he asked for a remand.

After some discussion the prisoner was remanded for a week, Sir Benjamin Phillips remarking that he had come prepared to adjudicate on the case, but he delayed doing so in deference to Mr. Chipperfield.

Contemporary Press.

CARTES DE VISITE.*

[GOOD WORDS.]

WHILST we are referring to the question of colour, let us enter our protest against the barbarous practice of painting photographic portraits with oil colour. The absurdity of this practice is evident enough to the artists, who are only the servants of the public in this respect. When water colour is used the photograph is printed specially light; the transparency of the colour, however, allows all the incomparable drawing to show through, and the result is the most charming. Possibly the miniatures of Messrs. Locke and Whitfield are unmatched by the finest miniature painters of the metropolis in many particulars; but how different the result when the heavy oil colour obliterates with its material daubs all the phantom-like grace of the sun's pencil ! It is urged as an excuse by artists who thus misuse their powers that the photograph is apt to fade in tropical countries very speedily, and even in temperate climates after a time—the effect being to remove, as it were, all the drawing upon which the colourist has based his picture. It is possible that the silver process is liable to this objection where a tropical sun has to be withstood, but the discovery of the process of printing portraits in carbon altogether removes this objection. The carbon photograph is absolutely indestructible, and there can be no longer any excuse for the use of any other material than water colour in the tinting of sun pictures.

It is a very common thing to hear a person say, "They never succeed with my photograph." We admit that the portaits of our friends are capital, but our own are "not a bit like." And there is something more than mere egotism in this remark. How few are the positions of one's face with which one is familiar ! We never see our side faces; it is very difficult to catch a glimpse in the mirror even of a three-quarter pose of the countenance ; hence many photographic portraits of ourselves are wholly unknown to us. Although the mere raw outline of a face may be given as well by an indifferent lens as by one of the best, yet a likeness, in the highest sense of the word, can only be obtained by the most artistic photographers with the best appliances. These advantages can only be commanded by the photographic firms that are largely employed by the public, and have been trained by large practice. It is vain to look for anything like an artistic performance from men who have left some trade or handicraft for the more profitable camera. It is by such hands that the many hideous likenesses to be found in most *carte-de-visite* albums are produced.

In France they have a keen appreciation of the difference between a good and a bad photograph. They produce some of the very best and some of the worst. At the last *fête* of St. Cloud, near Paris, there was a photographic van placed in a conspicuous position to make a trade of taking *cartes de visite* during the progress of the festival. On the outside of the van was a printed bill containing the following announcement:—

PHOTOGRAPHIC AMBULANTE.

FETE DE ST. CLOUD.

Cartes de Visite.

La douz.	Air de Famille.	Ressemblance garantie.
3 francs.	5 francs.	8 francs.

Thus the skill of the operator was nicely adjusted to the wants of the sitter. When mere quantity was required, three francs a dozen only was demanded, but a family likeness must be paid for liberally; and for a guaranteed resemblance the highest charge of all was demanded.

Three or four years ago, among the novelties photographers are ever seeking after, what was called the diamond cameo photograph was brought out. The plan consisted in taking four different views of the face of the sitter on one *carte.* The photographer employed a small camera and small lens. A simple arrangement within the camera enabled him to expose a section only of the plate at once, which, having received its impression from one portion of the sitter's head, was shifted so as to receive another, and so on until the four were taken. Before being exposed in the printing-frame, the negative was covered with a mask of perfectly opaque paper with oval openings, to show neatly and clearly the four pictures to be represented. The ob-

* Concluded from page 126.

ject of masking the negative was to protect the intervening space on the slip of the sensitised paper from the action of the light, so that it might appear perfectly white, while the sharp ovals representing the heads were more or less dark, making a striking contrast. The plan did not, however, succeed, for the reason that the sitter did not recognise his own face in some of the positions in which he could not see it in the glass; hence the fashion speedily died away.

But to return to the *carte-de-visite* mania. In these days of advertising, when so many people are clever at keeping their names well before the public, it is not to be supposed that the photograph is overlooked. When we scrutinise the scores of faces that gaze upon us from the booksellers' windows, we cannot help remarking that some heads are repeated with a pertinacity that is by no means commensurate with their real character. Upon inquiry, such individuals will be found to make capital out of this forced notoriety. Actresses, in particular, imagine their fame depends upon the profusion with which their *cartes de visite* appear in public. In cases where the sitter is very celebrated, and is sure to sell well, it is becoming the custom to demand a royalty for the use of the negative. We believe Tom Sayers was the first to set this fashion, just after his famous fight with Heenan. Not only did this worthy sell his "mug," as he termed it, to one of the sporting publishers, but he engaged to give them the exclusive copyright in it, to the exclusion of all others. But actresses and pugilists are not alone in this desire to be constantly before the public. The pedestrian may recognise the face of more than one clergyman who takes this means of keeping alive his popularity, and we more than suspect some physicians of taking the same course of increasing their practice. It is a refined method of advertising, which cannot well be brought home to the individual; moreover it has this advantage over the newspaper puff, that its cost is defrayed directly at the public expense.

For the direct and avowed purposes of trade the *carte de visite* has not been so extensively used as may have been expected. Large numbers are printed for the purpose of showing delicate designs in glass and in gold and silversmith's work by the Stereoscopic Company—a most legitimate exercise of its use; and it would be well if, as far as advertising purposes were concerned, these useful sun pictures stopped here, but we were lately favoured with an ingenious application of its powers as a begging medium. A card with the portraits of six children reached our hands, with a printed flyleaf to the interesting family picture to the following effect:—

"Children to Save.

"Advertisement sent to a few taken from the *London Court Directory*.

"The father of these British-born Protestant children is an elderly gentleman, ruined by competition in business, and past beginning life again; and the mother is in a very precarious state of health. To seek for adopters is against parental instinct; and besides it may ultimately come to that, as by the time their schooling is over, in ten or fifteen years, they would most likely be orphans, and their willing adopters would be welcome to it [*sic*]. At present, the father, in his alarm for the fate of these creatures, seeks for some that would pay, not to the father, but to good boarding-schools, for their clothing, keeping, and tuition; and after school time, see that they should not want. Willing benefactors are therefore requested to state what they would feel inclined to do for each child they may point out by one of the numbers given at the foot, to Alphabet, till called for, at the Post Office, No. 1, Liverpool Street, Moorfields, E.C., enclosing card or addressed envelope, to insure correct address, if a reply should be wished for."

The children are all duly numbered at the foot of the *carte de visite*, and the whole affair affords a most ingenious application of the art to the purposes of this new sort of pattern post, setting forth specimens of juvenile raw material. Whether this audacious male cuckoo succeded in dropping his six little responsibilities into any domestic or scholastic nest, we do not know, but the attempt shows that the begging fraternity know the value of photography.

The whole tribe of rogues who feed upon the credulity of mankind have also found out its powers of filling their pockets. The following advertisement touches a very tender chord, and we have no doubt is greatly successful:—

"Your future husband or wife's true *carte de visite*.—Mr. H———, the celebrated astrologer, will send the true *carte de visite* of your intended, with name, age, and date of marriage, for sixteen stamps. Three questions answered for two and sixpence. State age and sex. Send stamped directed envelope. Address, Mr. H———, ——— Villa, ——— Road, Notting Hill, London. Answer in two days."

This advertisement has appeared in many of the penny papers, and no doubt has eased a considerable number of servant maids and clerks of their stamps. It must certainly create a sensation in any man's or woman's mind to break the seal of the astrologer's letter, and draw forth the picture of the mate that is to be. It is, in fact, the magic mirror brought home to every door at the smallest possible cost. We must confess, however, that the specimens of promised wives and husbands we have seen have not been such as to tempt others to know their matrimonial fate by return of post.

But photography lends its aid as easily to the rogue-taker as to the rogue. The public may not be aware that there is a photographic album at Scotland-yard, in which may be seen the *carte* of every ticket-of-leave man in the country. The charitable regulation which allows a convict his liberty before his sentence has expired, is burdened with the condition that he must report himself personally once a month to the police authorities wherever he may happen to reside. Before leaving the prison, his photograph is taken by the prison authorities, for the purposes of identification. It is, of course, for him to resist; if he does, he is not allowed his liberty. One *carte de visite* is kept in the police album at Scotland-yard, another at the station-house of the division of the metropolis in which he may select to reside, and a third is forwarded to any country district he may wish to remove to. When the *carte de visite* and the prisoner arrive at Scotland-yard, a sergeant of each division of the force is called in to inspect both portrait and sitter, in order the better to identify him by the aid of the little *carte*, in case he should fail to put in an appearance. It is scarcely possible to conceive a *carte* taken under less agreeable circumstances. The ticket-of-leave man's album is, indeed, a strange psychological study. The individual who opens it is prepared to find a villainous portrait gallery of low foreheads; but his anticipations are by no means verified. Very many heads are those of the ordinary population, no better and no worse. Now and then the odd-shaped head, the curious formation of the eye, the full animal jaw, prove that we are gazing upon men predestined by nature to commit acts of criminal violence, or to perpetrate petty thefts. Sometimes a strikingly handsome countenance appears full of intelligence—be sure that man is a forger, or a delinquent in some of the higher branches of fraud. We asked the superintendent who kindly showed us the book, if any of the police would be justified in taking any man into custody on the strength of the *carte de visite* alone. The reply was guarded—"not on the *carte* alone, but certainly after previous identification of the individual." Appended to each *carte de visite* there is a most graphically-written description of each prisoner, especially of any particular marks he may happen to have about his person. These are powerful aids in identifying any runaway, for there is scarcely a living person that does not possess some mark about the body, not easily obliterated, that would lead to his identification. This is especially the case with the criminal population, and with the class from which convicts generally come. With a strange perversity they are in the habit of pricking in with gunpowder all sorts of marks—suns, stars, anchors, &c.—on the fleshy parts, brands, in fact, which can never afterwards be removed. In this respect they seem altogether to lack the cunning of the lower animals, many of which, as the sportsman well knows, have the tact to hide in "cover" so assimilated to that of their own body that they are overlooked. The scars, again, which men living by violence are sure to carry about them, in many cases make the police officer as certain of his man as the grazier is of sheep.

There are cases, however, in which identification of an absconding rogue by such marks, or even a comparison of his face with a photograph portrait, is out of the question. For instance, when Redpath some years since absconded, there were no means at hand by which the detectives could identify him. It was supposed that his negative would be found in some of the photographic houses, and upon inquiry Mr Mayall had one. A large number of photographs were printed and distributed among the police force, and before long he was detected just as he was about to sail from some port in the North of Europe. In this case he was, we are informed, much disguised.

Only a short time since, Mr. Pollaky, the private detective, made a bold stroke by the aid of a *carte de visite*. He was in search of a fraudulent debtor, a Mr. Gray, and one evening, whilst in the Stadt Theatre, in Vienna, he recognised a gentleman elegantly dressed who most completely answered the appearance of a photographic portrait in his possession. Without loss of time he arrested him; he turned out to be the veritable man he was in search of, and he afterwards ascertained that he had taken his passage and was about to leave Vienna by the night mail for his port of departure.

A far more interesting group of *carte-de-visite* portraits are those left by friends at the police-office of persons that are missing. Young ladies' portraits in such quarters especially look out of place; but there are many such. One cannot contemplate them without a feeling of pity or commiseration. Some of them have placed shame between themselves and home; some the dark water. We fancy the *carte de visite* is of little avail in such cases.

Viewed commercially, no art matter of modern introduction has made such extraordinary progress as photography; and this may be especially said of that branch of it which relates to *carte-de-visite* portraits. At the present time the sale of these amounts to between sixteen and eighteen millions a-year. As we have said before, the demand at present is nothing like what it was. In the years 1860-62 no less than between three and four million *cartes* were sold of Her Majesty Sometimes the *cartes* of illustrious persons, owing to peculiar circumstances, sell at greatly enhanced prices. Thus, when the Prince Consort died, his *carte* was in great demand at ten shillings each. The execution of the Emperor Maximilian, and the assassination of President Lincoln, produced a sudden demand for their portraits, with which the supply could scarcely keep pace. But independently of the trade in *cartes de visite*, a score of other tradesmen have been either greatly stimulated or brought into life by the new art. The demand upon the precious metals, gold and silver, has been very great; enormous quantities of glass are required for the negatives; the same may be said of cards; the making of albums employs thousands of persons. Cabinet-makers have additional employment in making the carved "properties," chairs and tables, garden balustrades, cabinets, that are so plentifully used. The chemists are required to furnish large supplies; the lens makers have been rendered equally busy; and, we may add, employment has been afforded to a great amount of labour, very much of which we

are glad to see has fallen to young ladies. In short, the introduction of photography generally has marked a new era in the arts and the higher branches of manufacture, and, as far as we can see, is destined to a further development year by year.

Amateurs are not as a rule successful in portrait-taking, but we must make an exception in favour of a lady, Mrs. Cameron, whose life-size portraits may be seen in a shop in Bond-street. These are taken with the large lens, and, without the appearance of art, are yet most artistic portraits. The head of Alfred Tennyson, with its flowing locks, and calm, grand expression, shows us the power of photography in large—if we may so speak. Mrs. Cameron has a fine sense of light and shade, and the heads she has taken remind us of the noble pencilling of Corregio, so grandly are the masses of light and shade disposed.

It is not uncommon, we hear, for some of our best portrait painters to aid their pencil with photographic life-size sketches of their sitters, and they need not feel shame at allowing Phœbus to be a guide to their brush in the matter of likeness and in the arrangement of broad effects of light and shade. It has been objected that these life-size portraits are always disagreeable, in consequence of the roughness they give to the skin. This is quite true of photographs taken with a small lens, and afterwards magnified to the life-size; but this difficulty is entirely got over by the use of a large lens, which has scarcely any magnifying power. Mrs. Cameron's portraits are perfectly free from any roughness by reason of her adopting this process; and more life-like heads than those shown in the windows as specimens of her art we have never witnessed. These large-sized heads, when artistically coloured, are so life-like that the spectator can scarcely help thinking a living individual is looking at him. ANDREW WYNTER.

Our Editorial Table.

THE SILVER SUNBEAM. By JOHN TOWLER, M.D.
New York: JOSEPH H. LADD. London: TRÜBNER & Co.

THE sixth edition of this standard American photographic work differs in some respects from any of the previous editions that we have seen. It would almost appear, indeed, as if the author, like Homer, had "nodded," and had allowed some other editor—such as "C. Nugent, C.E."—to prepare the new edition, inasmuch as the matter added to the book is, as respects originality, of a similar class to that in the treatise on optics by the gentleman just named.

A prefix of eighteen pages, extracted from Mr. Hughes's *Manual*, is given, because complaints had reached the publisher that, "in the previous editions of the *Silver Sunbeam*, the introductory part was too complicated for the pupil who had no knowledge whatever of the art of sun drawing." While we commend the publisher or editor for selecting the excellent practical instructions given in Mr. Hughes's *Manual*, we are reminded that Dr. Towler himself only recently issued a practical manual of a nature and scope similar to that laid under contribution.

The chapter *On Failures—Their Origin and Remedies* (extracted from Mr. Lake Price's manual) will also prove very useful and instructive reading for those who have no access to the work alluded to.

We cannot at all understand the relationship existing between the last three or four chapters of the work and the illustrations, or rather engravings, in which it so richly abounds. For example: *The Morphine Process* has, as an illustration, a drawing of an improved still. In the midst of an article on obtaining positives in colour by Niepce de St. Victor's method a *print cutter* finds a resting-place. A recent editorial article of THE BRITISH JOURNAL OF PHOTOGRAPHY on *Sel Clement* has been honoured with three illustrations, viz., two views of a printing-frame and "a camera stand sold by J. H. Simmons, of Philadelphia." Mr. Fowler's article on photo-enamelling, also from our own pages, is profusely illustrated by a bellows camera, a strong and steady-looking stand for the operating room, a portable stand, two tents, two plate-boxes, a dipper, and a plate-cleaner. Not being aware of the reasons which have prompted Dr. Towler or his successor to adopt this peculiar style of book illustration, we can only here give expression to the surmise that it has been found to answer, otherwise it would not have been adopted.

In another page we give an extract from a portion of the book which bears the unmistakable impress of Dr. Towler's own hand. It has appeared in all the editions of the work, and we extract it because, in the first place, it is really excellent, and, in the second place, we intend to make it a text on which we shall, in an early number, offer some remarks.

TRANSPARENCIES. By PUMPHREY BROTHERS, Birmingham.

THIS well-known firm seem determined to contribute their share of photographic labour towards meeting the competition of our Gallic neighbours in that portion of the artistic field known as stereoscopic transparencies. Messrs. Pumphrey Brothers have for many years been familiarly known to our readers in connection with general photographic production and publication; but it is only at a recent date that they appear to have bestowed peculiar attention upon the production of transparencies.

On a former occasion we alluded to the lantern transparencies issued by this firm. About two months ago, we received from them a very fine lantern transparency of the moon, from the negative taken by Mr. Grubb in his large telescope now *en route* to its permanent home in Australia. Messrs. Pumphrey, having become the possessors of this negative, are printing from it some of the best lantern transparencies of our satellite which, judging by the specimen in our possession, have yet been presented to the public.

We are glad to see these enterprising gentlemen producing stereoscopic transparencies, for we do not now anticipate much difficulty in breaking down the monopoly which has so long been enjoyed by our neighbours "over the water" in this department. The enterprise and skill of Pumphrey, Stuart, and others of this class, will eventuate, and that speedily, in a turn in the tide of popular appreciation. There is a charm, and a peculiar charm too, in a finely-executed stereoscopic transparency; we hope, therefore, that our readers' attention will in future be more attracted in this direction than hitherto.

The particular pictures which have prompted these remarks are Welsh subjects. Without dwelling on the high artistic merits of these pictures—which, if we remember aright, we did in at least some instances three or four years ago, when we reviewed them as *paper* photographs—we shall briefly enumerate a few of those that are exceptionally excellent:—*Ffos Annoddyfn; Pont-y-pair, Bettws-y-Coed; Pont Aberglaslyn;* and *Bridges on the Machno. Harlech Castle* is an interesting picture, recalling, as it does, days now long byegone, and the "march of the men of Harlech" to the field of battle. The *Swallow Falls* is also a picture of great excellence.

We are glad to learn that it is the intention of Messrs. Pumphrey to print transparencies for their brother photographers on terms which will shortly be announced in our advertising columns.

RIVER AND WOODLAND SCENERY. By M. CAREY LEA.

MR. LEA has sent us a print from a "wet" negative which was kept one hour and fifty-five minutes between sensitising and developing, having been carried twelve miles in the interim. The view is a very pretty one, and the photograph is excellent, being quite free from those spots or defects one naturally expects to find under such circumstances. Photographers in this country do not sufficiently realise the fact that a wet collodion plate will, when properly treated, keep good for a long period. Among the photographic treasures forming our private collection we have a number of interiors which were exposed for periods of over an hour, the resulting negatives being clean and good; and it is only a week or two since we received from Mr. Harding Warner, of Ross, some interiors produced under similar circumstances. The suggestion of Mr. Lea, in his letter in the present number, relating to the keeping of wet plates, is good. The plan is similar to that adopted by many photographers in this country.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 30th	Liverpool Amateur	Free Public Library and Museum.
April 1st	Glasgow	Andersonian University.

BERLIN PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on the 6th ult.,—Dr. H. Vogel in the chair.

The Chairman read an invitation from the French Photographic Society at Paris to forward contributions to this year's exhibition, which is to be opened on the 1st May next. He (the Chairman) then read a communication from Herr Husnik, of Tabor, wherein that gentleman stated that he had sold his process to Herr Albert; at the same time he had forwarded to the Society a remarkable picture in two colours—a landscape, in which the foreground was brown and the background of a bluish aspect.

Herr Schwarz, of Brandenburg, exhibited several very successful enlargements which he had himself executed, and showed the original negative, in *carte-de-visite* form, which had been used in executing some

of them, and which presented considerable difficulty in consequence of the lacquering on one side and the strong covering on the other. He spoke of the recently-proposed method of making enlargements, namely, that which consists in producing an enlarged positive, and after that a finished negative. He held that this method was not so practical as working with Monckhoven's apparatus, and on Monckhoven's nitro-glucose paper.

The Chairman exhibited a collection of hieroglyphical and architectural photographs from Upper Egypt, taken by him during the late photographic archæological expedition, besides some landscapes and figures executed by him on that occasion.

Herr Schwab, of Hanover, had sent many photolithographs as well as several phototypes in half-tone for inspection by the members. The half-tones of the phototypes elicited considerable attention; amongst them was a column capital, which was most successful, more particularly as it was stated to have been printed from glass. It had the appearance as if Herr Schwab had employed a process similar to Herr Albert's. Herr Schwab stated that up to twenty inches he could take one thousand and more proofs from one plate.

The meeting was then adjourned.

Another meeting of the same Society was held on the 19th ult.,—Dr. H. Vogel in the chair.

Herr Grasshoff exhibited two large carbon prints full of effect, and also two silver prints, made from the same negatives. The former were according to Dr. Vogel's transfer process with albumen paper, published a short time since. They looked like mirror pictures of the silver prints; and Herr Grasshoff thought he had given evidence in the proofs that the process was capable of giving more brilliant deep parts than Dr. Vogel had himself obtained. He said that one carbon picture was copied over in six minutes, in thick weather, and that he found the employment of green discs for thin negatives, and likewise for carbon prints, of great advantage.

The Chairman remarked that he had only experimented for a short time with this process, and that he was prevented continuing to do so by being obliged to travel; so it was only natural that his treatment should not have equalled that of Herr Grasshoff. He (the Chairman) then laid before the meeting a series of stereoscopic anatomical views, prepared by Mr. Haynes, of Albany.

Herr Remelé gave a short account of his experiments in regard to flare spots. The conclusive result was, that with a simple landscape lens the spot may very well be prevented by shifting the stop, but at the sacrifice of a portion of the sharpness of the picture, and an operator must arrange accordingly. In many landscapes what is seen of the spot is very trifling; but in others, where there happened to be a large dark object in the middle of the picture, it was very strong. It would be well if our opticians were to arrange for movable stops to be put into landscape lenses. Combined objectives which give the spot admit of its being got rid of by moving the screen.

After some further business of local interest only, the meeting separated.

Correspondence.

Foreign.

Philadelphia, March 6, 1869.

During the latter part of last season I made a large number of experiments on the subject of developing dry plates, which have also been continued until within a few days of the present date, and have been much interested in the effect of *temperature* in the developer. Whilst the use of hot developers is known to some photographers it has never passed into general practice, as it would do if its advantages were better known.

At this season of the year—in fact, at almost any season—a developer brought nearly up to blood heat will act very quickly and satisfactorily. It brings out the picture in half the time required by a cold one, and I think with more detail. At the same time more circumspection is, of course, necessary; and with those who are not thoroughly familiar with the development of dry plates there will be more danger of injuring the plate. In dry work the slow developments are the surest, but do not always give the best results. Heat is a great power in the hands of the operator—one that he cannot afford at times to dispense with. Judiciously used, it will permit of shortening exposures; and when, by oversight or unfavourable circumstances, the plate has been under-exposed it may be saved, when otherwise it could not be. The action of heat runs to a certain extent parallel with that of pyrogallic acid—that is, a hot developer with half-a-grain of pyrogallic acid to the ounce will work very like a cold one with two or three, or a tepid one with one grain to the ounce. Cold, on the other hand, is, like bromide of potassium, a powerful restrainer.

In a word: I am inclined to think—speaking with some reservation, as it is a subject not to be too hastily decided upon—that a cold development will be found to increase the tendency of the picture to contrast and brilliancy; also, therefore, when misapplied, to harshness. And conversely, a hot developer will help softness and detail, with the necessarily connected danger of running into flatness when badly managed.

In this way we gradually multiply our appliances in the direction of dry work, which is, after all, what may be called the "progressive side" of photography. If one could prepare a dozen *wet* plates, carry them out, and develope them at one's leisure, it would be delightful. The same thing could be attained, however, if dry plates could be produced that would act like wet ones; and this is being done after a certain qualified fashion. For it must never be forgotten that dry-plate work is a different art from the wet. One who will persist in transferring canons belonging to wet work will hardly obtain anything but failures. Dry-plate photography is not to be approached by the wet operator with the belief that a mastery of the one branch gives him a right to success in the other.

An ingenious suggestion by Mr. Samuel Fry admits, I think, of a certain simplification. That gentleman proposes to print an over-developed negative successfully and softly by making a glass positive and using it as a mask, so that the light shall be tempered according to the needs of the picture. As glass transparencies cause some little trouble to make, it would be simpler, and probably quite as effective, to print a thin paper positive and wax it, and use that as a mask. In this case, as indeed in the former, shade printing would doubtless be essential. Salomon uses, I notice, a plan very far from new, but which acquires interest and a *quasi* novelty from his sanction. In cases of slight over-development of the negative he exposes his sensitive paper for a few seconds to light sufficiently to make an impression which will not wholly disappear in the toning and fixing. He thus subdues any little patchiness in the whites, or, at least, renders it less prominent.

A little contrivance which I lately fell upon has afforded a good deal of satisfaction, and seems worth mentioning here. The mat silver stains that creep up from the corners of a plate kept long between sensitising and development are a well-known nuisance, and one which no device that I have known of, till I recently found one, availed wholly to prevent. Wiping out the corners between each plate, long and thorough draining before placing in the dark slide, ripe collodion, pure baths—all these are known as useful aids to plates that are to be long delayed. But these have not, at least in my hands, always proved an effective safeguard.

My plan is to take very thick, soft, blotting-board, to cut strips one and a-quarter inch wide, to fold over the long edge for about an eighth of an inch, first creasing it hard, then opening it at right angles. This strip must be of the same length as the plate.

The plate, after being well drained, is set into the slide, and then is pushed up a little, so as to get the narrow, bent edge under it. Letting the plate down again, the edge (*not* the face, or any part of it) rests on the strip, which thus also touches the edge of the collodion film along the whole of the lower edge. Against the back of the plate lies the wide part of the strip, ready to carry rapidly away anything that is absorbed by the narrow edge, and keep it always in an absorbent condition.

Whether this little modification is new or not I cannot say; it is wholly so as far as I am concerned, and it will be found, by all who may like to try it, most useful. With its aid it becomes quite easy to keep a plate for half-an-hour between sensitising and development.

But the full advantage of this system appears when we use it in connection with the method of *two baths*. If we sensitise a plate in a strong bath, say of thirty-five grains, and then plunge it into a new bath of twenty grains kept exclusively for that purpose, and finally set the plate into the slide, resting its edge upon blotting-paper in the manner which I have here described, it is in a condition extremely favourable for keeping. In November last I sensitised a plate in this way, carried it *twelve miles*, and developed at the expiration of nearly two hours (one hour and fifty-five minutes) after sensitising. The image came out perfectly clean, yielding a good negative, of which I shall endeavour to send you a print herewith.*

This mode of operating I have found very useful, and have applied it in many cases. I have had so much else that interested me to communicate that, although I made use of this plan last autumn, I have only now found time to write it to you. In the interval I have seen Mr. Hughes's proposition to keep plates by washing them off with distilled water. That is no doubt an excellent method, and perhaps keeps plates longer than mine. Mine has, however, the advantage that no fresh sensitising with nitrate is needed before development.—Very truly yours, M. Carey Lea.

Paris, March 22, 1869.

Although not immediately connected with the subjects of The British Journal of Photography, I think your readers would not expect your correspondent to pass over, without any allusion, the terrible catastrophe which occurred in this city from the explosion of chemicals, on Tuesday last. I could not pass this awful affair without alluding to it in your pages. The effect it has produced here gives it a vivid interest to all, and the special impression upon the writer, who has lost one of his earliest Parisian friends by the calamity, compel me to name it.

* Under the usual head of *Our Editorial Table* will be found a short notice of Mr. Lea's picture.—Eds.

About four o'clock on the afternoon of the 16th of March, a report like that of heavy pieces of ordnance was heard in the neighbourhood of the Quartier Latin, and it was found it was produced by an explosion of picrate of potash in the warehouse of M. Fontaine—a well-known maker of pure chemicals—who lived in the Place de la Sorbonne. The manager (he whose loss I lament) and others were engaged in transferring this salt from one vessel to another, and from some cause yet unknown the whole quantity, about half-a-hundredweight, exploded. Volumes of flame and smoke issued from the warehouse; two mutilated human forms were shot out of the volcano against an iron bench in the street, the bench was twisted up, and the shock still further destroyed those two mangled corpses. All the windows for fifty yards round were destroyed, and the scene, when I visited it on Wednesday, was as if a bombshell had burst in the square and carried devastation everywhere.

This is not the place to describe the horrors of the event, nor to work upon the feelings of your readers, therefore I will not relate the sickening details which have come to my knowledge. Bad as the accident was it might have been worse had the fire extended to the sulphide of carbon, ether, gun cotton, &c., of which there were supplies in the storehouse. The fire was soon got under, and so further damage was stayed. A quantity of potassium exploded from contact with water as the workmen were digging out the heaps of rubbish to which that fine shop, full of rare chemicals of all kinds, is reduced. The picrate of potash was for the Government, to enable it to experiment upon the best way of making submarine torpedoes. The "best way" is to form a substance which will destroy most lives and property when required; and the capability of picrate to perform this work, even when NOT required, has thus been terribly illustrated. Picric acid, from which the potash salt is formed, is obtained by the action of nitric acid upon carbolic acid, and so far has an analogy to gun-cotton and nitro-glycerine, though I believe that by itself picric acid is not dangerous. It may be interesting just now to show the composition of these three substances, and your more advanced readers will perhaps pardon me for employing the old nomenclature:—

Gun-cotton .... C_{12}, H_8, O_8, + 4 NO_5
Nitro-glycerine .... C_6, H_5, 3 NO_4, O_6
Picric acid .... C_{12}, H_2, 3 NO_4, O,HO

Nitro-glycerine can be considered as glycerine, in which three equivalents of hydrogen are replaced by three of nitrous acid, and picric acid as carbolic acid, in which three equivalents of hydrogen are also replaced by three of nitrous acid; an explosive compound is also produced by the action of nitric acid upon starch, in which two equivalents of hydrogen are replaced by two of nitrous acid. This substance is akin to nitro-glucose, and is termed xyloidine.

I, with many of your readers, have had to mourn the loss of a friend from the explosion of nitro-glycerine, and now another of these dangerous nitrogenated compounds adds to the list of lost friendships. Nitric acid is the arch enemy for introducing danger into once harmless substances, and it is refreshing to read of its use for the production of more innocent compounds, although its manipulation will always require care.

The celebrated chemist, M. Berthelot, has been engaged in researches upon the different varieties of carbon, and has succeeded in forming a solid oxide of carbon, which he calls "pyrographitic oxide," and in confirming the discovery of M. Brodie of the existence of a graphitic acid. All knowledge of the properties of carbon being interesting to photographic chemists, I venture to give a short *resumé* of these researches of M. Berthelot. He classes the different varieties of carbons under the heads of the diamond, graphite, and amorphous carbon. The effects of oxidation of these forms of carbon at a low temperature are—the diamond is unaltered; the graphites are converted into graphitic oxides; and the amorphous varieties are converted into yellow acid bodies soluble in water. It is in these graphitic acids that there is, perhaps, some chance of utility to photographers. To oxidise the carbon it is reduced to a fine powder, and mixed with chlorate of potash, and this mixture is formed into a pasty mass by means of fuming nitric acid. Be careful in doing this; it sounds rather risky. This mass is left in an open vessel for several hours, and then maintained at a temperature of about 100° or 120° for at least four days, when it is washed with tepid water. It is generally necessary to repeat this oxidising process five or six times, or even more, in order to completely dissolve the carbon. However, it appears that by this means we can obtain a solution of carbon, which fact, I believe, is one of those "not generally known."

I have been much interested in reading of Mr. Sarony's new patent, and it occurred to me that perhaps the glass plate on which the transparency is taken might be replaced by some of the pellicles or transparent films which have been brought before the photographic public. It is always best to avoid the use of glass, if possible, for pictures of a large size, and which are intended to be kept. What would have been the fate of the portraits in our picture galleries if the artists had entrusted their works to fragile glass? And where would have been the fame and reputation of the artists? It would not have survived their works. Why should photographers be less careful of their fair fame and renown than were the old masters we think so much of? If photographers worked for the future they would not, I think, entrust their reputation to window glass.

In connection with the subject of the production of artificial light for the uses of photography, or indeed for any other purpose, the beautiful researches of Dr. Franklin are worthy of the attention of all those interested in the question. Your readers have better opportunities of becoming acquainted with them than I have, as they have been made and published in England. The French *savant*, M. H. Sainte-Claire Deville, is following up these experiments of his English *confrère*, and has obtained the permission to construct a large apparatus whereby he may study the effects of pressure upon the luminous powers of flames. He suggests a theory to account for the fact of the increased pressure producing increased luminosity, which may be expressed in the following terms:—It is admitted that the same volume of a gas contains the same number of atoms, and that the weight of these are proportional to certain equivalents. These equivalents are called atomic weights. The equivalents of gases and vapours will be proportional to the number of atoms contained in the same volume; the densities of these gases, which are proportional to the equivalents, will be equally proportional to the number of atoms contained in the same volume. Suppose each atom in burning emits a certain quantity of light, the intensity of this light will be in the first place in proportion to the number of atoms, *i.e.*, the density of the matter in combustion. In the second place it will be in proportion to the temperature, *i.e.*, "to the square of the speed of the vibrations of these atoms put in movement by the heat;" and thirdly, the particles of an inert gas like nitrogen, mixed with hydrogen and oxygen, become illuminating themselves under the influence of the heat disengaged by the combustion, and thus add to the luminous power of the flame. Pressure having for effect the increase of the density of the gas, it should also increase its illuminating power. M. Deville says:—"I give this hypothesis for what it and all others respecting the intimate constitution of bodies are worth. When we talk of molecules, atoms, &c., we do not explain anything; we express our thoughts in a language which has become elementary, and that is enough for me."

Let me make use of this letter to inform your numerous readers in all parts of the world that there is a good market in Paris for *good* stereoscopic negatives of India, China, South Africa, Mozambique, Mauritius, St. Helena, and other portions of Asia and South and Middle Africa most generally known. These negatives should be *first class*, of a good size, and should not have been printed from, with the exception of a very few paper positives to show the subject and quality of the negatives. Should any of your readers have any such negatives to dispose of, let them send a proof and particulars to your correspondent.

I hope there will be some chance of getting zirconia cylinders in a month or two. R. J. FOWLER.

Home.

SARONY'S PHOTO-CRAYON PROCESS.

To the EDITORS.

GENTLEMEN,—In your issue of today I see a correspondent, "Photo," speaks of using for the above process the oxycalcium light with success in place of the magnesium light, as recommended. Perhaps it is not generally known amongst photographers that common gas light in the magic lantern answers excellently well for making enlarged collodion transparencies. The collodion film is so sensitive that it does not require a very actinic light for this purpose.

I have made very good enlarged transparencies in from one to two minutes' exposure, which is, I think, quick enough for anything. This can be very easily tested by those who have a lantern. It is much more easy to work and more economical than the magnesium or oxycalcium lights.

Trusting the above may prove of some service to your readers,—I am, yours, &c., JOHN J. ATKINSON.

37, *Manchester-street, Liverpool, March* 19, 1869.

To the EDITORS.

GENTLEMEN,—I do not see anything original in Mr. Sarony's patent except the mere application of lithographic sketches. I made positive photographs with paper backings of various tints *twelve years* ago. So far as I can remember this style of picture was introduced by Mr. Urie, of Glasgow. However, if wrong I am open to correction.

Notwithstanding Mr. Hughes's defence of the originality of the idea, Mr. Henderson was quite correct in his statements. I have two pictures done up in that style—one made in 1857 and the other a year later. I was shown the process by a photographer in 1856, and I know that he made scores of the same style of picture. Without in the least wishing to detract from Mr. Sarony's inventive genius, these facts being indisputable, I decidedly demur to his patent.—I am, yours, &c.,

Dundee, March 18, 1869. J. ROBERTSON.

[If our correspondent will refer to the few lines appended to the letter of "One who was Present," in our last issue, he will find that Mr. Urie's process was different to that of Mr. Sarony. Mr. Robertson states Mr. Sarony's case in the opening sentence of his letter: the novelty is not in a mere paper backing, but in the lithographic sketch on the paper.—EDS.]

REPAIRING GAS BAGS.

To the EDITORS.

GENTLEMEN,—Thanks for your kind reply in your number of last week but one about the retort. I have carefully perused the article by Mr. Harman, to which you referred me, about the safety valve, but find he does not give sufficient particulars to enable a person to construct one like it.

May I further trouble you to tell me how to mend a gas bag which has been injured by being placed too near the fire for the purpose of softening before filling with oxygen? Would a piece of India-rubber cloth, cemented over the hole with a solution of India-rubber in benzole, answer the purpose?—I am, yours, &c., MERCURIUS.

Derby, March 20, 1869.

[We publish this in the hope that any reader who has had experience in discovering and rectifying leakages and defects in gas bags will communicate some information on the subject. We have had many inquiries of a similar nature.—EDS.]

Miscellanea.

A NEW CEMENT.—A cement said to possess many advantages, and to be especially adapted for sealing up vessels containing benzoles, etherial oils, etc., is prepared by rubbing up finely ground litharge with concentrated glycerine. The liquid cement is to be poured upon the cork or stopper, or it may be applied with a brush.

A NEW SOURCE OF ILLUMINATION.—A new illuminating material, recently patented in Germany, consists of a mixture of two parts of the poorest rape seed oil, and one part of good petroleum. It is burned in a lamp of peculiar construction, but somewhat similar to that of the ordinary moderator lamp, and gives a light not to be surpassed for purity and brilliancy.

EASIER SAID THAN DONE.—*Punch* of last week has a cartoon representing three smiling young ladies posed before the camera and ready to be "taken" by a pompous and fussy-looking photographer with ferocious whiskers, squinting eyes, pug nose, and pursed mouth, who, with lens-cap in hand, exclaims—"Now, look straight in my face while I count fifteen, and *pray* don't laugh!"

RATHER COMPLIMENTARY.—While glancing the other day over the pages of the last number of our cleverly-conducted and admirably-printed contemporary, the *Scientific American*, we observed an editorial article which, without reading it very carefully, appeared to us to be of a practical and useful kind, and, as such, sure to be welcomed by our readers; accordingly we handed it over to our P. D. to be "put in type." Imagine our gratification on being informed by this nigrescent young gentleman that not only the article in question but some other editorial articles in the same number owed their existence to the wants of some of *our* readers, and had some months ago made their *début* in the form of "answers to correspondents" in this Journal. To have our "answers" thus elevated to the rank of "editorials" for a leading transatlantic scientific journal is, perhaps, no small honour.

THE SUN.—At a late sitting of the French Academy of Sciences a letter from M. Janssen was read. It bore the date of Simla, 8th ult., and contained a general view of the method employed by the writer in examining the solar protuberances. He briefly referred to M. Faye's theory of the constitution of the sun, according to which that orb is essentially gaseous, and so hot that no substance can be contained in it without being instantly converted into vapour. Now gas, even when raised to the highest possible temperature, is comparatively but slightly luminous, so that the centre of the sun will appear dark in comparison to the light of the photosphere, which consists of all the vaporous particles driven from the centre and becoming solid again by a diminution of temperature. The photosphere itself is surrounded with a gaseous atmosphere, which M. Janssen says he can now study at any time with his new apparatus, in which he uses opaque or semi-transparent diaphragms, or glasses of a peculiar tint. Lastly, instead of placing the slit of the spectroscope normally to the sun's limb, he places it tangentially, so that, approaching slowly, he soon discovers Bailey's beads on the circumference. The protuberances, which are hydrogen, lie all along the whole disc, and on the photosphere itself.—M. Elie de Beaumont remarked that M. Janssen's instrument bore great resemblance to that of Professor Zantedetchi, of Venice, communicated by him to the Academy on the 9th of November last—a second instance of strange coincidence between two persons, one of whom was in India and the other in Italy.

LIME TONING.—Mr. Duncan has communicated to *Humphrey's Journal* the following:—"Ere I give a simple formula for lime toning—which I have found very successful in practice—I would fain impress the necessity of its being prepared some time before using; that being attended to, it will be found simple and efficient in practice, giving nice results. Weigh, for the first experiment—the proportions can be afterward increased if the results are satisfactory to the experimenter—half a drachm of chloride of lime and one drachm of precipitated chalk, both of which can be procured from any stock dealer or drug-store; put into a bottle with forty ounces of water; add likewise half a drachm or two fifteen-grain tubes of chloride of gold. Now put it by on the shelf for a week or more, occasionally shaking it. We will call that the *concentrated stock solution.* After that time decant and simply dilute it with twice its volume of water. It will work splendidly. If liked, make up more of the concentrated solution and always keep some ready. The bath can be used continually, but when the tones begin to deteriorate, or it works feebly, a few drops of chloride of gold solution with a little of the concentrated solution, not less than a week old, will quite restore it. If the bath should bleach too much with some samples of paper, dilute it. The concentrated solution will keep good for months; thus a large quantity can be made up at a time. The above bath has yielded magnificent tones with paper sensitised on a forty-grain silver bath, with about half-an-ounce of alcohol to every pint of solution; also with paper sensitised on—

Nitrate of soda	1 drachm.
Nitrate of silver	½ ,,
Water	1 ounce.

I believe it will work well with paper sensitised on any kind of silver bath for printing. I trust this modification may prove as successful in other hands as it has done in mine."

DUST SEEN THROUGH THE MICROSCOPE.—At a late ordinary meeting of the Manchester Literary and Philosophical Society, Mr. J. B. Dancer, F.R.A.S., read a paper *On Microscopical Examination of Dust.* The author stated that he had made some microscopical examinations of dust collected in June, July, and August last, and also of the particles contained in the rain water after the long drought. He had intended to bring these observations before the society in a complete form, but had not hitherto found time to do so. He proposed to carry on observations during every month in the year, for the purpose of recording the average amount of solid matter deposited on a given area, and also as far as possible to ascertain the character of the deposits. The observations so far have shown, as might have been expected, that the dust in various localities, at different altitudes, and under other varying conditions, contained particles differing in magnitude, appearance, and quantity for the same superficial area. In every instance molecular activity was abundant, but the animal life was very variable in amount, the largest number of moving organisms being in the dust collected at the lowest points—this was about five feet above the surface of the earth. This dust also contained the largest proportion in magnitude and quantity of vegetable matter. These observations also show that in thoroughfares where there are many animals engaged in the traffic, the majority of the light dust which, when disturbed, reaches the average height of five feet, or about the level of a foot passenger's mouth, consists of a large proportion of vegetable matter which has passed through the stomachs of animals, or which has suffered partial decomposition in some way or other. This is not an agreeable piece of information, but it is a fact. It shows the necessity, in a sanitary point of view, of the streets being well watered before the scavengers are allowed to commence operations; otherwise the light dust is only made to change its locality, and is not properly removed. It is not pleasant to contemplate the possibility of germs of disease being wafted along with this decaying matter, and inhaled by those whose condition might be favourable for its development. The author hopes to bring the details of these observations before the society at some future time.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will give a half-plate lens, by Jamin, for portraits, or a wide-angle view lens, by Shepherd, for *cartes* and cabinets, in exchange for a rolling-press or a half or whole-plate bellows camera, or both for a *carte* lens by a good maker.—Address, PHOTOGRAPHER, at Richards' Auction Mart, Tottenham Court-road, W.

Musical instruments, stringed or brass, wanted in exchange for a bellows gusset half-plate camera and view lens, pair of stereo. view lenses and camera, pair of stereo. portrait lenses and camera, *carte-de-visite* lens, with Waterhouse diaphragms, also 10 × 10 mahogany camera.—Address, E. J. E., 24, Noel-street, Lodge-lane, Liverpool.

A very superior triplet lens, by Vogel, 1-1 plate, and a very convenient dark box with velvet sleeves, &c., for working plates up to 8 × 10, both nearly new, will be exchanged for a good outdoor lens (must be a good maker), or a small ditto, for *carte-de-visite* views, &c.—Address, OPERATOR, at the West of England Portrait Studio, The Hoe, Plymouth.

A Ross's doublet with cover 7¼ × 4½; a 7¼ × 4½ screw adjusting camera, by Meagher, with pair of Wilsonian view lenses; a half-plate cabinet lens, by Shepherd; or a fine 2¼-inch astronomical telescope, is offered in exchange for a good *carte-de-visite* lens, by Dallmeyer or Ross, or other good portrait apparatus.—Address, R. MERTON, 63, Amberly-road, Harrow-road, London.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

Tattersall and Rogers, Accrington.—*Portrait of Dr. Macrorie, Natal.*

☞ *Correspondents should never write on both sides of the paper.*

R. STARK.—A private reply is being prepared, and will be sent in a day or two.

R. C.—One ounce of hyposulphite in a pint of water will be quite strong enough for the purpose.

JAMES G—— (Birmingham).—We have put the proper addresses on the letters you enclosed, and have forwarded them.

A COUNTRY PHOTO.—We cannot aid you in disposing of your negatives. You should apply to some photographic publisher.

J. BRADLY.—We have not yet received the "opinion" expected, but hope to do so in time to communicate with you early next week.

INQUIRER.—Spanish white is merely carbonate of lime. You will probably be able to procure it at any oil shop; if not, try the drysalters.

OLD PHOTO.—For your purpose the calotype or negative paper process will be better and more convenient than collodion, either wet or dry; indeed, under the circumstances, it is the only one you can employ.

S. W. P.—We cannot here give you the details for recovering silver from waste solutions. Consult our back numbers or our Almanacs, or, indeed, any good manual of photography, and you will find full instructions.

F. F. B.—Do not apologise; there is no occasion for it. Protonitrate of iron is obtained by mixing together nitrate of lead, *or* nitrate of barytes, with protosulphate of iron, each having been previously in solution.

JAMES ARMOUR.—You will obtain better results by diminishing the proportion of bromide. What you require is great intensity and no half-tone. An iodised collodion is better than a bromo-iodised one for this purpose.

LEVELLER.—We fear that your organ of ingenuity (wherever that may be situated) is not highly developed. You might easily extemporise a levelling stand for developing by placing a small bowl or a large handleless cup in a jam pot or tumbler.

D. M. (Liverpool).—There is nothing whatever new in your idea of a grain for either photo-engravings or photolithographs. Your proposed process, which you give us in outline, was practised, and even published, by M Berchtold in 1859. It is, indeed, difficult to invent or discover anything new now-a-days.

AULD LENS.—Without uncementing your lens you may ascertain whether or not it is an "aplanatic." Examine the edge and see at which side the junction line is to be found. If it is next the concave side it may be at once assumed that it is really an aplanatic lens; if next the convex side it is not so.

AMATEUR.—Add carbonate of soda (in solution) to the silver until the whole of the silver is thrown down; allow it to settle, decant the water (which is now a solution of nitrate of soda), and add more water until it is freed from soluble salts. This is carbonate of silver, which is soluble in nitric acid, and forms with it the nitrate of silver.

W. J.—Although the paper containing the packet of pyrogallic acid you sent was stained by it to such a very great extent, we found on trial that the developing qualities of the acid were not in the least impaired. It is a very convenient plan when travelling to do as we have before suggested, viz., weigh out the pyrogallic acid in quantities of one, two, and three grains, and place them in labelled packets.

A DAGUERREOTYPIST.—Cyanide of potassium is the only agent we are acquainted with by which a Daguerreotype can be cleaned when it is covered over with the brown oxidation. Some photographers are foolish enough to banish this salt from their laboratories because it is a poison (as if nitrate of silver and the other chemicals were innocuous). If you have any scruples about using it, you will have to send the Daguerreotype to some brother photographer for restoration.

F. S. (Birkenhead).—It is not merely not impossible to do as you suggest, viz., to intensify with silver and pyro. *after* fixing, but in many instances it is better to do so. In the case of stereoscopic transparencies, for example, a richer and warmer tone can be obtained in that way than if the intensification were carried to its full extent before the iodide was removed. Make a few trials, and you will alter your present. Of course, we recommend this only in special cases, and not for general negatives.

WATERPROOFING (J. M. D.)—You will find the following to be a good means of making your tent cover waterproof:—Boil in a gallon of water half-an-ounce of Castile soap, and in this solution, when cold, immerse the calico to be rendered waterproof. Hang up on a clothes line, and when half dry immerse for an hour or two in—

Alum	2 ounces.
Acetate of lead	1 ounce.
Water	1 gallon.

After this hang up the cloth until dry. It will now be waterproof.

SUBALTERN (Deesa).—Your experiments have interested us very much, but without devoting a long article to the subject it would be impossible in this page to discuss the matter fully. One word we may say—the acid mixture employed by you readily dissolves organic matter in some forms. For example, immerse in it, or in plain hydrochloric acid, some good writing paper. After a very short time remove it to a vessel containing water, and then dry. You will find that the size is removed; it is now converted into blotting-paper. The remedy for the organic matter must be sought for in the direction of permanganate of potash. Respecting your other query, you may use the old bath *immediately* after adding the gold solution.

G. F. W. is responsible for the following:—

Some people praise photography,
And glory in the magic lens;
But don't you really think with me
That such are not true artists' friends?

The reason's clear—I'll tell you why—
For, setting preference apart,
The art we call "photography"
Is the foe to graphic art!

J. F. (69, Gloucester-road).—There is, practically, no difference between a landscape taken with an ordinary landscape lens and the front of a portrait combination placed as you describe. It would differ, however, in some respects, from one taken by the portrait lens in its complete form. With the landscape or single lens a much flatter field is obtained over a larger angle than with the portrait lens. To get the requisite flatness of field for landscapes when employing a portrait combination, a small stop must be used, and this gives rise to a bright spot of light in the centre of the picture—the spot being the more apparent in proportion to the smallness of the aperture in the diaphragm. For this reason, a small stop should not be employed with a portrait combination for taking landscapes, except under very exceptional circumstances. Of course, if the front lens of a portrait combination be employed as a landscape lens, it will be very much longer in focus than the complete combination, and hence will include a smaller angle on a plate of a given size.

RECEIVED.—M. Carey Lea. Unavoidably left over till next week.

*** Several correspondents in our next.

☞ **Editorial Communications should be addressed to "THE EDITORS;"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.**

PHOTOTYPE.—From Messrs. Früwirth and Hawkins' specification of an alleged new method of producing phototypes, just published, we observe that our well-tried old friends, bichromate of potash and gelatine, are once more in the field, and, what we had *not* been led to expect, in their old guise. What is described is the taking of a mould from a swollen gelatine film, and obtaining an electrotype, which is afterwards built up by the well-known glyphographic process, the result being an electro. block for surface printing. We shall give the details of the process next week.

THE TRANSPARENCY EXCHANGE CLUB.—The members of this exchange club are requested to withhold their exchange contributions for the present, or until the end of summer, the lantern season being now supposed to be over. The umpires, or referees, consider that by the adoption of this suggestion as to a recess, the members will be afforded ample opportunities of not only increasing the number of their negatives and subjects, but of taking some with a special view to transparency printing. For camera printing, a negative should be less dense than when it is to be employed in what we must call frame-printing.

LONDON GAZETTE, *March* 16.

BANKRUPT.

JACOB FINLAYSON, photographer.—April 7, at 1, at the Bankrupt's Court, London.

Tuesday, March 23.

NOTICE OF SITTING FOR LAST EXAMINATION.

J. BARRY, Strand, Photographer.—April 26.

METEOROLOGICAL REPORT,

For the Weeks ending March 17th and 24th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Mar. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
11	29·40	41	30	31	34	NNW	0·04	Dull
12	29·66	44	30	33	35	NNW	0·02	Dull
13	29·65	42	29	30	33	E	0·06	Fine
15	29·83	41	29	32	35	ENE	—	Dull
16	29·80	40	33	32	36	NNE	0·02	Rain
17	29·33	41	33	35	37	ESE	—	Dull
18	29·92	51	32	35	38	NE	0·08	Fog
19	29·81	50	37	41	43	SSW	0·23	Dull
20	29·54	42	33	36	37	NNW	0·53	Dull
22	30·08	46	34	39	41	NE	—	Dull
23	30·25	42	34	35	39	NE	—	Fair
24	30·19	—	31	35	38	NNE	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 465. Vol. XVI.—APRIL 2, 1869.

WORK FOR PARKESINE TO DO.

Our readers will no doubt have been surprised that so little has lately been heard of the material named "Parkesine." We were led to hope at one time that this substance would have proved of considerable value in photographic operations; but it is now a long time since we have heard anything of the material in question. It appears to us, however, that a peculiarly favourable opportunity for advantageously introducing Parkesine into general photographic use now occurs.

Our readers will recollect that the beautiful photo-crayon process of Mr. Sarony requires the production of an enlarged collodion positive on glass, which print is then used to place over the engraved card. It appears to us that a decided advantage would be gained if, instead of producing the positive on so fragile a material as glass, we were able to substitute a tough but transparent body. We here meet with the difficulty, however, that but few of the substances which we could obtain in thin transparent sheets, and which would, therefore, be suitable for our purpose, are at the same time sufficiently indifferent to the action of the chemical agents used in preparing the positive proof.

Mica, probably, is the only substance which would be employed for the purpose indicated, but since there is great difficulty in obtaining this mineral sufficiently free from colour and mechanical defects—such as flaws, cracks, &c.—such a substitute for glass in Mr. Sarony's process is scarcely to be thought of. Here, then, we appear to have a most favourable opportunity of testing the value of Parkesine, as this substance can not only be obtained in large transparent plates as tough as horn, but it also possesses the advantage of being as little liable to injury from chemical agents as collodion itself.

Some of our readers may be disposed to ask—What is Parkesine? and though we have long since answered such a question in this Journal, it may not be uninteresting to some whose attention may not have been previously directed to the matter if we briefly describe the preparation of the new substance.

The name "Parkesine" is applied to a remarkable substance discovered by Mr. Alexander Parkes some two or three years ago. The mode of preparation is exceedingly simple. Ordinary pyroxyline is dissolved either in a mixture of ether and alcohol, nitro-benzole, or some other suitable solvent. With this solution Mr. Parkes combines castor or cotton-seed oil. The combination of the oil and the pyroxyline on evaporation gives rise to a substance which is as hard and flexible as ivory, and is stated to be neither softened by heat nor hardened by cold. It can be obtained perfectly transparent, and can be easily rolled into large plates; hence it would seem to be a peculiarly suitable substance for employment as a substitute for glass in Mr. Sarony's photo-crayon process.

From what we have stated above it might appear that but one substance can be produced by Mr. Parkes's process, but this is not so. By varying the materials employed, and the proportions in which they are used, we can obtain products of very variable properties. By suitable adjustment of the proportions of castor or cotton-seed oils to the pyroxyline, products can be obtained varying in consistence from that of a soft and somewhat elastic mass to a hard and inelastic substance which easily receives the impress of a die. Such a wide range of physical properties in a substance, when associated with general chemical indifference, would appear to render Parkesine of peculiar value as a photographic adjunct; added to this we have the fact that the varieties of this material admit of easy colouration, and we thus have the means of obtaining transparent and delicately-tinted films of any degree of thickness or tenuity.

We had written thus far on the subject when our Paris correspondent's last letter came to hand, and in this communication we find that Mr. Fowler also proposes that some less fragile material than glass should be employed for the production of the developed positives required for Mr. Sarony's process. In this week's letter Mr. Fowler returns to the subject, and points out that Marion's pellicle might be employed for the purpose of supporting the collodion print.

In the case of the "pellicle Marion" it is necessary to transfer the collodion film from the glass plate on which the print has been produced to the final support. This is rather objectionable, not only on account of the amount of trouble involved, but also of the uncertainty attending the process of transfer; for our readers are well aware that even in practised hands failures sometimes occur; and though we have no doubt the transfer process might be employed, yet it does not appear to be desirable to introduce any element of uncertainty into Mr. Sarony's beautiful process.

Parkesine would be free from the objection just indicated, since if Mr. Parkes were able to produce large transparent and colourless sheets of the material in sufficient quantity, the Parkesine plate might be substituted for the ordinary glass plate, and the former then coated with collodion, sensitised in the nitrate bath, and the positive printed, developed, fixed, and dried, just as in the ordinary process.

We foresee but one difficulty in the matter, viz., the solution of the Parkesine plate itself by the collodion which the operator would have to pour on its surface. Mr. Parkes can alone settle this point for us; but, even if such a solution did take place, we can scarcely conceive that this would prove an insuperable difficulty, since the surface of the Parkesine plate might easily be coated with some substance which would prevent the direct action of the fluid collodion on the material of the plate itself.

A NEW AND SIMPLE CARBON PRINTING PROCESS.

We have much gratification in being able to present to our readers the details of a new and simple carbon printing process, and one which yields such excellent results as to register the most delicate gradations in the negative without any apparent sacrifice of the strength and vigour of the shadows requisite in a photograph of the highest merit.

A few days since Mr. J. R. Johnson, the patentee of the new process, exhibited before the members of the Amateur Field Club the whole details of operation, everything requisite for this purpose having been brought to the meeting in a small square box—a veritable portable laboratory—in which pictures of 9 by 7, or thereabouts, could be satisfactorily manipulated.

Before proceeding to describe the new process it will be better that we give, in the fewest possible words, an outline of Mr. Swan's carbon process, because by doing so the "points" of the new method will be more readily grasped.

In Swan's process a sheet of paper is coated on one side with a tissue composed of gelatine, pigment, and a little sugar. The pigment is usually China ink, with carmine or some other colouring matter to modify the tone. Any pigment may, however, be used without affecting the principle. The pigmented tissue is made by passing a long web of paper over rollers, and allowing the bottom of the endless band to dip into a vessel containing the coloured gelatine, which is retained in a liquefied state by means of heat applied below the vessel. It is found better to give the paper a number of thin coatings of gelatine rather than one thick one, for which purpose the paper is formed into a band and passed over rollers which revolve at any requisite speed.

Paper thus prepared is technically denominated "carbon tissue," and it will keep for any length of time. It is, of course, insensitive to light, but may be rendered sensitive—much more sensitive than even chloride of silver paper—by floating it for a couple of minutes on a solution of bichromate of potash. It takes several hours to become dry, and it is of consequence that the temperature of the drying room be not much raised during the drying, on account of the tendency of heat to liquefy gelatine which has absorbed water. It is also of importance that it be dried rapidly, for if this operation be much prolonged the tissue is apt to become insoluble.

Carbon tissue thus prepared is essentially necessary in all the carbon processes of the present day. The tissue is exposed under a negative for about one-fourth of the time required to print on albumenised silver paper. And now, having obtained a piece of blackened tissue which has been exposed to the light under a negative, comes the point at which Mr. Johnson's process diverges from that of Mr. Swan.

In Mr. Swan's method a sheet of paper, previously varnished over with a solution of India-rubber in benzole and allowed to become dry, is pressed into very close contact with the tissue, which has also previously received a similar coating of the India-rubber solution. To effect this intimate union of the two sheets, a powerful copper-plate press is employed in those establishments where carbon printing is carried out on an extensive scale, heavy pressure being indispensable.

The picture is now ready for development. To effect this the compound sheet is immersed in cold water for half-an-hour, and is afterwards transferred to water of from 80° to 100° Fah. The two sheets of paper—that is, the original paper which supported the tissue previous to exposure and that which has been cemented on by the India-rubber—are now pulled asunder, the softening of the gelatine tissue permitting of this being easily accomplished. Only the paper last applied is kept, the other being thrown into the waste basket.

When replaced in the warm water, the rapid dissolving away of the tissue not acted upon by the light causes the details of the picture to appear with considerable rapidity. It is in those places where, from the density of the negative, the light had no action that the pigmented gelatine will be found to be completely washed away. In proportion to the action of the light so is the insolubility of the film.

When the print is dried it is transferred to another sheet of paper, that which is intended to form its final resting-place. The face of the print receives a coating of the following:—

Gelatine	2 ounces.
Glycerine	½ ounce.
Water	1 pint.

When dry the print is trimmed to the proper size, if it be intended to mount it on cardboard; but, if on paper, this can be done after the final transfer, which in both cases is effected by pressure applied by means of a rolling-press. Immersion in a five-per-cent. solution of alum renders the print insoluble, and subsequent washing in plain water, and drying, completes the operation.

The above description refers, of course, to the double transfer process of Mr. Swan, and not to that in which the picture is mounted directly upon its permanent support, and which has been called the single transfer process—albumen coagulated by spirit being the cementing substance.

In Mr. Johnson's process the tissue is sensitised by floating it for two minutes on a five-per-cent. solution of bichromate of potash in water (bichromate of potash twenty-two grains, water one ounce). This gentleman's process is founded upon his discovery that the exposed tissue, if partially saturated with water, will of itself, and without any cementing substance, adhere to any surface if this be impermeable to water. Thus, to form transparencies on glass, all that is necessary is to lay the wetted exposed tissue on a clean glass plate, and press out the air-bubbles. In a few minutes the gelatine, not being saturated, absorbs the superfluous moisture, and the exposed surface of the tissue adheres firmly to the glass and may be developed upon it; and, as it can be viewed through the glass, the picture is now reversed. Any impermeable substance, as oiled, waxed, or varnished paper, card, wood panel, metal plate, &c., &c., may be substituted for the glass with the same result; but when these substances are opaque the image is reversed, and reversed or transferred negatives must be employed to get correct pictures.

Having thus stated the general principles, we now proceed to describe the manipulations witnessed on the occasion we have referred to.

The exposure having been effected in the manner and for the time previously mentioned (*i.e.*, one-fourth the exposure of silvered paper), the pigmented paper was immersed for a few minutes in a dish of water. At first the tissue curled up slightly, but it soon lay quite flaccid, and at this stage a plate of ordinary opal glass was introduced below the tissue, which floated on the water face downwards; and the tissue was then raised up on the opal glass, and, after being adjusted to its position, was pressed in contact with it—not by any press, but simply by a flat camel's-hair brush, which was passed all over the surface, commencing at the centre.

When proper contact was supposed to have been established, and all air-bubbles removed, the opal glass with the pigmented paper attached to it was pressed in contact with a pad of blotting-paper until the back of the paper was surface-dry, after which it was immersed in a tin vessel, grooved like a plate box, and full of water of a temperature of 100° Fahr. Mr. Johnson, however, explained that it was preferable to allow a longer time before developing, as the adhesion was thereby rendered more certain, but said there was considerable latitude in this respect. In about a minute or a little more the plate was withdrawn and the paper peeled off, some of the pigmented gelatine adhering to the paper; but the greater portion remained attached to the glass, which was again immersed. In about two minutes more the glass was again withdrawn, and this time the picture could be seen, although still much obscured. A third immersion with agitation of the water showed, when removed from the water bath, the image on the opal glass very beautifully and perfectly developed. It was now a carbon opalotype, and, after being placed in cold water for a short time, was set aside to dry.

The next picture, Mr. Johnson said, would be transferred to paper. The opal glass in this case received a coating of stearine in methylated spirits, which was afterwards nearly all polished off. The object of this thin coating is to prevent the too close adhesion of the gelatine tissue to the glass. It was treated precisely as in the former case; but when the picture was fully developed, a sheet of paper, previously coated with gelatine, was moistened and pressed in close contact with the picture, and the glass with the paper covering was set aside until it became quite dry. In this state the paper, with the picture adhering to it, comes entirely away from the glass, which is now quite denuded of its pictorial coating.

It was explained by Mr. Johnson that any solid fatty body infusible at the temperature at which the picture was developed might be used for preventing the adhesion of the picture. He had used India-rubber, gutta-percha, wax, stearic acid, dissolved in weak ammonia and in weak spirit; he preferred, however, the latter, as being most clean and free from smell.

In connection with this method of transferring it may be of interest to observe that the surface of the finished picture is just such as it obtains from the glass or surface upon which it is developed—a polished glass giving a picture with a smooth, glossy surface. In order, however, to get the most varied results, Mr. Johnson has adopted the simple, although ingenious, expedient of having one side of the opal glass or metal plate ground; hence, accordingly as the picture is transferred to the ground or the polished surface, so will the finished picture be glossy like albumenised paper, or in mat like plain paper.

Mr. Johnson next showed an extremely simple and economical method of producing single transfer pictures. He immersed a piece of thin bank post paper in some aqueous fluid holding a white resin in solution. The saturated paper was then laid upon a sheet of tin, and another sheet or two was then prepared in the same way. That which was first prepared was then taken, and upon it was laid a piece of moistened exposed tissue as in the above experiments, and so with the remainder. In a few minutes the first plate was declared ready for development, and after immersion the gelatine tissue came away, leaving the picture on the thin resinised paper which still remained attached to the plate. On this being dried the reversed picture was complete.

It will be seen that in this method of producing single transfer pictures neither albumenised nor gelatinised paper is required, the only materials used being the carbon tissue and ordinary bank post paper wetted by some special solution. This solution is also used by Mr. Johnson in the second transfer instead of gelatine; and the print so treated will then bear not only immersion in hot water (the modern "scientific" test for carbon pictures), but any amount of scratching or rubbing—like dyed calico.

The success of the demonstration at the meeting of the Amateur Field Club, and the neatness and simplicity of the operations, have not been without their due effect upon the members of that body, some of whom, previously quite apathetic to carbon printing, have now signified their intention of at once giving it a trial.

For some reason which we cannot well explain, the great mass of photographers, both amateur and professional, have hitherto held aloof from carbon printing. We are glad to be able to state that Mr. Johnson (whether *in propriâ personâ* or as the directing manager of the Autotype Company we cannot at present say) purposes at once to offer the process to the public. From the beauty of the results, the sensitiveness of the tissue, and the ease of the manipulations, not to speak of the advantages in respect of permanence possessed by carbon over silver, we are confident that, during the forthcoming season, many will readily avail themselves of the elegant process to which we have thus directed attention.

As we have at our office some specimens produced by the new carbon process, we shall be happy to show them to any of our readers or others who may call for that purpose.

DEVELOPMENT.

I notice that a controversy has been going on upon the action of old and new developers, in which my own views and expressions on the subject of development have been largely quoted by both sides.

As these views have been very decided, and as I have expressed them very pointedly, I am not willing to be placed in this ambiguous position. I have never held but one opinion, viz., that in the wet process *slow developments favour contrast*, and that *rapid developments tend to softness;* and when I read over what I have said on the subject, I do not see that it could well be expressed more clearly or distinctly.

In an editorial article in The British Journal of Photography I am cited in support of the opposite opinion, and an expression is quoted which, *as quoted*, means just nothing at all, one member of the sentence expressly contradicting the other. The passage is:—"If we develope slowly [iron development by the wet process is here expressly referred to] we tend to get a harsher picture; the greatest stiffness is got by developing rapidly."

"Stiffness" is a word never used in connection with development. I wrote "softness," for which "stiffness" is a misprint. Although the context plainly showed that harshness could not be meant, so that a correction was almost unnecessary, still, not caring to leave a possibility of mistake, I wrote the first opportunity to correct this typographical error, and my correction will be found under my signature to an article on page 600 of last year's volume.

Even, however, without this correction I do not see how this passage could be cited to mean that slow developments give softness—first, because the words immediately before most positively contradict this view; and, secondly, because the whole object of the passage is to place iron development of wet plates *in contrast* with alkaline development of dry, in which last case I expressly said that slow developments *promoted* softness. M. Carey Lea.

[Our correspondent will find, on referring to our last note upon this subject, at page 95, that we there expressly point out that we could not and did not quote him in support of the view that *very* slow development gives soft negatives. We do not hold this opinion ourselves, and we knew that he did not either, and could not, therefore, quote him in an opposite direction.—Eds.]

New Photographic Society.—It affords us much pleasure to be able to announce that the Bristol and Clifton photographers are about to form themselves into a society. From the personal knowledge of several gentlemen in the western metropolis, we believe that the new Society will not be inferior to any at present in existence; for among the photographers in that district are many of great theoretical, practical, artistic, and chemical skill. We wish the young Society a hearty God speed.

THE COLLODIO-BROMIDE PROCESS.

The Collodion, and Preparation of the Collodio-Bromide.*

Since the efforts made by Messrs. Sayce and Bolton, in 1864 and 1865, to introduce the collodio-bromide process, the papers on the subject have not been very numerous, and little has been done to bring its merits before the photographic public. We in this Society have been working the process since its introduction with the greatest success, and few who have mastered it would think of going back to a dry process requiring the use of the bath, with its tedious and cumbrous manipulations.

I almost feel as if some apology were needed from us for not having done more to advance the claims of this process, believing, as I do, that it will eventually supersede all other dry processes. We have been content to work on, satisfied with the charming results, and with an enthusiasm only to be felt by those who have experienced the difficulties and uncertainties of most dry processes.

The object of this paper, and of the series of which it forms part, is to endeavour once more to bring the collodio-bromide process before our photographic brethren, and show the simplicity of the means by which negatives of a beauty unsurpassed by any other process may be produced with certainty and regularity.

This process does not yet seem to be much in use outside of this Society, and, judging from conversations with other photographers, much misapprehension exists concerning it. Suggestions have been made which tend to invest it with difficulties and deter anyone from making trials with it. That the process is not capable of improvement no person will assert, and experiments with this view should be encouraged; but mere variations, possessing no advantage over the original simple process, do no good, and serve only to confuse.

It is this simple process that I intend to describe; and that it is a good, workable process is proved by the large number of excellent negatives taken by it.

Very few words are needed concerning the pyroxyline. A specially prepared cotton is quite unnecessary. Some three or four years ago I had some difficulty in obtaining the required intensity, and made some "intense" cotton in acids at as high a temperature as 160°, whereby it was greatly disintegrated and much reduced in weight. It did not bring me the advantage I sought for, which I found was to be obtained with ordinary cotton with proper treatment.

Any sample of good soluble cotton, such as may usually be bought at a photographic chemist's, suits admirably. Of course, a pyroxyline giving a very horny, repellent film, such as would be rejected for almost any process, would not answer quite so well, unless altered by particular salting or long keeping, or perhaps both combined. As is well known, the salting influences the physical condition of the collodion considerably, and this is a matter of some importance. Some collodion I made last summer, containing eight grains of pyroxyline to the ounce, and salted with eight grains of bromide of calcium is now as limpid as water, and, on coating a plate of glass with it, it leaves a very thin film, and so rotten that a stream of water from the tap, not very strong, soon washes it away. This was not the case when the collodion was new.

Upon adding the proper quantity of nitrate of silver to convert it into collodio-bromide, after the usual shaking—although creamy-looking in the bottle, owing to its great fluidity—the film left on the plate was excessively thin and pale. I have since added eight more grains of pyroxyline to the ounce (which it readily dissolved), making sixteen grains, and it is now, to all appearance, in good condition. I hope to be able to make some experiments with this collodion, and report at our next meeting. On the other hand, it is known that the cadmium salts cause the collodion to become gelatinous, and this condition is clearly unsuitable.

I merely call attention to these facts to show the necessity of having a collodion with some body, and because they may be one of the sources of the complaints that have been made of inability to obtain creamy films.

It would be interesting to observe the behaviour of two different samples of collodion—one (say) containing three or four grains of cotton to the ounce, brought to the desired state as regards fluidity by cadmium, and another similar to what I have just described, containing sixteen grains of cotton thinned by calcium, each with the same quantity of bromine in the salts employed. In the one collodion the atoms of pyroxyline would be in contact with double the number of the bromide, and in the other the case would be reversed. Some experiments in this direction might help to elucidate the theory advanced by Mr. Sutton respecting the influence of organic matter on the image.

* Read at a meeting of the Liverpool Amateur Photographic Association, March 30, 1869.

In selecting bromides for the collodion great latitude is allowable, the chief requisites being that they do not alter its fluidity by keeping. I do not know a better formula than that proposed by Mr. Sayce. It is as follows:—

Bromide of cadmium	6 grains.
Bromide of ammonium	2 ,,
Pyroxyline	6 ,,
Alcohol	½ ounce.
Ether	½ ,,

The solvents may be methylated if the operator do not object to the vapour. The result will not be affected in any way. This collodion keeps well, and is better after standing a month or two.

By calculation it is seen that it requires eleven grains of nitrate of silver to convert the bromides in each ounce into bromide of silver; and, to ensure a slight excess of the former salt, it is better to add from half to one grain more. Eleven and a-half grains will be found a good working quantity.

The nitrate of silver is to pulverised very finely. Some mortars are not made with the same curve as the pestle, and with these the operation is rather tedious. A good method is to grind the bottom of a large stopper flat on the side of a grindstone, and use it as a muller on a slab of strong coarsely-ground glass, six or seven inches square. As the whole surface of the stopper is in contact with the ground glass, the nitrate of silver is readily reduced to fine powder.

In a non-actinic light add the proper number of grains of the powder to each ounce of collodion required. If in very fine powder, at the end of about two hours, with occasional shaking, all the bromide will be converted into bromide of silver, and there will be a slight excess of free silver.

A portion poured on a plate of glass leaves a creamy film similar to what is produced by using a bath. If the resulting film be not creamy, but present a thin blue appearance, it will most probably be because all the bromide salts have not been decomposed—perhaps in consequence of the nitrate of silver not having been in sufficiently fine powder; and the remedy will be to shake for a longer time, in order that the larger particles of nitrate of silver may present fresh surfaces to be acted on by the bromide. With the collodion made as recommended, the desired condition is usually arrived at in two or three hours.

If the quantity of bromide in the collodion be not known—as, for instance, when it is bought—there need be no difficulty. The best way to proceed is to take an ounce of the collodion, and add to it a given quantity of the nitrate of silver (say eleven grains) of course in the fine powder. After the usual time, shaking at intervals, pour about six drops into one and a-half or two drachms of water, stir with a glass rod, and filter through a scrap of filtering-paper into a clean glass measure. Test this for free silver by pouring in three or four drops of a solution of some bromide in water—strength about ten grains to the ounce. This solution is used in the development of the plates, so is generally at hand.

If a slight turbidity make its appearance, the collodio-bromide may be used with confidence. If the solution remain clear, it will indicate that the bromide is still in excess, and more silver must be added, and well shaken, until, on further trial, it is found, by the turbidity, to be in excess. It will be easy, on preparing collodio-bromide again with the same collodion, to use a grain or two more silver.

Manufacturers of collodion for this process should put on the labels the quantity of nitrate of silver required to convert the bromine into bromide of silver, leaving it to the judgment of the photographer to employ what excess he thinks proper. It is a good plan for beginners in the process to test in the above manner every batch of collodio-bromide made. Indeed, there is so little trouble involved that I generally make use of it, in order that I may know when the bromide salts are neutralised, for creaminess is not a criterion.

The collodio-bromide is most sensitive when there is an excess of nitrate of silver; but it is not advisable to have this more than about one grain to the ounce. Good pictures have been taken when the bromide salts have been in excess, the plates being insensitive in proportion to it. A greater excess of silver than that mentioned above, whilst conferring sensitiveness, necessitates long washing and soaking in water before applying the preservative, to prevent stains. In developing, also, it would be necessary to use much bromide to prevent fogging.

As the collodio-bromide deteriorates with keeping, it is not advisable to make more than can be used at once. It gives the best results when freshly prepared. There will be little difference in it for twelve, and it will be usable for twenty-four, hours; beyond that time it is not much to be relied upon.

A recent writer on the process has recommended that a portion of each batch should be kept to use with the next, as a sort of leaven, by way of obtaining creaminess. Creaminess can be obtained without this practice, which is so opposed to the experience of the best workers that I need not further allude to it except to point out what is to be avoided.

The process is capable of endless modification by adding various substances to the collodio-bromide. There being no nitrate bath to be spoiled with any organic matter, there is plenty of scope for ardent experimenters in this direction.

When the process was new, Mr. Sayce published some experiments he made with such substances as tannin, resin, gum, and honey, in the collodio-bromide, both with and without washing. He obtained good results with the tannin, but found he could not dispense with the washing. It is true he afterwards gave it up as possessing no advantage over the ordinary process. Still, I am inclined to think improvements will yet be made by this means.

The part of the process I have briefly described is that in which it principally differs from other processes, and also that in which its chief advantages are found. These may not strike anyone not practically acquainted with the process as very great. A trial will, I believe, be very convincing on this point.

To be able to dispense with that source of constant trouble, the nitrate bath, is so contrary to one's photographic faith as to be, in my opinion, the main cause of the process not being more generally worked—photographers viewing with distrust such innovations.

Lastly: I should not omit to call attention to another of its recommendations, which it will be conceded is not slight, and that is the certainty of every plate made with a batch of collodio-bromide being the same; so that, if out of a dozen, one upon trial turns out well the remainder may be guaranteed. W. H. Wilson.

A HALF-HOUR WITH "CLERICUS."

Among the numerous friends who occasionally favour us with a visit, no one is more welcome than "Clericus," whose conversation and suggestions (which are as compressed as the notes of a shorthand writer) invariably leave most pleasant reminiscences.

A few days since we were favoured with a flying visit by our friend, and during anything but a protracted conversation—in which, however, we managed to get through an amazing variety of subjects—the following topics were talked over:—

Old Collodion for Cleaning Plates.—Who that has employed old collodion for cleaning his plates has not had his "eyes bedewed with tears?" The cleaning of plates is about the only use to which old collodion can be put; but when it is decomposed it renders this an operation exceedingly painful to the eyes. "Clericus" finds that a small portion of powdered cyanide of potassium added to the collodion quite prevents the eye-destroying and tear-engendering tendency it previously possessed. Besides, the addition of the cyanide improves its plate-cleaning qualities, and thus we can "kill two birds with one stone."

Carrier's Paper.—Our friend speaks strongly in favour of this paper, but he finds a difficulty attendant upon it, viz., the want of a really safe toning bath. The formula given along with the paper he considers, from its nature and composition, to be objectionable, and is desirous of knowing if any photographer has succeeded in obtaining the best class of tones from any of the ordinary or modified gold-toning formulæ in common use, and if so, how is the bath composed.

Filtering.—We are reminded by "Clericus" that a rapid filtering apparatus, almost similar to that described by us at page 107 as having been devised by Professor Bunsen, of Heidelberg, was sketched and given to us by himself more than a year ago. To this we readily plead guilty, for the practical suggestions of our friend are so numerous that unless we have literally note-book in hand we are very apt to overlook some of them. By his plan the exhaustion was effected by a double syringe India-rubber ball, by the breath, or by a common exhausting syringe.

For bath filtering he uses a funnel, with two or more thicknesses of filtering paper. For collodion, a tall upright glass tube about fifteen inches high and one inch in diameter, pointed at one end so as to pierce the cork. For very stubborn collodion, he passed it through two layers of sponge, with an intermediate layer of washed white-alum bay fine sand.

Collodion.—Despite the most severe filtering, there are samples of collodion, even from the best makers, which contain fibres of undissolved cotton. The microscope gives undoubted testimony that this is so, and very, very difficult are they to be got rid of, being so eel-like in their nature. For microscopic purposes he puts the pyroxyline in a fine muslin bag and suspends it in the mixture of alcohol and ether; after a short time, you will see the dissolved pyroxyline threading its way through the ether and alcohol. When

you think enough has been dissolved, try a plate, and, if satisfied with its density, throw away the residue in the bag.

For all dry-plate work he uses his old lawn handkerchiefs converted into pyroxyline.

Ammonio-Nitrate Bath.—Of this he cannot speak too highly; it is mentioned in the Journal of Jan. 22nd of the present year. He gives the formula in the fewest possible words:—Make as many ounces as you please of ammonio-nitrate of silver, taking care that the silver is slightly in excess—one drachm of nitrate of silver to the ounce. Make a similar quantity of plain nitrate of silver solution and of the same strength, and add the two together. This bath clears itself spontaneously, and the oxide of silver thrown down dissolves at once in nitric acid, and can be thrown into your chlorided bath for such residues. One minute suffices for floating your paper, which is a great gain. Sutton's patent paper, under ordinary treatment, did not, in his hands, give satisfactory results; but with the above bath and the chloride of calcium toning bath he gets very fine results. This toning bath is Mr. Heisch's. *Vide* THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, page 64, *On Printing and Toning*, by Mr. Foxlee.

Collodionised Paper.—That made by Obernetter, of Munich, gives the finest results "Clericus" has ever seen; but the manipulation is troublesome, and the film curls up and splits off from the printed paper. For printing microscopic objects it is unrivalled. Our friend pronounces his opinion after a sufficient number of experiments of Harnecker's collodion for the dry process, which, after sensitising, it is said, only requires washing, and also what he thinks of Talbot's new toning salt.

HOW TO REPAIR GAS BAGS.

As information is required concerning the repairing of gas bags, I am glad to be able to give it to the readers of this Journal.

First: let me explain that gas bags are almost universally made of unvulcanised India-rubber, and all such can be repaired by the plan indicated below. If made of vulcanised rubber, it is out of the question. There is no advantage in vulcanisation, except that of increasing the price.

First procure a piece of two or three-ply waterproof cloth—that is, cloth with alternate layers of canvas and India-rubber; if there be any difficulty in procuring it, I can send sufficient to any correspondent, by post, for a few pence. Cut a piece somewhat larger than the hole to be covered; wet one side freely with some mineral naphtha or benzole, and, with a dull knife, remove the surface cloth, which will be easily detached if plenty of the naphtha be used, and the India-rubber surface will then be uncovered free from the surface cloth. Do exactly the same with the gas bag, removing a piece of the surface cloth a little smaller than the patch. All that is then required is to bring the two adhesive surfaces together with pressure, and allow them to set for a few hours.

It is often a difficulty to find the place where a gas bag leaks. There are two plans of discovering it. The first and the most effectual is to put a little air into it and immerse in water, patiently turning it over till the bubbles which rise through the water are traced to the leak. But before repairs can be made, the bag must be dried; and it often happens that with a leaky bag this has to be done several times. The second plan is to fill the bag with hydrogen and apply a light; it requires care, and will answer for finding large leaks. Or, again, one's nasal organ may be used.

Gas bags are not things that last for ever. The oxygen acts on the cloth in the inside of the bag and entirely decomposes it, converting it into a white powder; and, although I have seen many gas bags in this state, I have not had an opportunity of dissecting one used under my own eye, but I fancy it often results from filling the bag without a cooler.

For permanence, there is nothing like a metal gas holder, such as shown by the enclosed sketch. I know of such an one that has been in use for many years. The only disadvantage attending them is that they take much more labour to work. A. PUMPHREY.

[We have received specimens illustrative of the process of repairing above described, which are at the service of those who wish to see them. We shall next week give an article descriptive of the metal gas holder alluded to by Mr. Pumphrey, with an engraving.—EDS.]

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

I BELIEVE I am warranted in saying that the *greatest* event of the past month has been a succession of storms, by which, I regret to learn, serious damage has been done to many glass houses. When a battle comes to be waged between a falling chimney-pot and a glass roof the resistive power of which can be roughly estimated without the aid of a treatise on dynamics, there can only be one result. Moral: insure the glass of the studio. In connection with meteorological phenomena, I saw in a paper a short time ago that a partially-developed earthquake, which visited some portions of this isle, made its advent under such circumstances and with so much "parade" as to knock down a camera and stand in the glass room of a photographer. This may or may not be true, but I certainly "saw it in print."

Mr. Sarony's idea—whether it be original and his own discovery, or, dating from "days o' auld lang syne," also said by Burns to be "a thousand years 'fore the creation"—is good in at least one thing: it has broken in upon our monotony, and has set thinkers a-thinking, writers a-writing, dreamers a-dreaming, and practical men a-working. Scientific men turn up their scrupulous noses at the crayon photograph and consider it quite unworthy of notice; enthusiastic friends of the process or its originator hail its introduction as something of a millenial type. My own opinion is rather more commonplace. I believe that Mr. Sarony is a shrewd business man, who knows well what will "go down" with the public; that he has hit upon something which tickles the public taste, which can be easily and cheaply supplied, and something which, successful in his own hands and with his own customers, he offers to his brother photographers for a moderate consideration. As a matter of business this is quite right. From what I can see the Sarony photographs are likely to become the means by which a good deal of money can be coaxed out of the purse of the public into that of the photographer, and it is only right and fitting that a gentleman who has shown photographers how to undo the purse-strings of society should receive an acknowledgment in the shape of a small percentage on the emoluments thus derived. The specimens of this process which I have seen are good, and appear to be much admired even by "artists of the brush."

Will Darker's new lime light "without oxygen" answer for the magic lantern? This is the chief point in connection with the new light to interest photographers. The idea of making a pair of common bellows costing a shilling or two supersede gas bags and retorts —not to speak of the terror which all but "old stagers" feel when exhibiting the lime light—is really one which is too good to be lightly thought of. The saving of human life (for explosions *do* occur sometimes) is something; the saving of one's money is also something; but the saving of trouble! who can rightly estimate that? I look forward with intense interest to the evening when this light is to be publicly exhibited at the South London Photographic Society, where I believe it is to make its *début*. When this takes place I shall have more to say about Darker's new lime light.

The new carbon process of Mr. J. R. Johnson deserves a passing word from me, although I suppose, from its having been published at the meeting of the Amateur Field Club, it will be described in your forthcoming number. I have seen several pictures produced by the new process, and find them, speaking negatively, to be not inferior to silver prints. Report speaks highly of the simplicity of the means employed in their production. Much was at one time written respecting the time when, in the course of its triumphant progress, carbon printing was to have swept before it silver printing in every shape. One enthusiast was so far carried away by an anticipatory mental glance at carbon printing as to put on record the prediction that, on the first of July, 1858, the process of silver printing would be "swept away and superseded by another." When prophesying it is a safer proceeding to give dates of accomplishment a "wide berth;" for even in photography, as well as in matters of theologic history, one is apt sometimes to get rather loose in one's reckoning. This by the way. From what I have heard of Mr. Johnson's process, if it be not destined to supersede silver printing, I don't think I shall to any extent jeopardise what little reputation I enjoy as a prophet if I say that it will soon be much more extensively employed than any other carbon process. One of the most delightful little pictures I have ever seen was a glass transparency by this process backed with writing-paper. *Apropos* of the subject of carbon printing, I hear that a gentleman whose name has been mixed up with the introduction of carbon printing, Mr. Blair, of Perth, is about to issue a historical work on the subject. I once read in your pages an article descriptive of a method of rendering paper translucent, introduced by that gentleman, which pleased me much. I practised it a good deal, and, if you make no objection, I shall at some future time devote a short article to an account of my experience with it.

NEWLY-PATENTED PHOTOTYPE PROCESSES.

We now present our readers with two processes for producing printing surfaces by means of photography. They have both been recently patented, and, so far, may be considered as new processes.

In the one which we give first—that of Messrs. Fruwirth and Hawkins—the points of difference between it and those which we have frequently published may be said to consist in using Nuremberger glue instead of Scotch or Russian glue as an addition to the gelatine and gum hitherto employed. Instead of the Nuremberger glue, the "best French transparent glue" may, it seems, be substituted. This substance, however, has already been frequently employed for the same purpose. Albumen is also used, but this, too, is, we fear, no new thing.

A novelty certainly, if it be not an improvement, consists in mixing up with the sensitive coating mixture a certain proportion of hyposulphite of soda and chloride of ammonium. The other parts of the process appear to us to be similar to what has been previously employed. The details, however, differ in some apparently unimportant respects; but, as in other things, the whole virtue of the process may lie in these.

Respecting the other invention—that of Mr. Argamakoff—whatever may be the merit of his process, he has commenced by giving utterance to a grave blunder, which would almost induce us to believe that he is quite unacquainted with what has for years been familiar as "household words" to every reader of periodical photographic literature—the expression being that the property of sensitised gelatine, swelling or not swelling, when immersed in water, according to the previous action of light, "has as yet been practically unapplied." Now, this action of sensitised gelatine is one of the most commonplace facts of the day, and, so far from its having been "practically unapplied," we have, almost within reach, upwards of a score of photo-engravings and phototypes which owe their existence to this property; and nearly a dozen patents have been taken out for various ways by which it can be applied.

In like manner Mr. Argamakoff is in error in patenting as a novelty the compound of wax, gutta-percha, and oil, described in the specification, for obtaining a cast from the swollen gelatine; for, not only was it employed in the printing establishment of Herr Paul Pretsch, in which it was introduced by its inventor, Mr. Dallas, but its preparation was well known and explained to the visitors to that establishment. The other points of the invention will be estimated by our readers at their correct value.

On the principle of the true use of language being to hide one's thoughts, a waggish patent agent says that a skilfully-drawn-up specification can be so constructed as to mystify the public as to the real point of value in an invention, and prevent them from utilising it. If this be the case there are some "clever" patent agents moving among us at the present time—a conclusion which will be forced upon those conversant with phototype processes after they have completed the perusal of the specifications appended.

The first is that of Messrs. Fruwirth and Hawkins:—

Our invention of *An Improved Process for Producing Raised Printing Surfaces* has for its object the production of metallic surfaces in relief suitable for surface printing in an ordinary letterpress printing press, by the combined use of photography with a process somewhat resembling in its main features the known glyphographic process for the production from engraved plates of other plates or blocks with the design in relief, so as to be suitable for printing in typographic presses. Various attempts have been made to produce printing surfaces from plates on which a photographic picture has been obtained in any of the known ways, and this has been effected by first removing from the sensitive surface on which the photographic image has been produced such parts as have been unaffected by the rays of light, and then taking a cast or electrotype mould therefrom. Such processes, however, have not been found to be of any practical use, as it is impracticable to obtain sufficient relief, and the high lights are consequently very imperfect.

In carrying out our invention we first produce by any of the known photographic processes a negative on glass or paper (or any transparent substance) of the print or drawing or object it is intended to produce in relief as a printing surface. The success of the printing process depends mainly upon the negatives, and every means must be taken to render them as intense and black as possible. The negative must be capable of giving positive impressions by transmitting chemical rays of light in the well-known manner. With this negative a reversed image is produced on a copper or any other metal plate, glass, or ebonite, paper, or flexible substance according to the work it is required to produce.

To render the surface sensitive and suitable to receive the photographic image, a paste is made composed of bichromate of potash and a salt of soda or ammonia pulverised and mixed with a solution of gum or any suitable glutinous or organic substance which is not soluble in alcoholic mixtures. This paste is composed of the ingredients above mentioned, mixed in about the following proportions, viz., one ounce of bichromate of potash, half-an-ounce of hyposulphite of soda, and half-an-ounce of hydrochlorate of ammonia, commonly called sal ammoniac. These ingredients are to be pulverised and dissolved by means of gentle heat in a mucilage composed of one ounce of albumen, two and a-half ounces of gelatine, and two and a-half ounces of Nuremberger glue or best French transparent glue dissolved in from two to three pints of water. This paste is spread evenly over the metal or glass plate, and artificially or spontaneously dried.

The plate thus prepared is then to be brought in contact with the aforesaid negative or transparent medium in an ordinary photographic printing-frame, and exposed to light for a short time until the photographic image has been produced. When removed from the printing-frame the prepared surface is to be covered with a mixed solution of alcohol or methylated spirit with acetic acid, which, when applied to the bichromate surface, all the unaltered bichromate will be dissolved out, leaving behind a faint reversed impression, which is capable of being transformed into a surface in relief. This surface in relief is obtained by means of a process somewhat resembling in the main features the well-known glyphographic process, and will be hereafter explained.

For some kinds of work we employ a paste composed principally of equal parts of dissolved gelatine and gum or other glutinous substance mixed with one-eighth part of bichromate, thus forming a paste which may be spread upon ebonite, glass, or any other material. The proportions we prefer are as follow:—

Two and a-half ounces of each of the solutions of gum, gelatine, and Nuremberger glue, one ounce of solution of bichromate of potash, and half-an-ounce of oxalic acid. The mixture may be thinned down to any desired extent according to the season of the year and the temperature. This paste must be dried on the plate as in the former instance, and after exposure to the action of light under a negative or positive taken for the purpose, the plate is put into a dish with cold water, which will dissolve out the unaffected bichromate, after which the surface must be dried. This will produce a surface from which a cast may be made, but in some cases the high lights should be built up with wax or varnish to a certain extent, care being taken not to cover any part of the picture. The plate must then be put into water and allowed to swell, after which it may be taken out and carefully dried with blotting-paper; the surface is then to be brushed over with a solution of ox-gall and coated with a substance or composition consisting of one part of sulphur to four parts of refined tar melted with a gentle heat, during which a small quantity of India-rubber or gutta-percha solution may be added. Or a cast may be taken in plaster of Paris, as in making stereotype plates. From the plastic or other mould thus obtained a stereotype cast in intaglio in metal may be taken, and if any defects in the plate are found they may be repaired by hand.

In order to obtain a surface for printing by a letterpress machine we first of all build up the fine work by passing over the surface a roller covered with copal or other varnish, and this operation is repeated until a sufficient thickness or depth is obtained. The high lights may be still further built up by the application of varnish with a brush. When the intaglio is completed we prepare it to receive a coating of copper by the electrotpye process, and on the back of the film or sheet of copper thus produced is to be placed a sufficient thickness of type metal to give strength to the copper, which, when mounted on a wooden block, will be ready for printing in an ordinary printing press.

Having now described our invention of *An Improved Process for Producing Raised Printing Surfaces*, and having explained the manner of carrying the same into effect, we claim as the invention secured to us by Letters Patent, producing surfaces in relief (suitable for printing in ordinary typographical printing presses) by the combination of any suitable photographic process with the glyphographic process, as herein set forth.

We now subjoin the specification of Mr. Argamakoff:—

This invention has for its object improvements in the production by means of photography of printing surfaces adapted to lithography, typography, and chromotype. By application to lithography is to be understood the transfer of the drawing from the copper plate to the stone.

The improved method is based on the property, as yet practically unapplied, of gelatine when prepared in a certain way not swelling from moisture in those parts in which it has been acted on by light, and not melting when any hot liquid substances are poured on it, such as tallow, compounds of gutta-percha with wax, or any other substances capable of serving, whether directly or indirectly, the purpose of a matrix for obtaining a copper galvano-plastic plate. The method includes (*a*) an application to litho and typography, (*b*) an application to chromotype, and (*c*) to printing from nature by means of gelatinous ink.

The first part of the method consists of the following ten operations:—1. Covering plate glass with a layer of gelatine. 2. Drying the gelatine layer. 3. Preparing the gelatine layer, *i.e.*, making it sensitive to light and incapable of dissolving when the gutta-percha is poured on it. 4. Exposing it to the light under a photographic negative or positive taken from an original made with pen or pencil in those cases when the drawing is to be on a reduced scale. When, however, the drawing is to be of the same dimensions as the original I employ the

original itself, if on thin paper. 5. Revealing the drawing by means of a moist surface (glue or gelatine). 6. Impressing the drawing on gutta-percha. 7. Increasing the relief of the gutta-percha plate by hand. 8. Obtaining the copper matrix. Operations 7 and 8 are omitted in those cases when in order to obtain the printing surface I make use of the photographic positive or of the original executed on thin paper. 9. Obtaining the copper plate or printing surface in relief (*cliché*). 10. Increasing the relief of the copper plate or the *cliché* by corroding the ground.

The method as applied to chromotype consists of the following operations:—1, obtaining an outline plate in relief (*cliché*) from an outline original; 2, printing on paper from the outline *cliché* by means of a blue or other non-photogenic colour; 3, preparing the originals for the simple colour contained in the drawing; and, 4, preparing according to the above-described method *clichés* for printing the simple colours separately.

The Method as Applied to Lithography and Typography.—1. *The Gelatine Layer.*—I take 1 part of the best gelatine and wet it in 10 = 15 parts of water of the usual temperature, and at the expiration of a quarter of an hour I warm the water to 70° R. When the gelatine has cooled sufficiently I add strong liquid ammonia, and cool it to a temperature of 30° R., and then pour a thin layer of gelatine on glass laid horizontally. The use of ammonia is indispensable in order to avoid a film when the drying of the glasses is produced very slowly, and also for the more convenient pouring of the gelatine on the glass.

2. The drying of the gelatine layer is performed in a dry air at the usual temperature, and is effected in one night.

3. *Preparing the Gelatine.*—In order to render the gelatine sensitive to light, and to make it incapable of melting when hot gutta-percha is poured on it, I wash the gelatine layer in a solution consisting of one part of bichromate of potash or ammonia, three parts of alum, and all this is dissolved in a sufficient quantity of water. Previous to use the entire compound is diluted with twenty or ten parts of water, and the gelatine layer is wetted during one or two minutes.

4. *Exposing it to the Light.*—The gelatine layer prepared in the above way is slowly dried in a dark room, and then in order to obtain a printing surface is exposed to the light under the original made on thin white paper, or under the photographic positive or negative, the use of the positive or the negative being dependent upon the circumstance that in order to obtain a copper plate the light must act on the drawing itself, and in order to obtain a *cliché* on the ground of the drawing. Care must be observed that there should be no dust between the gelatine and collodion layers, and after both the glasses have been placed in the printing-frame and subjected to firm and equal pressure they are exposed to the light from one to twenty-five minutes, according to the strength of the light and the quality of the photographic glass.

5. *Revealing the Drawing.*—Those portions of the prepared gelatine which have been exposed to the action of light lose their capability of swelling from moisture, while the remaining portions preserve that capability. Therefore, by dipping the glass with the gelatine layer in water, it is possible to reveal the drawing, but by such means it is impossible to obtain anything fit for use, as the gelatine swells more in those parts where the drops of water adhere than in other places. This difficulty is completely obviated by pouring on the prepared layer of gelatine a thick layer of glue or gelatine simply dissolved in hot water, and cooled to a temperature of 33° R., taking one ounce of gelatine to four ounces of water. When the gelatine thus poured on has cooled it can be easily taken off the prepared layer, when an excellent drawing is obtained, either in relief, or hollowed out according to which portion of the gelatine has swelled, *i.e.*, the one corresponding to the ground or to the drawing. Independently of this action the moist surface imbibes the bichromate of potass in the parts not acted on by light, so that after the drawing has appeared the glass may be kept in the light, and whenever a moist layer is poured on it the drawing will be revealed, or, in other words, the glass may serve several times for obtaining the gutta-percha plate.

6. *Impressing or Transferring the Drawing on Gutta-Percha.*—As soon as the moist surface is removed the following compound is to be poured on the glass, viz., four parts of wax, one part gutta-percha, and one or three wine-glasses of oil. This is the most important point in the method. No one engaged in gelatine methods has been able to render the gelatine at the same time capable of swelling and incapable of melting from hot substances (and to make immediate use of the relief of the gelatine layer is impossible, as it quickly disappears entirely). This is why no one has practically availed himself of the non-swelling of gelatine, but only of its indissolubility in water after the action of light.

7. *Increasing the Relief of the Gutta-Percha Plate.*—The relief obtained on the gutta-percha is not sufficient to admit of its being applied to the printing press and to chromotype purposes; I therefore first hollow out by hand those portions in the gutta-percha which correspond to the large white spaces in the drawing.

8. *Obtaining the Copper Matrix.*—I then carefully cover the gutta-percha with blacklead, and plunge it into a copper bath to obtain the copper matrix; and when the seven and eight operations are omitted I obtain not a matrix but directly a copper plate or *cliché*.

9. *Obtaining Copper Plates and Clichés.*—After having covered the copper matrix with turpentine and allowing it to evaporate, I slightly cover the copper matrix with blacklead and again plunge it into the bath in order to obtain the copper plate or *cliché*. When the copper has become deposited in a sufficiently thick layer, I detach the plate from the matrix. In this state the *cliché* is still unadapted to typography, it being necessary somewhat to raise the relief.

10. *Increasing the Relief by Corrosion.*—For this purpose the entire plate is covered with asphalte varnish, or any other varnish non-conductible to electricity; I then clean the varnish with charcoal from the raised drawing, leaving it on the ground. The drawing is then gilt, silvered, or is covered with other suitable substance, the varnish is washed off with benzine or some other suitable substance, and the copper ground is corroded with the aid of galvanism, nitric acid, or any other acid which does not act on the layer preserving the drawing. The *cliché* is then mounted in the usual way.

1. *The Method as Applied to Chromotype.*—From a coloured original an outline drawing is prepared, and from it, by the above-described method, an outline *cliché* is made.

2. From this outline *cliché* an impression is taken on paper in blue or other non-photogenic colour.

3. On each such impression the portions corresponding to one of the several simple colours of the original are covered with Indian ink, and thus originals are obtained consisting of spots.

4. From which *clichés* are made separately for each simple colour.

I consider it necessary to add that the above-described method is quite original, although other gelatine methods are in existence.

In the process *a* the operations marked Nos. 1, 3, 5, 7, 10, and the entire method of chromotype, have nothing similar in existing methods. If the substances entering into the solution in process (No. 3) be taken in suitable proportions—if the drawing be not revealed in the way described in No. 5—if the drawing be received on any other material but grease and gutta-percha, as in No. 6, then the entire process not only loses its adaptability to typography but becomes perfectly useless for practical purposes.

The Method Adapted to Printing from Nature by Means of Gelatinous Ink.—A photographic negative is taken from nature or from a painted original, and then, according to the above-described process, a metal plate is prepared in which there will be concave spaces corresponding to the shades of the original, which concave spaces will be deeper the stronger the shades are. The metal plate is covered with a thin layer of benzine or collodion, and when it is dry gelatinous ink is poured on it. The paper is then placed on a plate, and they are subjected to equal and strong pressure in order to squeeze the ink out of the elevated portions. When the ink is quite dry the plate is taken out of the press, and on the paper will be found an image resembling a photograph. For durability it is well to add to the gelatinous ink a small quantity of alum.

"OUT INTO THE WEST."

No. II.

PEMBROKE.—Being in rather a "large way" on the morning which I propose to give up to this excursion, I despise the mode of transit offered by the Pembroke and Tenby Railway Company, and, instead of that mode of conveyance, secure the services of a pair of small horses, with carriage and juvenile driver complete. Another guest at our hotel turns up at the last moment, and is starting for Pembroke by rail. I wish for his company, and obtain it by giving glowing descriptions of the beauty of the proposed route, as seen from the high road; and contrasting it with the mere barren waste which the same locality presents to the eye of the traveller by rail. We are quite a party. My newly-caught friend and I occupy the body of the carriage. The driver's seat accommodates that official and my valued assistant. The last-named young gentleman is attached to the fishing interest in Tenby; but when I am within reach he makes it a point of honour, never to be departed from, to keep me properly in hand from the beginning to the end of my stay. Either I must go out fishing with him and his mates, or he must go with me photographing. Either plan will do; but no other possible arrangement can be entertained for a moment.

When the party have got about two miles out of the town, the vicious little mare who officiates on our near side turns restive and kicks off a large piece of our dashboard. Continuing to lash out, she endangers at once my photographic apparatus and my "man Friday," both being within her reach. Luckily she gets fast, with her leg over the pole. Taking advantage of this state of things, we all alight, take out the horses, and, after re-arranging the harness, put them to again. After this we go on very well.

The village of Lamphey is passed on our route. Ruins of an old palace exist here; but, judging from the distant view which we get of them, they do not seem to be worth much trouble on the part of photographers on the look-out for material. Lamphey Church would make a nice photograph; but at present some poplar trees near it are all in commotion in the wind, and would spoil any picture attempted now.

Arriving at Pembroke we find a fine old castle and the remains of a priory, but nothing else worth mentioning. The chief speciality of the castle is a large and lofty "keep" in the form of a truncated cone. Besides this there is a fine gateway flanked with towers, all in good

preservation. Henry VII. was born here. In passing from this, his cradle, to his gorgeous grave in Westminster Abbey he certainly changed his quarters for the better! Pictures of the "keep" and the gateway are taken.

The castle looks grandly from across the water—a branch of Milford Haven—and would make a fine photograph from that point of view. Another good picture might be taken from the site of the old priory, comprising the church (now remaining in repair) with the ruins of the rest of the buildings in the foreground, and with the castle and town to form a background. However, on my visit the weather proves awkward. Rain falls and puts a stop to my operations. My friend, who probably fears further complications with the restive mare, deserts me, and goes on, contrary to my advice, to that uninteresting place, Pembroke Dock. He returns to Tenby ignominiously by train, and is, I am almost glad to say, disgusted with his day. Meanwhile, I have luncheon at the "Lion," and, having provided for the wants of my two boys, start for home. The vicious mare, mollified by rest and a feed of corn, and having her head turned towards home, forgets her ill-humour and does not cause any further trouble.

And now, for the present, my labours with the camera are over, and that instrument, which has been my companion on so many occasions, may rest awhile. Likewise shall my tent—so painfully suggestive to little boys of a "Punch and Judy" show—repose in its obscure retreat, the carriage house of my hotel; for I am off oyster-fishing in the bay, two miles hence, under the lee of Caldy Island.

Does the reader know how to catch oysters? Probably not. Then let him accompany me for a lesson; for an hour's practice is worth a month of theory. Besides, if I can secure the company of the reader, our adventures may be recorded with all the dignity of the editorial "we."

It is the time of breakfast at our hotel. From the open windows we command a view of the harbour, whence are issuing a dozen or more boats, each hoisting two brown sails. The larger vessels are destined to take soles, turbot, congers, and what not, by means of a trawl-net; the smaller ones are bound for Caldy Island, near whose shore they will spend the day dredging for oysters. We will join the latter party. Moored to the pier, and rubbing off her newly-applied paint on the wall thereof, our gallant craft, the "Spartan," waits our arrival.

Tenby does not yet muster a *table d'hôte*, so before leaving we must have a two minutes' interview with the waiter respecting the nature of our dinner and the time of its taking place. This settled, we walk down to the pier just in time to meet our three mates, each carrying a waterproof suit of clothing made of calico saturated with boiled oil and dried. We are provided with mackintosh coats which will keep us dry.

There is not much wind, and our boat moves somewhat languidly out of the harbour. We throw some water on the sails, which makes them take more hold of the scanty breeze. After a while we make better way, and get on rapidly towards the scene of action.

Let us examine our fishing tackle. It consists merely of a carpet-bag-shaped basket made of strong, square iron links, something in the style of chain armour on a large scale, and measuring about four feet each way. It is fastened to a long rope, the other end of which is tied to a ring fixed in the fore part of the boat. A simple windlass and pulley afford the means of hauling up the "dredge" when loaded.

Arriving at the windward side of the oyster bed we lower the dredge to the bottom of the bay, and then proceed to tow it along till we get to the other side of our fishing-ground—perhaps about half-a-mile distant. Then we lower the mainsail, haul up the dredge, and empty its contents into our boat We then hoist our canvas and tack about till we get to our former starting point. Meanwhile we examine our "take." Stones and empty oyster shells form the great bulk of our haul. But we have got thirty or more very large oysters, which are put on one side, and then all the stones and rubbish are thrown overboard.

Many other boats are out, and often come near enough to us to allow of a little friendly conversation between us and our fellow-workers. Some of the boats are only carrying passengers who are out pleasuring. One of these approaches us, and its occupiers prefer a mild request for a few oysters; so we pitch some of our best into their boat, and then they depart.

Once or twice the dredge gets fast among the stones at the bottom, and then we are brought to a standstill. Suppose we should not be able to get the dredge loose—what must be done in such case? Must we cut the rope, and let the dredge remain below? Or must we follow the example set by fishermen in difficulties long ago, and "beckon to our partners in the other ship" for their assistance? Happily we do not now require an answer to these questions, for we soon get loose again and pursue our avocation. Sometimes a higher wave than usual comes and moistens us with a dash of salt water. Never mind; we have provided a flask of brandy and water (to keep out the cold), and a piece or two of bread. Upon these provisions we will lunch, and will vary our bill of fare by the addition of two immense oysters from our store.

Truth compels us to say that the oysters have *not* a fine flavour at all. They would not pass muster at the supper-table for a moment; in fact, their proper sphere of action is that of scallops or oyster-sauce. But the sea-breeze takes off any tendency to squeamishness on our part. So we manage to get on pretty well; and, besides, there is one good point about the oysters—they are undeniably fresh!

The breeze gently dies away, and we begin to be scarcely able to tow along our dredge. The other boats gradually leave us, one by one. Let us turn our vessel's head towards home, lest the breeze should entirely fail, and oblige us to go paddling into Tenby, by means of our oars. The tide has left the harbour when we arrive, so we must anchor outside, and land in a small boat which puts off from the pier for us.

On landing our party breaks up. The fishermen will go home to snatch a hasty dinner, and will then eagerly take up their remarkable position on the wall, already named. There they will remain till the rising tide will allow the "Spartan" to come into the harbour. Then will our spoils of the morning be displayed in baskets on the pier, and sold at the rate of four or five shillings per hundred of six scores. We, the amateurs, retire to our hotel just in time to share in the distribution of the letters (for the post has just come at 3 p.m.), after which we discuss, with satisfaction, the dinner which has been before alluded to. That over, we have a long walk, and a look at the town by gaslight; and then finally retire to our snug coffee room, with the thought of a possible adjournment to the billiard-room as the evening advances.

The reader will probably be of opinion that my late intercourse with nautical people has given me a tendency to spin rather long yarns. To his satisfaction I now announce that a few more words will be all I have to say, for I am off from the station at eleven a.m. My excellent "man Friday" has come to see me off, and to exchange a final greeting with me. I have heaps of luggage, which be the greatest possible nuisance; for my journey will occupy me for ten hours, and will involve *eight* distinct changes of carriage.

Gentle reader, I pray you, of your charity, wish me *bon voyage!*

EDWARD CHAWNER.

Contemporary Press.

SOLUTION.

[SCIENTIFIC AMERICAN.]

EVERY one is familiar with the phenomenon of solution, but few except scientific men really know what a remarkable thing it is. We toss a handful of common salt into some water, and in a little while it has entirely disappeared. So far as our sight can determine it has ceased to exist. We can still detect its presence by taste, and by its effects upon other bodies; but until, by the aid of heat or some chemical reagent, we wrench it from the strong grasp of its transparent menstrum—we cease to see it.

So alcohol absorbs into itself camphor, and other gums or oils, and retains them. Add a little water to these solutions and you will immediately see the dissolved substances reappear like spectres, to again vanish upon the addition of more alcohol.

The analytical chemist knows well how to make such appearances and disappearances answer his inquiries, both as to quality and quantity, of any substance contained in a given mass which he examines. In fact, the deportment of substances in solutions in the presence of certain reagents forms the basis of one method of analysis.

One of the most conspicuous characteristics of a solution is transparency. This is a test as to whether a solid contained in a fluid is perfectly dissolved. Very concentrated solutions may intercept, to a great degree, the transmission of light—molasses is an example—but if the solution be perfect, thin layers will prove to be transparent. Any opacity or cloudiness is an index that either solid or vesicular matter is present. Solid substances when dissolved are changed into fluids. What is the agent by which the intense cohesion existing between the atoms of the most solid bodies can be so overcome? To this question science has, we think, yet given no satisfactory answer.

The only means known to us other than solution by which solid bodies can be made fluid is heat. It is a well-ascertained fact that heat and cohesion are opposing forces, but in the phenomenon of solution sensible heat does not appear except in such quantity as may be accounted for by the increased density of the entire mass of the solvent and the substance dissolved. In cases where solids placed in contact become liquefied, we have decrease of temperature and absorption of heat; an example of this kind of action is the liquefaction of mixed ice and salt.

The books account for the phenomenon of solution by classing it among the manifestations of adhesive force. Cohesion is the attraction existing between molecules of the same kind at insensible distances; adhesion is the attraction existing between molecules of *different* kinds at insensible distances. A very slight consideration of the nature of these attractive forces, and their effects upon the condition of material bodies, will show that solution involves something more than disruption of the particles of a solid by the superior adhesive force of a liquid.

A solid body is *solid* by virtue of the great cohesive force by which its particles are held together. When cohesive attraction is nearly or quite in equilibrium with repulsive molecular force, bodies assume the liquid form. Liquids may, therefore, be considered as practically without cohesive attraction, that attraction being neutralised by repulsion.

Suppose, now, the cohesive force in a solid body to be represented by 4, the superior adhesive attraction of some liquid for that solid to be 6, and the cohesive force in the liquid as neutralised by the repulsive force to be nothing. What ought to take place upon the immersion of the solid into the liquid as the result of cohesion and adhesion? The particles of the liquid adjacent to the solid ought to adhere to the solid so strongly that they could not be removed by an external force without rupturing the solid. If either body be acted upon by an external force, the rupture ought to take place in that body having the least cohesive power, *i.e.*, the liquid. A stick thrust into treacle is a good illustration of this action. When the stick is withdrawn it carries a portion of the treacle with it; the stick is not broken nor any of its particles removed.

But it may be said in this case the cohesive force acting between the particles of the wood is greater than the adhesive force of the treacle. Let us then suppose the adhesion of the treacle to the wood to be so powerful that the treacle cannot be removed from the stick except by scraping down into the body of the wood itself. If solution depends solely upon the fact that adhesion in the liquid is greater than cohesion in the solid, the stick ought in this case to dissolve. But in order that a substance may dissolve, its particles must not only be seized upon by the particles of the solvent, but conveyed away from their position in the solid to new positions in the liquid. We submit that adhesion accounts sufficiently for the seizure, but it does not account for the convection. Standing in a boat by the side of a wharf, a man may clutch a timber attached to the wharf with great force; he may, however, tug in vain to remove it, so long as the want of cohesion in the water upon which his boat is floating affords a resistance less than that which holds the timber to its place.

There must be some other principle involved in this matter. Something perhaps analogous to electrical attraction and repulsion, at least some force acting independently of adhesion which overcomes the cohesion of the solid.

PHOTOGRAPHY IN COURT.

PIRACIES—GRAVES *VERSUS* RITCHIE.

THIS case, which was before the court last week (*ante* page 148), is assuming a degree of importance not previously anticipated. The prisoner, Thomas Ritchie, of 7, St. Swithin's-lane, was on Monday last brought up on remand at the Mansion House and charged, as on the former occasion, with unlawfully selling photographic copies of copyright engravings, without the consent of Mr. Henry Graves, the proprietor.

Mr. Lewis, sen., appeared for the prosecution; and Mr. Chipperfield for the defence.

Mr. Boydell Graves, manager to his father, Mr. Henry Graves, produced the certificates of the registration as copyright of the following pictures, together with copies of each of them, and the pirated photographs:—*The Last Kiss*, by Miss Edwards; *The Morning Before the Battle* and *The Evening After the Battle*, by Mr. Barker; *My First Sermon* and *My Second Sermon*, by Mr. Millais, R.A.; *The Offer* and *Accepted*, by Mr. Faed, R.A.; *The Piper and Pair of Nutcrackers*, by Sir Edwin Landseer; *The Railway Station*, by Mr. Frith, R.A.; and *Waiting for the Verdict* and *The Acquittal*, by Mr. A. Soloman. When the prisoner was arrested thirty-seven negatives were found, many of them in the presses, and all piracies.

The defendant here denied having printed from any copyright subjects.

Maurice Fleishhacker, a picture-frame maker in North-street, Whitechapel, said he knew the defendant, who had a place of business in St. Swithin's-lane. On the 8th, 9th, 11th, 15th, and 17th instant, he purchased of him thirty copies of engravings belonging to Mr. Graves, including all those mentioned by the last witness. The large-sized pictures were sold at 3s. each.

Mr. Henry Graves said he was the sole owner of the copyrights of all those engravings. He had never seen the defendant before in his life, and had certainly never given him consent to copy them. He had been for some time prosecuting people who were robbing him every day. He did not own the paintings themselves, but only the copyrights. The first registration at Stationers' Hall proved the copyright.

Mr. Boydell Graves was recalled and examined. He said *The Morning Before the Battle*, by Barker, was a photograph taken from an engraving, and the engraving was made from the picture. Barker sold the picture, with the copyright, to Mr. Ramidge in 1863, by a memorandum in writing, and witness's father purchased the whole of the copyright and a half share of the picture from Mr. Ramidge. He believed the copyright was assigned to his father, but his father did not register the memorandum of assignment. His father had then an engraving made, and in 1867 witness commissioned Mr. Spencer to make a photograph of the engraving, under an agreement in writing. As to the *Evening After the Battle*, the same answers applied. *The Last Kiss*, by Miss Edwards, was a painting, and was registered as such. There was an agreement made in April, 1865, transferring all the copyright in the painting, which was bought by his father, and both the painting and the agreement perished in the fire at Her Majesty's Theatre. The engraving was put in hand immediately after the sale. In the case of *My First Sermon*, his father registered it as a painting in September, 1866, under an assignment from Moore, McQueen, and Co. (Limited), who had bought it from Mr. Agnew, and engraved it. He bought the copyright in the engraving, the engraving itself, and all the stock, under an agreement, which was also burnt in the fire. Mr. Agnew had bought the copyright from Mr. Millais. Witness's father also bought *The Offer*, by Faed, from Moore, M'Queen and Co., both picture and copyright, and he claimed the copyright in the painting. *Accepted*, by the same artist, was bought by him at the same time. His father bought *The Railway Station*, by Frith, from Mr. Flatow, the copyright as well as the painting, in July, 1863. It had been painted some years before, on commission from Mr. Flatow, and was exhibited in 1862. There had been an engraving taken before the transfer. About £24,000 altogether was involved in the purchase of the picture and engraving. His father bought *The Piper and Pair of Nutcrackers*, by Sir Edwin Landseer, from Mr. Flatow, viz., the copyright in the painting and the steel plate, which was then unfinished. The date of the agreement was July, 1865. In the cases of *Waiting for the Verdict* and *The Acquittal*, his father registered photographs from the engravings. Mr. Lucas, the builder, was then in possession of one of those pictures, and witness's father bought from him the copyright of the painting only. Mr. Lucas had bought the first picture, and afterwards gave the artist (Mr. Soloman) a commission to paint the companion. His father only claimed the copyright in the photographs in these cases. The photographs were taken from the engravings, and the negatives were delivered up at once.

Mr. John E. Millais, R.A., was then called by the solicitor for the defence, and, replying to him, said:—In January, 1863, I sold the picture, *My First Sermon*, to Mr. Gambart, reserving the copyright, which he did not think valuable enough to purchase. The copyright was mine, and he paid me so much less in consequence of my retaining the copyright in my own hands. Some days afterwards Mr. Agnew called upon me, and told me he had bought the picture from Mr. Gambart, and that, understanding Mr. Gambart had not bought the copyright, he desired to have it with the picture, and I sold it to him. He gave me a cheque for 100 guineas for the copyright, and I assigned it to him. The copyright, in fact, was paid for before the picture. I do not consider a picture completely sold until it is paid for, and my reason for saying that is, that I have more than once sold a picture in the same way as Mr. Gambart purchased in this case, and it has afterwards been thrown on my hands. I only agreed to sell Mr. Gambart the picture. Nothing was paid by him in the first instance on account of the price. On the 28th January, 1863, Mr. Agnew gave me a cheque for the copyright, and on the next day Mr. Gambart paid me the price for the picture. I painted *My Second Sermon* in 1864, on commission from Mr. Agnew, and it was sold from the beginning. Both pictures went to the Exhibition before they were delivered to the purchasers. In the case of *My Second Sermon* I assigned to Mr. Agnew the picture and copyright together. Before *My First Sermon* I had sold pictures, reserving the copyright. I had an agreement with Mr. Agnew for *My Second Sermon.*

Mr. Chipperfield said, a very important question in the case would be what was the benefit an artist derived from the Act of 1862, and he proposed to show what was the system before the passing of that Act.

Mr. Thomas Faed, R.A., was next called. He said he painted the picture, *Embracing an Opportunity*, which represented a girl writing a letter in a quiet way. It was about 31 × 21. He afterwards painted a smaller one on the same subject—a replica. He did not know who had the picture now. He sold both to Mr. Gambart: the larger one first, and that was in 1865. He sold him the picture and copyright included, and gave him a memorandum to that effect. In the same year, he thought, he painted a companion picture to *Embracing an Opportunity*, entitled *Perfectly Satisfactory*, which represented a girl reading a letter. Those pictures had since been known as *The Offer* and *Accepted*. There was a replica to the letter; and he sold them, pictures and copyright, to Mr. Gambart by a memorandum in writing, as before.

At this point the examination was adjourned for a week; and in the meantime Sir Benjamin Phillips said he would admit the defendant to bail in two sureties in £100 each, and himself in £200, after due notice as to the sufficiency of the sureties.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 7th	North London	9, Conduit-street.
„ 7th	Edinburgh....................	Hall, 5, St. Andrew-square.
„ 8th	South London	City of London College.
„ 8th	Manchester	Memorial Hall, Albert-square.
„ 8th	Pho. Sec. Lit. & Ph. Soc., Man.	Rooms, 36, George-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting of this Association was held on Tuesday last, the 30th ult., at the Free Library and Museum, William Brown-street,—Mr. O. R. Green, President, occupying the chair.

After the minutes of the former meeting had been read and passed,

the recommendations of the Council in reference to prizes were discussed, and it was decided to offer the following :—

1. A prize of the value of £2 for the best year's work, entirely the production of the competitor.

2. A prize of the value of £1 for the best picture not less than fifty inches area, entirely the work of the competitor.

3. A prize of the value of £1 for the best photograph under fifty inches area, the entire work of the competitor, except preparation of the plate.

4. A prize of the value of 10s. for the best transparency, the plate to be prepared by the competitor.

5. A prize of the value of 10s. for the most artistic photograph.

It was also decided to distribute these prizes at the meeting in November.

Further recommendations of the Council in reference to the issuing of a circular, and making the next meeting in April a popular one, so that members may bring their friends, were agreed to.

Mr. C. O. Ellison and Mr. Llewellyn Nash were elected members.

The paper of the evening was then read by Mr. W. H. Wilson; subject—*The Collodion and Preparation of the Collodio-Bromide* [see page 157], being the second of the series of papers on the collodio-bromide process.

A discussion ensued principally on the question as to the amount of free nitrate of silver desirable in the film. Opinions differed as to quantity.

Mr. Wilson thought that for beginners the excess should not be more than the amount mentioned in his paper.

Mr. Phipps said a convenient mode of testing for free nitrate was to dip a piece of clean copper into the collodion; this would be blackened if the slightest trace were present.

The following objects of interest were shown :—

By Mr. Watling: A photograph on glass accidently burnt in. A useless print having been thrown into the fire, the collodion film had been destroyed and the image fixed on the glass. It was sufficiently non-actinic to be employed as a negative, and a print from it was also shown.

By Mr. Forrest: A volume of photographic scraps.

On the motion of Mr. Phipps, seconded by Mr. R. Cooke, a vote of thanks was passed to Mr. Wilson for his paper, and the meeting soon afterwards separated.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 3rd ult.,—M. Teisseire presiding.

After the minutes of the last meeting had been read and confirmed, a letter was read from Dr. Liesegang, stating that he had forwarded to the Society some papyroxyline and collodio-chloride of silver, which were distributed amongst the members present, who undertook to examine them.

The Secretary then laid before the meeting a pamphlet accompanied by several photographic proofs, forwarded to the Society by M. E. Lacan, who had received them from Mr. Gaffield, of Boston.

M. Taylor, who had previously read this remarkable work, which was entitled *Action of Solar Light on Glass*, undertook briefly to explain its special object. For the last four years (he said) Mr. Gaffield had made the action of light on glass his study. He had already observed that certain glasses, originally without any colour, after a certain length of exposure to the sun took a violet colour; and one occasion is mentioned of glass taking a golden colour. Faraday, who had made some observations on the subject, remarked that a glass of a clear violet colour took a much more intense colour after eight months' exposure to the action of light. During twenty years' experience in the window glass trade Mr. Gaffield said he had met with very few cases of this kind, and he had attributed them to a defect in the quality of the glass; but he had more recently noticed a change of colour even in glass of the first quality, and it was that which induced him to make some useful experiments, of which his pamphlet contained the detail. He (Mr. Gaffield) passed in review various kinds of glass procured from different sources and of different qualities, and the modifications which, with greater or less rapidity, they underwent when under the influence of the light, and particularised some sensible alterations even at the end of a single day's exposure. He (M. Taylor) said that the importance of this treatise would escape no one present. Glass occupied too prominent a place in the photographic art for them not to study its different properties, particularly those of the glass of which photographic lenses, &c., were composed. The author, without pronouncing absolutely on the point, indicated by his observations that green glass was that least susceptible of alteration.

Photographic tableaux had been received with the treatise, representing the series of tones obtained, in the same space of time, on positive paper through glass of different countries and of different colours; likewise reproductions of sheets which had served as negatives.

These proofs were examined with interest, and

The Chairman thanked M. Lacan for his communication, and M. Taylor for the trouble he had taken in furnishing them with a *resumé* of the principal points.

M. Meynier called the attention of his colleagues to the letter M. Clement had written in reply to the observations he had presented to the Society on the chemical nature of his silver salt, and the relatively high price of that product. Not desiring to follow the example of the writer of that letter by entering into personalities, he confined himself for the moment to stating that what he had previously asserted was entirely unaffected by the reply of M. Clement. He adhered purely and simply to the facts as at first stated by him.

M. Pelissier presented some proofs obtained by him on the mica paper of M. Marion, and strengthened with the *sel Encausse*. These proofs displayed very fine effects. He showed afterwards some images obtained from negatives engraved with the point, and very cleverly executed by M. Petit Jean. One plate had been covered with a layer of sensitive collodion and uniformly impressed; and upon that bed figures had been traced with the aid of a fine point, and so cleverly that, on seeing the proof, anyone would imagine it to have been the result of an engraving on copper with aquafortis.

The Chairman said he did not see the value of the process, which entailed at least as much work as that of engraving with acquafortis in the execution of a negative, which had afterwards to be printed by exposure. That, it appeared to him, could not be advantageous; nevertheless, every application might have some special pretension, and it was well to show all attempts made in any direction, as all the roads of science led to progress.

M. Taylor exhibited some new proofs engraved with aquafortis, and gave the details of new experiments for obtaining on the surface of varnish as intense a photograph as possible of the image to be engraved. The Society followed M. Taylor in his explanations with the greatest interest.

After some further business of a private nature the meeting separated.

Correspondence.

Foreign.

Paris, March 29, 1869.

Some photographers having objected to Mr. Sarony's new patent, on account of the large pictures being on so fragile a material as glass, I suggested in my last the substitution of a transparent pellicle of some kind. Mica, I fear, cannot be used on account of the difficulty or impossibility of procuring sheets of the required size. I was speaking to a gentleman the other day upon this subject, and he considered that the "pellicle Marion" would answer very well as a medium for the transparent positives required by Mr. Sarony. There is no difficulty in obtaining this pellicle of any size, and the manipulations of transferring the collodion image from the glass plate to the pellicle are said to be easy. I have described these once before, but perhaps may be allowed to refer to them again in special reference to the matter under consideration.

The glass plate should be covered with a solution of white wax in ether, made in the proportion of one part of the former to 300 of the latter. This facilitates the transfer of the film. The wax solution is applied by means of a tuft of cotton wool, a second tuft of clean cotton being passed over the film of wax to render it even. When dry the plate is coated with collodion, and all the operations of exposure, development, fixing, &c., as usual. The picture is *varnished.* The transfer is accomplished in this manner:—A sheet of cardboard and a sheet of pellicle, both a little larger than the negative, are made ready; the negative is laid face upwards on the cardboard, which is kept perfectly horizontal on a levelling stand. The transfer varnish is poured in excess over the negative or transparent positive, and the pellicle is laid upon the varnish in the same way as a sheet of albumenised paper is sensitised on the silver bath, great care being taken to expel all air-bubbles. The excess of varnish flows over on to the cardboard, and the pellicle being larger than the glass plate also overlaps it. The card "warps" from the moisture of the varnish, and thus "stretches" the pellicle evenly over the glass plate. The glass plate is taken off the cardboard and put up on end to dry, and is then placed in a dish of water in order that the transfer of the image to the pellicle, and of the pellicle off the glass, shall be effected. Several hours' immersion in the water are required to accomplish this, according to the tenacity, &c., of the collodion film. Five or six hours is the ordinary time—as many as forty-eight hours have been given; but sooner or later the transfer is made. Do not detach the film from the glass too hurriedly—give plenty of time; and, if any resistance be felt, put the plate in the water again, and wait a little longer. I believe that the collodion pictures developed with pyrogallic acid are more easy to transfer than those of iron development, hence a reason in favour of the trial of this pellicle.

Whilst writing about this material I may mention that it can be used to place between negatives and the positive papers whilst printing, thus preventing all injury to the negatives from whatever cause. It is found best to pass a little pounce over the pellicle to prevent its adhesion to the paper. If it were thought best to protect the transferred pellicle picture when fastened to its lithographed ground by a sheet of

glass, there is no objection; for if the glass be broken it can be replaced, whereas were the portrait upon it it might be an irreparable loss. There may be substitutes for glass better than the pellicle I have described; if so, let photographers use them in preference. I would point out that the fact of the new portraits of Mr. Sarony being brought out on glass is no objection to the process, if a good substitute for glass can be found.

A curious *carte-de-visite* portrait is being offered for sale by the photographer, M. Henry, of Cholet. It is the likeness from life of an old Abbé, the *père* Fulgère, of the monastery of Bellefontaine, near Cholet. This old man entered the religious establishment many years ago. He was accompanied to the door by a stranger, who gave to the Superior a small case, which was not to be opened on any account till the death of the new inmate. This man became the Abbé of the monastery, and was eighty-four years old when he died a few weeks ago. It was remarked during his lifetime that he had a very great likeness to the Bourbon family, but, when questioned upon this subject, the old Trappist would not say anything about it, but only smiled. When he died the case was opened which was given to the monks when this man entered their order, and it is asserted that papers have been found in it which prove that the dead Abbé was none other than the son of Louis XVI. and Marie Antoinette, the Dauphin, or Louis XVII. of France! This is not the place to go into the history of this mysterious subject. There have been many who have been "proved" to have been the Dauphin who was given into the keeping of Simon the shoemaker, but this is the last; and the photographer, M. Henry, is reaping a little harvest from the credence which is attached to the story I have just related. The *cartes* are sold at sixpence each.

A useful book has just been published. It is written by M. León Vidal, the Secretary of the Photographic Society of Marseilles, and is a practical *resumé* of all the processes on carbon. The nature and object of this work may be gathered from the author's preface. He says:—"After having, in a general manner, shown the principle upon which the impression of stable photographs is based, we shall give as detailed an account as possible of the various processes in use at the present time, and enlarge upon the manipulations which merit especial attention. We shall then compare the different processes amongst themselves, having care to express our modest personal opinion upon their merits and respective advantages. We shall point out the improvements of which we think they are capable. We shall then give some practical details upon the nature of the substances which are employed," &c., &c. How the author has accomplished his task those will learn who peruse the work itself. It is, unfortunately for many Englishmen, written in French; so perhaps a few extracts, or a *resumé* of some of its most useful chapters, will not be unacceptable. I must content myself today with referring to Chapter IX., on the products employed in the carbon processes. First, gelatine:—M. Vidal finds that the Japanese gelatine, a "vegetable product," gives better results and more constant than animal gelatine. The developing bath must be kept hotter when this gelatine is employed. Its price, which is five times as great as the ordinary article, is against its use. Liquid Indian ink, which is bought ready made, is recommended, instead of grinding up the sticks with water. Both this colour and the animal black can be rendered "warmer" by the addition of sepia or purpurine. If the sepia be used, the mixture must be made only when wanted, and just before it is used, as the colour has the property of rendering gelatine insoluble in water *without* the action of light. A great deal of the information in M. Vidal's work is taken from Mr. Swan's book, published some twelve months ago, and it is acknowledged. The author gives the preference to M. Marion's modification of the carbon process, as being more simple than the others, and he considers that, if rightly looked at, the transfer of the negative to the transparent pellicle is an advantage rather than a complication of the process. "Mr. Woodbury had already proposed the pellicle, but the idea of forming pellicle negatives for the carbon process, to avoid a second transfer, is one of the happiest 'hits' of M. Marion, and is one of the greatest services he has rendered to photography," says M. Vidal. Much of the success of the operations in carbon printing, it is said, depends upon the temperature of the air at the time of the operations; for the same operations which produce perfect success in the summer in the South of France give very imperfect and bad results in the winter. I must return to this work in my next. R. J. Fowler.

Home.

SARONY'S PHOTO-CRAYON PROCESS.

To the Editors.

Gentlemen,—As an experimentalist in photography since 1848, and somewhat of an observer of novelties during a period of over twenty years, I feel myself bound to take exception to the spirit of Mr. Robertson's letter in your last issue, respecting the novelty of Mr. Sarony's elegant "photo-crayons."

I have seen specimens of all the processes which are being pitted against the new combination, and I say, without hesitation, that there is only one kind besides Mr. Sarony's that a person of taste would think of purchasing, that process being the combination of *two photographs* on paper—one being rendered semi-diaphanous, the other roughly but harmoniously coloured, the combination producing a soft pastile-coloured effect.

Your Paris correspondent takes exception to glass as a support for the transparency, and recommends substances barely introduced, and no data for their permanent stability. He forgets that there are mezzotint transfers on glass over a hundred years old in thousands of homes of the humbler classes of this country, and your readers must have noticed them in old country inns—certainly not places for *special preservation*. Very likely there are many nearer two hundred years old, mezzotint engraving having been invented in the middle of the seventeenth century, and the process of transfer is described in a work in my possession printed in the middle of the last century. If these humble pictures have survived for so long a period, how much more care would a thing of beauty be likely to command on the walls of the drawing-rooms of the upper and middle classes, who are most fitted to appreciate the new style. We all know the kind of appreciation the other styles have met with, and how many drawing-rooms *they* adorn.

If glass be ignored, where is the permanency of enamels? In the case of fire, which would endure the longest—an oil painting or a photograph on glass, or even on paper?

In conclusion: I hope photographers will not allow such weak objections to bar their almost certain success in the introduction of so charming a style.—I am, yours, &c., F. W. Hart.

8, *Kingsland-green, London, March* 30, 1869.

To the Editors.

Gentlemen,—After reading the glowing accounts in your Journal of Mr. Sarony's new portrait, I was anxious to know how he would overcome the difficulty of applying the lithographic sketchy backgrounds so that they would suit *all* portraits, and not infringe on the cheek or neck of a lady's portrait.

Seeing one of them, last week, in your office, I was confirmed in my opinion that a special background would be necessary for some portraits. The one referred to was that of a lady, with a dress having a low body, the background having been very carefully sketched in with lead pencil round the neck and shoulders. Had this not been done, the outline would have been ruined.

They are, however, very pleasing pictures, and, no doubt, will "take," especially as *cartes* are now so little in demand.

A very pleasing and soft effect may be obtained by taking a tracing on vegetable paper, transferring this outline to either prepared artist's millboard, academy board, or canvas, strained or unstrained, and then slightly tinting in oil. For this an additional charge could readily be made, especially in portraits of ladies.

The canvas or millboard can be had either of a grey or drab tint, which, I need scarcely state, will take either chalk or lead pencil for portraits intended to be plain.

As you are aware, three years ago I brought out a similar style of portrait on a tinted ground, the difference between Mr. Sarony's and mine being that his are on glass and mine on paper.—I am, yours, &c.,

30, *Regent-street, London.* Walter Petty.

ENLARGED TRANSPARENCIES FROM DENSE NEGATIVES.

To the Editors.

Gentlemen,—Referring to the opinion expressed by Mr. Henderson, at the last meeting of the South London Photographic Society, relative to the difficulty in producing a good transparency from an ordinary printing negative, I venture to state that my experience is quite at variance with his on that point, as I have now by me some transparencies which I printed from *ordinary carte* negatives, magnifying them to such an extent as to entitle them to be deemed "enlargements." They are so far successful as to have elicited a considerable amount of commendation.

I was the more sorry to see that the statement was made by such an authority as Mr. Henderson, as I think it is calculated to deter some from trying the beautiful process just introduced by Mr. Sarony, in connection with which process the statement was made.—I am, yours, &c., W. Cobb.

March 30, 1869.

[Mr. Cobb, in illustration of the above remarks, has submitted for our examination a very charming and sharp enlarged transparency—the degree of enlargement being about five diameters.—Eds.]

Improved Pencil for Marking Lines.—A patent for the above has received provisional protection. It is composed of—

Nitrate of silver	1	ounce.
Colouring matter or lampblack	$\frac{1}{4}$	,,
Gamboge	$1\frac{1}{2}$	scruple.
Gum Arabic	$1\frac{1}{4}$	,,

These are made in the form of a pencil. The linen should first be damped with a solution of soda.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted, a rolling press, roller four inches long, and a good curtain for photo studio, in exchange for a large rolling press (roller twelve inches long).—Address, J. Coates, stationer, Willington, Durham.

A "*jumelle*" camera, by Geymet and Alker, complete, will be exchanged for a small landscape camera and lens, also complete. It must be such as to stand the severest test.—Address, C. P., 2, York-street, Covent Garden, London, W.C.

A triune universal, woollen cloth background (both almost new), and a rolling press, is offered in exchange for a good 12 × 10 or whole-plate portrait lens, or stereo. camera and half-plate double backs, and pair of 3½-in. stereo. lenses. Differences adjusted.—Address, H. Browning, 46, Church-street, Liverpool.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

R. J. F. (Paris).—The safety valves are being constructed.

"The Camera and the Lens."—The article bearing this heading in our last issue was extracted from the *Silver Sunbeam.*

Muffle (Edgbaston).—We have not tried the gas furnace for enamelling, nor have we any immediate intention of doing so. Why not try it yourself?

D. Ross.—From the data supplied in your letter, we can arrive at no other conclusion than that the impurity of the water is the cause of the defects.

"Ascot."—Plates prepared by the hot water process will keep well both before and after exposure. They cannot be purchase ready prepared, so far as we know.

A Young Hand.—The writer of the work in question is like some other authors, *i.e.*, he speaks dogmatically on a subject of which he is apparently very ignorant.

J. Green.—The presence of a few air-bubbles in your lens will not appreciably affect its working, but if there be "striæ" or "tears" in the glass the definition will not be of the best order.

Thomas R. (Sydenham).—A piece of soft wash leather is the best material with which to clean the lens. If the surface be very dirty and dusty, the application of a handkerchief will be apt to cause scratches.

J. T. R. (Glasgow).—To obtain a sharp focus use a magnifying glass. For securing sharpness when copying an engraving this is absolutely necessary, for the small stop employed gives such depth of focus that without a magnifier it is almost impossible to secure the exact point of best definition.

"Non Compos Mentis."—We regret that we cannot aid you in the elucidation of the dark, and apparently unfathomable, matter referred to. It may be some consolation for you to know that we share your sentiments.

A Sufferer.—Cyanide of potassium operates prejudicially on the system both by inhalation of the fumes and by absorption through an abrasion of the skin, as well as by its being swallowed. Due care must be taken when working with this or any other of the numerous poisonous substances used by photographers.

O. W. S. (Manchester).—On the principle that desperate diseases require desperate remedies, we must suggest cyanide of potassium. In connection with the precipitation of the fine crystals, see our article about four months ago on pinholes, and also refer to the report of the meeting of the South London Photographic Society in the same number in which the article alluded to appeared.

T. G. Perry (Trim, Ireland).—In the construction of a three-wheel velocipede we recommend you not to make one with a crank axle as you propose, but to drive it by the direct action of the feet on a projecting pedal on the front wheel, in the same manner as in the case of the two-wheel description. This is the best form that we have recently seen, and if well made, can turn a corner as sharply as the "two-wheelers," if not more so.

J. Bell.—The difference between your instrument when used for landscapes, and what you designate a "regular landscape lens" is this—the front lens of your combination is a plano-convex or nearly so, whereas a "regular" landscape lens partakes more of the meniscus form. The advantage of the latter lies in the picture being projected on a flatter field than can be obtained with the other. The stop may also be placed rather nearer to the lens, and this secures a larger area of definition, or angle of view. Try your lens with a stop of moderate size, and if the definition be satisfactory, you wtll have no occasion to obtain another.

"Long Tube."—The property you desire will not be imparted to the lens by shortening the tube. The effect of shortening the tube of any portrait combination is to extend the field of delineation; but this extension is obtained at the expense of marginal definition—assuming here, of course, that the tube has previously been of the correct length. As a rule the lenses of English manufacture have shorter tubes than those made on the continent; but we know, from actual trial, that some French lenses may, by having the tube shortened, be mounted closer together with much advantage. In the present instance this will *not* confer depth of definition, nor would it be reasonable to expect it to do so. You had better employ a diaphragm placed as close to the front lens as convenient. This will reduce the angular aperture and increase the penetrative power of the combination.

Wag.—The solution inquired about consists of bichromate of potash, sulphuric acid, and water. You will find proportions and manner of using in any of our recent Almanacs. Our Almanac for the present year contains an article, by Mr. Woodbury, on transferring negatives by means of collodion, in which you will find much useful information on this subject.

"Amulree."—The reason you cannot get an image on the ground glass of your copying camera is simply this—that you have not placed it in the focus of the lens. You can get the desired image by the following means, which, if not scientific, are at least "rough and ready":—Having pulled out to the farthest point the end of the copying camera next to you, take a small piece of ground glass in your hand and hold it up tolerably close to the lens, gradually pulling it out until you see the image upon it. If you send us the equivalent focus of your lens we can give you the exact distance at which if not scientific, are at least "rough and ready:"—Having pulled out to the experiment just recommended by repeating it with the space between the negative and the lens altered. To ensure success in your first trial, let the negative be as far as possible from the lens, and then notice the effect of bringing it up closer to it.

E. M. writes as follows:—"I beg to draw your attention to the enclosed paragraph, and would feel obliged if you would give me your opinion whether the remedy there indicated is really to be relied upon. My glass room has been built about six years, and I find a material deterioration of light. At first, I was able to get pictures in from seven to ten seconds; now it frequently takes from twenty to thirty seconds to get a good picture. I entirely blame the glass, though it may be also the developer, for, having previously developed with plain iron and strengthened with pyro., I now use exclusively a developer with gelatine. Your advice on the matter would greatly oblige."—We subjoin the paragraph referred to, but must remind our correspondent that a developer containing gelatine necessitates a somewhat longer exposure than one from which it is omitted. The experiment described in the paragraph is easily performed, and, if it do no good, it will certainly do no harm:—"Glass panes, constantly exposed to the action of the sun and rain, are soon deteriorated, as the potash or soda they contain combines with the carbonic acid of the air. A whitish opaqueness is the consequence of this action, and, in order to make the pane return to its pristine transparency, it should first be rubbed with diluted hydrochloric acid, and then cleaned with moistened whiting. By this means, glass in an extreme state of decomposition may be completely restored."

☞ Editorial Communications should be addressed to "THE EDITORS;"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-ttreet, Covent Garden, London, W.C.

Discovery of Platinum in Scotland.—An explorer announces that during his investigation into the auriferous nature of Scotch quartz he has discovered small quantities of platinum associated with the gold there existing. The platinum exists in the form of small scales, resembling silver, but they are not magnetic, like much of the crude platinum found in South America. In the process which he employs the gold is volatilised by chlorine at a bright red heat, but the platinum is left unacted on by the chlorine, and, perhaps, this may account for its non-magnetic quality, as any iron united to it would be carried away by the chlorine. Platinum is very rarely found in this country, but few authentic records existing of its having been met with. Some ten years since, Mr. W. Mallett, of Dublin, found crude platinum in minute grains and scales, associated with gold, wood, tin, &c., in the auriferous sands of some of the Wicklow rivers; and about the same time it was also said to have been met with on a farm near the mouth of the Urr, in Buittle, Kirkcudbright.—*Mining Journal.*

METEOROLOGICAL REPORT,

For the Weeks ending March 31*st and* 24*th*, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Mar. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
25	30·09	46	37	40	42	NNE	0·07	Fine
26	—	50	—	—	—	—	—	—
27	29·68	42	29	32	34	NW	0·07	Fine
29	29·72	42	36	36	39	NE	0·04	Fine
30	29·94	45	34	37	39	NNE	0·03	Dull
31	29·84	47	37	38	40	NE	—	Dull

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 466. Vol. XVI.—APRIL 9, 1869.

A NEW ELEMENT SUPPOSED TO OCCUR WITH ZIRCONIA.

Our valued Paris correspondent, Mr. Fowler, has kept our readers *au courant* with the progress of the work undertaken by the Zirconia Light Company, and many of us are looking forward to the pleasure of being able to test the zirconia cylinder against the old lime ball. But while MM. Tessie du Mothay and Company are working in an eminently practical direction with the rare earth, zirconia, chemists and physicists have been studying the zircon from which the earth is prepared by either of the processes which we described some time ago.

At the recent *soirée* of the Royal Society, Mr. Sorby, F.R.S., exhibited some specimens of a variety of zircon from Ceylon, which has received the name "jargoon," and in this mineral Mr. Sorby believes that he has discovered evidence of the existence of a new chemical element, to which he has provisionally given the name of "jargonia." It is found that the action of the true zircon or hyacinth and of the jargoon upon transmitted light is often very different; in the case of the jargoon, a number of black bands—almost lines—are observed crossing the spectrum of the light transmitted, whereas, in the true zircon, these lines or bands do not occur. Mr. Sorby's inference, then, is that in some jargoons the earth zirconia is accompanied by another earth, which appears to be the oxide of a hitherto unknown metal. It now appears that Mr. Sorby was forestalled in this observation by Mr. Church, of Cirencester; but, to whomsoever may ultimately be assigned the honour of having discovered a new element, it appears that there is some ground for believing that the zirconia obtained by M. Tessie du Mothay's process may be often contaminated with the oxide of another metal, of whose properties we know nothing as yet.

We mention this matter here, not only because it is a matter of interest to many to know that there is some probability that another element will soon have to be added to our already long list of so-called elementary substances, but further, because the presence of small quantities of the new earth in the zircons employed in the manufacture of zirconia for the cylinders, may have something to do with the difficulty which we were given to understand had arisen in the satisfactory manufacture of the small balls of the new earth. It is a well-known fact in chemistry that two substances which are each very infusible *per se* will often when intimately mixed and strongly heated, give an easily fusible compound. If such a body as this jargonia be really present in zircons or jargoons, it may materially interfere with the power of the zirconia itself in resisting the action of the intense heat of the oxyhydrogen flame.

If any one had told us but a very few months ago that photographers would care to know anything about so rare a mineral as the zircon we should scarcely have believed them, and yet to day it possesses a considerable amount of practical interest. This is but another illustration of the importance of extending scientific researches in every direction; since, though the value of the discovery of a new fact is not always apparent at first, and the announcement is often hailed with the cry of *cui bono?* yet the bounds of our knowledge have been extended, and sooner or later the apparently abstract observation is found to possess a practical importance quite unsuspected in the first instance.

REPLY TO MR. BOW'S REMARKS ON THE MUTUAL REACTION OF PICTORIAL ART AND PHOTOGRAPHY UPON ONE ANOTHER.*

One of the great benefits a photographic journal holds out is that of the advantage that any subject, such as the one I had the privilege of bringing before this Society lately, may be at leisure carefully reviewed for discussion, if needful.

It gave me great pleasure to see the subject referred to so earnestly taken up by Mr. Bow; and although he evidently felt my remarks not very debatable, yet I was glad to find him discussing some points and making some very valuable remarks on other topics connected with art.

The first matter on which he brought his views of art-science to bear upon was his taking exception to artists appearing to consider it necessary that all pictures should be picturesque. My answer to this is—if there be nothing of what I defined as the constitution of a picture in anything pretending to be that [see page 50 of The British Journal of Photography], then it is to be classed with something merely descriptive, such as a map. It may be a perfect transcript of a scene, but unless it has in itself more or less of the elements referred to it cannot be a picture.

A map feeds the intellect—a picture feeds the heart. I believe in the feeling of solitude, and no one could depict that profoundly without carefully selecting it from nature by the camera, or most thoughtfully exercising much art in reproducing it on canvas. But I do not believe in, nor ever hope to be deeply affected with, what Mr. Bow styles the "eloquent" sense of monotony that some transcripts may present.

It would involve a great amount of writing were one to enter fully into the domain, or the extent of the license, of art, and the principles that regulate it. Much of Mr. Bow's restriction to a limit may be very desirable with some subjects, because they may appeal only to the head, such as a scene where the horizontal line is high, serving little more than a map to trace a certain road or mark the locality of a town as seen with a bird's-eye view; or again, such as objects that serve only to please the eye, such as a piece of ornament. But with objects or subjects that are intended to appeal to and affect the heart, and for which the imagination must be in active exercise, it would be wrong to set limits to any legitimate device that might successfully carry it out.

I need not again refer you to the very successful efforts of Lake Price—for instance, his *Don Quixote;* or the most masterly work of Robinson's, *Bringing Home the May.* The singularly beautiful feeling in the unconsciousness of these figures surely exhibit that it is no want of capacity in the means if there be only the art how to treat it. Witness, again, his *Children Asleep.* The singularly successful, easy feeling given to the compartment by the choice of material, the arrangement of lines in the folds of the drapery, the treatment of the shadows, the gentle ripple on the shore, and over all the most complete illusion of moonlight effect that has perhaps ever been rendered, making it a truly successful work of art.

To set a limit to such efforts as these would do the art department of photography great injustice. Certainly, in landscape subjects it is more limited. I do not know whether it would be considered

* Read at a meeting of the Edinburgh Photographic Society, March 24, 1869.

legitimate to have double printing for foregrounds and skies. Perhaps not for ordinary subjects would it be worth the labour, or with subjects of historic or scientific interest; but for pure æsthetical purposes, working out fine sentiment, I think something very effective might be rendered by the composition of different pieces of foreground. If Robinson can do it with figures, why not with rocks, stumps of trees, and different kinds of herbage? I see nothing to hinder this when gone about patiently. One good negative secured from such a combination would amply repay the labour, and give the artist credit for his invention. Without the inventive faculty being more or less present in any work pretending to be a work of art, it can only be classed with those works which are merely imitative—and such are photographic impressions in general if taken without regard to treatment of subject; and even worse than that, for what of nature there is in the impression is not due so much to the work of the hand as it is to that of the instrument.

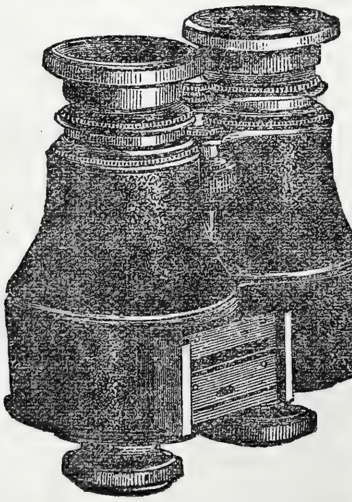
Mr. Bow does not believe in the Fritz Luckhardt method of finding out the strong and weak points of a given field of picture, and considers it a mistaken attempt to construct an empiric rule for what is observed to frequently please the eye. Well, by whatever name he may call it, it is one of the best that I know of for discovering a repetition of points of interest. He says:—"The true art consists in avoiding stiffness, and placing the leading objects so that lines joining them will form an irregular figure placed unstiffly on the canvas, and generally also so as to balance upon a diagonal." What is all that but just using more or less *forte* points? Stiffness is frequently composed of sameness, formality, and too apparent balance; and he proves that by the approbation of diagram No. 7 [*ante* page 74], composed of the sportsman, the bird, the hare, and the spire of the church, constituting an irregular figure of four unequal sides.

As to Mr. Bow's differing from me with regard to the distance of the head in portraits to the top boundary, he would require to test this by viewing each size separately. With full-length portraits the boundaries should be determined very much according to the size of the individual either sitting or standing. Mr. Bow approves of diagram No. 8, by Burnet [page 74], but that is a full-length sitting subject. In the case of kit-cats, or any size where the figure is cut down to suit, these sizes have been determined as suitable subjects in general. These sizes have passed through the use of centuries, and have been recognised by the most experienced of every period, the great object being never to leave any portion unoccupied. It is always the result of too large a space lying between the principal subject and the certain boundaries that has been the cause of introducing other objects to fill the vacuity. At first I used to be much taken up with particular form of boundaries; but I feel that there is nothing like the severe square corner, as it is free from fancy, which is trifling. NORMAN MACBETH.

HINTS ON POCKET CAMERAS.

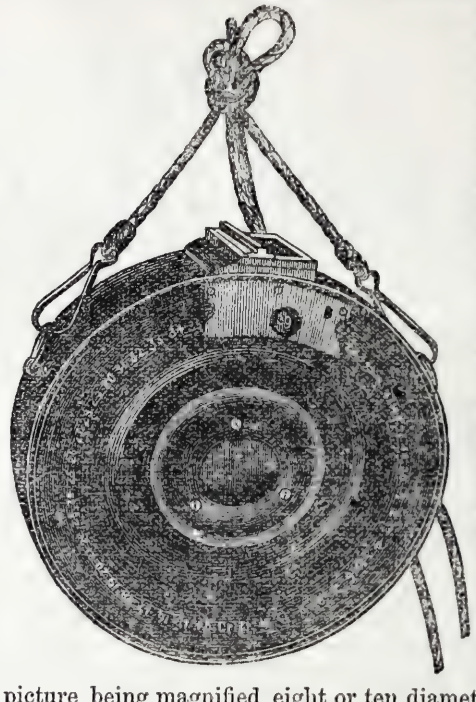
FOR some weeks past we have been making experiments with cameras of the diminutive kind known as "pocket cameras," the one to which we now refer more particularly being the *jumelle* or opera-glass camera of MM. Geymet and Alker.

The external appearance of this interesting little instrument may be ascertained from the accompanying engraving. It appears, at first sight, to be an ordinary opera-glass, but a closer inspection reveals certain peculiarities. First of all, the lenses are composed of the ordinary portrait combination, with a stop placed in each tube and between the lenses. Next, we find that in one barrel only is placed a ground glass for focussing; and, for the purpose of securing the utmost sharpness, a small and powerful magnifier is placed behind the ground glass so as to magnify the image. For the sake of symmetry, the second barrel, in which there is no ground glass, has a similar projection to the other, but it contains no magnifying lens.



The acting tube has a groove in the top through which a plate may be dropped down into the body, and the position of the plate is such that when the focussing has been correctly effected in one barrel, the plate in the other will also be in sharp focus.

We must now direct attention to the plate box, which is quite a curiosity in its way. It may be described as a drum having fifty grooves in each side radiating from the centre to the circumference, and in which an equal number of plates may be stored, as in a plate box. The outer rim of the drum prevents the plates from getting out, except at a slit, which, however, by means of a handle and index, may be brought opposite to any special aperture, the plate in which will then drop out. The means for closing the apertures both in the camera and the "drum," so as to prevent the possibility of light getting to the plate, are most ingenious and, we may add, automatic.



The lenses, as we have said, are of the usual portrait kind. The definition is intended to be such as to permit of the picture being magnified eight or ten diameters; for we may observe that although the plate is rather larger, the area of real sharpness, even with a small diaphragm, does not much exceed an inch.

In one of our trials we got pictures in which the well-known central flare spot was annoyingly well developed. To obviate this we changed the portrait objective for one of those of the single or landscape form, and, as we expected, found that a much more uniform picture was obtained; and when a small stop was used—no smaller, however, than that belonging to the superseded portrait combination—the definition was quite good enough to stand magnifying from one inch to eight inches.

With the view of still simplifying and improving this apparatus, we tried the effect of doing away altogether with the second or focussing tube; and, although we have not actually effected the disunion of these twins, we can work with perfect sharpness and comfort with one of them only, quite ignoring the existence of the other.

As we know that several of our readers are interested in the subject of a really portable and efficient camera, and are also aware that some of them are about to turn their attention to the construction of instruments of this class, we invite their attention to the consideration of the following:—

When experiments are made with photographic lenses, it will be found that if an object which is situated at a distance from the camera of a hundred times the principal focal length of the lens be sharply focussed, everything beyond that object will also be in sharp focus. For example: if a lens of three inches focal length be used, this, when multiplied by a hundred, will represent twenty-five feet. We are now assuming that a lens with a wide aperture is employed. When a stop is used with such a lens, the depth of focus becomes so great that objects situated at a distance of twenty times the focal length of the lens (or five feet) will be quite sharp enough to stand a considerable amount of magnifying power. As no one possessing any artistic taste or skill would care to introduce into a picture intended to be magnified objects within such proximity to the camera, it follows that when once the focus has been arranged in accordance with the rule hinted at, no further alteration will be found necessary—it will always be in focus. This is true in principle; in practice it is so true that many of the best landscapes we have seen have been taken in cameras in which the lens was rigid, the camera being equally so.

The only point remaining to be considered in connection with the construction of such a camera as that to which we now direct attention is to have erected on the top of the instrument a small "sight," through which the eye can see the landscape to be depicted. The extent of view must be regulated by means of a small square frame of brass situated at a little distance from the eyepiece, which, in this case, is a bit of thin brass of a size equal to that of a threepenny piece, having a small hole in the centre. Both it and the outer frame which bounds the view should be hinged like the "sight" of a rifle, and, like it, be adjusted to stand, when raised, at a right angle to the axis of the camera.

We have constructed (somewhat rudely it is true) a camera in accordance with these principles, and although the plate is only of the tiniest dimensions, we can secure on the ground glass, with the greatest exactness, any view that we may select through the "finder." Here, then, we have a camera which for simplicity cannot be excelled, while its simplicity is obtained without the sacrifice of any good quality.

On the best method of utilising these small-sized plates we shall have occasion to speak on a future occasion.

CONCERNING ACCIDENTS ARISING FROM THE EMPLOYMENT AND MANIPULATION OF CHEMICAL PRODUCTS.

The subject treated of in this article was suggested by the terrible catastrophe of the Rue de la Sorbonne, some account of which I gave your readers in a recent letter. These events re-awaken one to the danger that always exists in the manipulation of chemical products, and if they produce also more caution and more knowledge of the causes and preventatives of such accidents, one good effect arising from the evil may be perceived.

Photographers should have a good knowledge of the properties of the compounds they handle, and of chemical science and manipulation in general, for they have to do with some of the most dangerous substances that have been produced by modern chemistry. I have only to enumerate soluble cotton, nitro-glucose, ether, alcohol, bromine, iodine, ammonia, fulminates of gold and silver, to call up a battery of chemicals the use and combination of which would readily destroy a dwelling-house and all contained therein, either by fire, explosion, or suffocation. If I put down bichloride of mercury and cyanide of potassium, I only name the causes of many premature deaths from their baneful poisonous nature. Photographers are being instructed in the use of phosphorus and bisulphide of carbon in vapour, and who can think of the state of these bodies without feeling there is danger in their employment. It may be that a few words of warning, a few examples of accidents which have happened even in the "best regulated" laboratories, and a few hints as to the course pursued in such cases, will neither be *de trop* nor without use to the readers of The British Journal of Photography.

Passing along the district where the picrate of potash mixture exploded, I had my attention called to a pamphlet upon the subject of my article, and find in it much of utility and interest, and of which I shall make use for your pages. That such an article is not unnecessary the following from the preface to this pamphlet will show:—"There exist very few chemical substances of which the preparation is not dangerous. We might even say with truth that nearly all the operations of chemistry are accompanied by dangers more or less great. Now the operator is exposed to suffocation, to an excessive irritation of the respiratory organs, to a burn slight or grave; and, beyond all these, there are those terrible explosions of which, unfortunately, very few laboratories have been exempt."

Some of these accidents may be prevented by careful attention, some by special scientific means; but as long as we have such names as those of the illustrious chemists Dulong, Dumas, Liebig, Regnault, Thénard, and Wurtz among the list of wounded from accidents, we are forced to the conclusion that the most experienced manipulators and the most scientific experimenters cannot always prevent their chemicals taking forms and effecting combinations which are entirely unlooked for, and which are the cause of serious accidents. If these philosophers have not escaped except with their lives, how can photographers without any or much chemical knowledge expect to die on their beds, if they indulge in preparing some of their own chemicals?

Let me first call attention to burns from corrosive gases and liquids and melted metals. A photographer may subject himself to all these by using bromine, chlorine, hydrofluoric acid—the three ordinary acids—and in reducing his residues to a metallic condition. Phosphoric acid also produces bad burns, but phosphorus produces worse, and is more likely to come under the photographer's attention. I have had experience of the effects of two, at least, of these substances—bromine and phosphorus—and I retain the marks of the burn from the latter to this day. "All other things being equal, the point of ebullition being higher makes the burn from that body more serious; thus there are fewer serious burns from boiling water than from boiling oil."

The effect of the burn from melted metals is the carbonisation of the tissues, and a similar effect is generally produced by the concentrated acids and their vapours, from their great attraction for water, which they absorb from the skin and anything with which they come in contact. Use long tongs to the crucibles containing residues, hold them tightly; do the same with vessels containing strong acids, if necessary—at any rate put on India-rubber gloves, and look sharply after fluoric acid, the burn of which is terrible. Well-greased gloves are a protection from the effects of fluoric acid, as it does not act upon greasy bodies. A mask of wire gauze is a useful protection for the face, and is not inconvenient to wear.

With respect to bromine: I was in a place once where a bottle containing a pound or so was broken, and instant flight was the only means of saving us from immediate suffocation; quantities of alkali and ammonia were used to neutralise its effects, and a strong current of air cleared the room of its vapours after some time. For long the effects were felt in a sore throat and painful breathing.

An instance is related of an accident to one of the operators in Paris. He was preparing hydrobromic ether, using for the purpose alcohol, bromine, and phosphorus. The quantity of bromine was about fifteen grains, and it was to be dropped gradually upon the phosphorus in the alcohol. The operation had scarcely commenced when the flask was smashed, and a flame of fire nine feet high darted up. The operator had the bromine thrown over his face, the room was in darkness, and filled with the horrible asphyxiating vapours. The cause of this was, the bromine dropped too quickly upon the phosphorus. The wounded man managed to get to a tap of water, and turned a stream on his eyes and face; feeling his mouth burning he tried to swallow some, but nothing whatever could go down his throat; it was completely paralysed, and he could scarcely breathe. In about three-quarters of an hour respiration was re-established better, and he could swallow a little water. The wounds were first washed with weak solution of caustic potash, and then dressed with lint dipped in glycerine. Washings with infusion of Peruvian bark were also used later on, and in about five weeks the patient was enabled to leave his bed with his arm in a sling, but he never lost the marks of the terrible scalding of bromine.

Many persons fill up their spirit lamps without putting out the already burning wick. This is highly dangerous, for the flame is readily communicated to the vessel containing the alcohol, and an accident is the result. One of the most active workers with M. Dumas, M. Polydore Boullay, died at twenty-nine years of age, from the burns proceeding from a bottle of ether which caught fire in his hands. I need hardly say how dangerous phosphorus is from its highly inflammable nature. M. Malaguti says that "the best way of soothing the burns produced by this body is to wash them constantly for hours, in slightly alkaline water containing chalk or magnesia in suspension. It has also been proposed to plunge the hands or the parts burned into very weak solution of chloride of lime with a little magnesia in suspension. In five minutes," it is said, "the *pains* disappear." I wish I had known this some years ago, when melted burning phosphorus dropped upon one of my hands. I put it in water, but no good came of it. I think I plunged it into sand afterwards, and I remember the surgeon probing the wound and picking out the little bits of phosphorus which remained in it.

Gun-cotton burns badly. A case is recorded of a young man who was filling a box with this substance one evening. The lamp was placed on the table some eighteen inches from him, when suddenly he found himself enveloped in flames and grievously burnt. At first sight this accident seemed unaccountable, the lamp being at a distance from the cotton, and all precautions taken to avoid danger. These are the explanations which, perhaps, may show the cause of such explosions:—"Many accidents happen during the drying of pyroxyline, when stoves, hot air closets, &c., are used. The chief cause is the *unequally hot currents of air*, which produce an *average* temperature of 104° to 120° Fah., but which also bring little streams of air which play upon the cotton at about 400° Fah. This may be proved by holding a piece of gun-cotton above a heated metal dish at such a height that the hand only feels a slight temperature; the cotton will ignite there, although it will resist a temperature of 212° in a water bath. It will, therefore, be prudent to always dry gun-cotton in a current of air, which shall not be allowed to exceed a temperature of 77° Fah. It was highly probable that a current of superheated air from the lamp ignited the gun-cotton in the accident recorded above. Professor Liebig writes the following letter to the author of the pamphlet I alluded to in the beginning of this article, and from which the quotations are extracted:—

"*Munich, June* 25, 1866.

"Sir,—I know two cases which perhaps merit to be placed in your treatise. The first is a terrible explosion which took place during one of my lectures before the Royal Family and the Bavarian Princes, and is not explained to this day. This experiment was the combustion of the vapours of bisulphuret of carbon in laughing gas. The accident

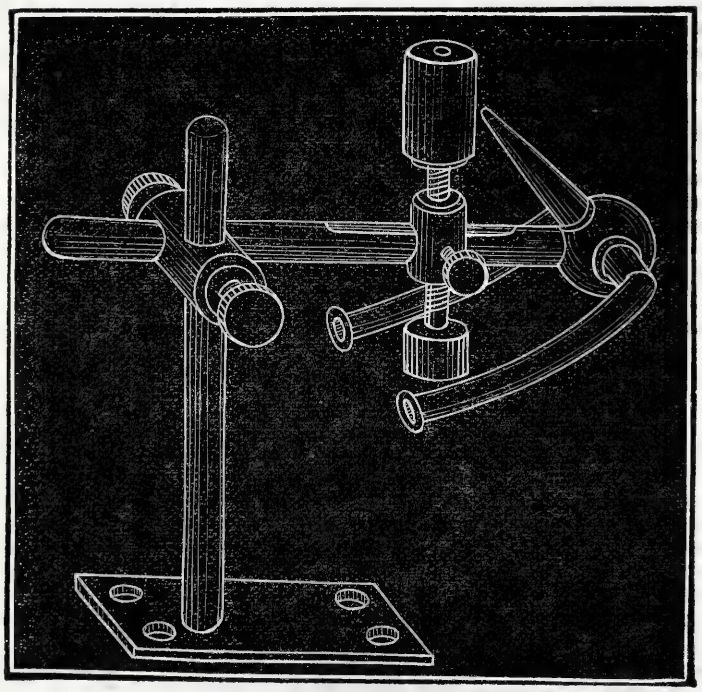
appears to me to have arisen from my having neglected to well shake the liquid in the vessel of gas; thus there was a great excess of the latter in presence of the vapours of the bisulphuret of carbon. This experiment is made without danger, and is always good, when the mixture contains enough vaporised bisulphuret to burn the carbon, and not the two elements—in one word, some sulphur must remain in the vessel. The second case of explosion occurred in a mixture intended for red fire. It contained, as usual, a salt of strontian, sulphuret of antimony, and *chlorate of potash*. This explosion took place in a cupboard in my laboratory during the night. I and my family were roused up, and it was only much later that the cause of the explosion was discovered. It arose evidently from the chlorate of potash, which renders these substances spontaneously explosive." "LIEBIG."

The explosions of the mixed gases oxygen and hydrogen have often been alluded to in your pages, and the ways of avoiding them pointed out. I find that there is still so much to write upon this subject that I prefer to finish this article in another number, rather than bring it to a hasty conclusion in this. R. J. FOWLER.

IMPROVED FORM OF BURNER FOR THE OXY-HYDROGEN LANTERN.*

THE burner now laid before the Society is not properly new in so far as the method of mixing the gases before combustion is concerned, nor in the principle of applying the light to the lantern; but there may be a little novelty in the construction of its parts, as they are almost entirely made in the lathe, and, consequently, can be prepared more easily and cheaply than those of some other forms of burner in use, while none of the essentials are sacrificed, and the necessary adjustments are obtained by very simple means, the whole being of sufficient strength to stand almost any amount of hard usage.

The construction of the burner is as follows:—A vertical rod is fixed to the sole of the lantern near the back, and a block of brass slides on this, with a pinching screw to hold it at any required height. The block supports a horizontal rod, which can be held in



any position by another pinching screw. On the end of this horizontal rod is a ball, in which are screwed at the sides two kneed tubes for the admission of the gases, and near the top is a straight nozzle or burner inclining backwards, the three openings meeting in the centre of the ball. The lime cylinder is supported on the end of a vertical screw working in a nut, which slides on the horizontal rod, and is held in position by a pinching screw at the side. As the screw for supporting the lime has to pass through the horizontal rod, a slot is made in the rod of sufficient length to admit of any required amount of adjustment of the lime, and wide enough for a little lateral adjustment and to prevent jamming. The tubes for the admission of the gases are made in the old way, to take on India-rubber tubes, in which stopcocks are inserted outside the lantern; but, if preferred, the brass may be prolonged sufficiently to carry the stopcocks directly.

The stopcocks are a somewhat important part of the apparatus, as in the common cock the change from full open to shut is made by a comparatively small motion of the key. The cocks now shown are similar to those on the lantern used for the popular meetings of the Society, and have the keys made with gradually-decreasing grooves round them, so that advantage can be taken of nearly a whole quarter turn of the key between full open and shut, and the supply of the gases regulated with the greatest nicety. GEO. H. SLIGHT.

* Read at a meeting of the Edinburgh Photographic Society, March 24, 1869.

A NEW METHOD OF TRANSFERRING DEVELOPED CARBON PRINTS.*

THE present mode of transferring carbon prints is one requiring great care and skill in the manipulation. It consumes a considerable amount of time, and is altogether, in a commercial sense, unsatisfactory. I take pleasure in offering to those who print in carbon an easier and quicker way, which is likewise a success. Prepare sheets of paper as follows:—Make a solution, the quantity required, of

Gelatine	2 drachms,
Glycerine	½ drachm,
Water	2 ounces,

with sufficient carbonate of magnesia or oxide of zinc to make it white. The proper quantity of pigment must be determined by experience, and regulated according to taste. It would be idle to recommend a special paper, as any suitable for mounting or attaching pictures to will do; thin Saxe answers very well. The paper should be floated on the above solution, avoiding bubbles, and hung up to dry, then stored away for use. The solution, of course, should be warm; but according to the temperature it is kept while preparing the paper, so will the thickness of the film of pigmented gelatine be increased or decreased. Care must be taken to keep the solution at a uniform temperature when in use, as a thick coating would be unnecessary, and a very thin one would fail in accomplishing the object desired. Having developed a print, and transferrred it to the clean water trough, take a dry sheet of the prepared paper, immerse it in the same water with the print, and let it remain until the coating of gelatine has become soft; then take the print and lay it uppermost on a sheet of glass or smooth board. Next lay carefully on the print the gelatinised paper, and with a flat camel's-hair brush press the paper and the print together, so as to exclude air-bubbles and water from between them as much as possible; put aside, without removing the board or glass, until dry. The print will then be found to be perfectly attached to the gelatinised paper. This method is all that can be desired, and is speedily performed. Perhaps it is necessary to add that the transferred print should be immersed in a solution of alum, to render the gelatine of the paper insoluble.

D. DUNCAN.

GAS BAGS *VERSUS* GAS HOLDERS.

THE drawbacks attendant upon the employment of gas bags are such as to have long since impressed "practical men" with the necessity of having them supplanted by some other means of holding gas. There are two main objections to gas bags, in addition to others of a minor nature, to which we directed attention some years ago when advocating the introduction of iron cylinders for compressed gas.

The first to which we may call attention is the rapid deterioration of the India-rubber film, by which a bag of Mackintosh cloth owes its airproof property. The second is the deterioration of the gas itself, even when the bag is good, by the principle of osmose, in virtue of which the gases outside and inside of the bag are apt to change their respective places. Oxygen acts upon India-rubber with serious effect; and, so far as our experience has gone, it converts it into a brittle, resinified body which permits the gas to leak out. So with the common house gas, now almost universally used by photographic and other "lanternists"—its action upon India-rubber is well known to be of a rapidly-destructive nature.

It must not be thought from these depreciatory comments that we dislike gas bags. On the contrary, we consider this form of gas holder to be one of the most convenient, and, if not the best in the abstract, at least the best for general use with the magic lantern. When it is out of use, the exercise of ordinary care will tend to its preservation for a long period. Let the bag be first emptied, then blown full of wind and again emptied. One or two repetitions of this course will so dilute any gas inside that that which remains will be absolutely innocuous. Attention to this would save many a gas bag from premature decay.

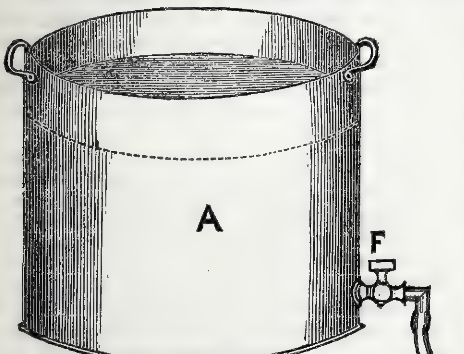
The deterioration of the gas from osmose may be prevented by

* *Phil. Phot.*

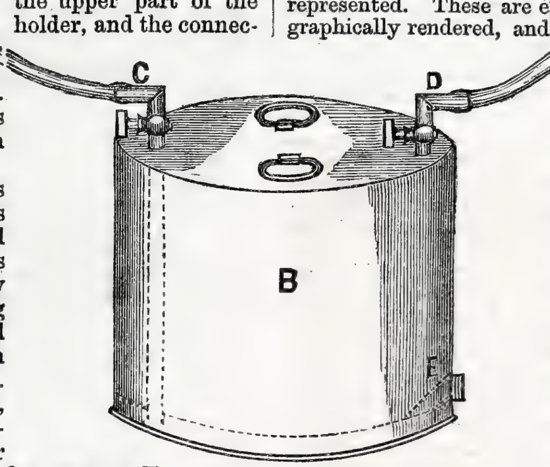
not keeping the gas longer in the bag than can possibly be helped. We have known some oxygen bags in which the gas could be kept good for nearly a week. In other cases in which the gas remained for only three days, a well-marked depreciation was caused. We at one time had a small bag in which the oxygen was impaired by being kept over a day.

The best form of gas holder (best, because most convenient) for the lecturer or traveller is the bag. It has its defects, but they are not such as to be irremediable in competent hands.

For those who, like professional photographers, make their enlargements and copies in one particular place and by means of artificial light, the special qualities or advantages of gas bags are not required. In this case portability goes for nothing. To meet the requirements of the class here indicated, a metallic gas holder, at once simple and effective, has been manufactured by Messrs. Pumphrey, the nature of which will be ascertained from the following diagrams:—



A and B are two galvanised iron vessels. A is open at the top, and is made rather the larger, so that, when not in use, the smaller vessel fits into it. B is a closed vessel, with the exception of apertures C, D, and E. Taps are placed at D and C; from the latter a tube descends to the bottom of the holder. D opens into the upper part of the holder, and the connection with the burner is made from hence. E has a tube which dips downwards, and is closed with a metal cap when filled with water or gas.



The mode of filling and using these holders (which are a modification of the gas holders used for chemical experiments, but adapted to the requirements of the lime light) is as follows:—Fill the holder B with water by removing the taps at C and D, the cap being screwed on at E; then replace the taps, and arrange to catch the water that will run from E (as the gas is generated) in the holder A. As soon as the oxygen begins to come away, connect the tube with the tap at D and remove the cap at E; the weight of the water will then draw the gas from the retort, and flow away at E.

In placing for use, the holder A must be elevated about six inches above the top of B (the elevation determining the pressure) and filled with water, and a pipe connected from F to C; the water will descend into B, driving the gas out through the tap D. It will be obvious that, as the one vessel is filled and the other emptied, the pressure will become less; it is, therefore, advisable to make these holders as low as convenient.

LANDSCAPE PHOTOGRAPHY.

Mr. Lake Price, in his excellent work on photography, has some valuable remarks on a subject which, at the present more than at any other time of the year, is calculated to interest landscape photographers. From the following extracts it will be seen how suggestive and practical are his observations:—

Landscapes.—The photographic landscape, judged by the rules of art, is yet far from being a *perfect* work. It presents to the spectator many charming parts, but taken *as a whole* it is defective as a picture. The sky, that principal point of the landscape painter's selection and care, in the photograph has no existence, but remains a blank. If a river or water in many of its picturesque combinations of river, lake, falls, &c., enter into the subject, the treatment of it by *lengthened* exposure in the camera becomes a photographic conventionality, with certain smudgy reflections in the one case, and woolly-looking white patches in the other; wanting entirely in the *drawing* of the ripple of the near water, the beaming light or passing shadow of mid-distance, or the sharp sparkling dash of the mountain stream. The trees in most instances have waved their branches backwards and forwards during the execution of the picture, and on what should be their delicate and feathered margins enigmatical forms are found.

These points render photographic landscape seldom quite perfect as a whole, though exquisite in the detail of its parts; and when, by dint of careful selection and study, anything approaching a satisfactory result is attained, it should be valued in proportion to the difficulties overcome.

Generally speaking, the subjects which will offer the best conditions to the camera, are those situate amid *mountainous scenery*, as Tyrol, Norway, Switzerland, Wales, and the Highlands of Scotland, for the reason, that the height of the distances dissimulates the want of sky, and, indeed, as they are full of sufficing forms and drawing, are better left in repose. The masses of rock in the foreground and middle distances are rendered in a manner by the camera which leaves nothing to desire, and, the whole being composed of rigid forms, any degree of desired definition may be attempted with probability of certain success. Mr. F. Frith's recent Swiss views completely illustrate the foregoing observations.

The subjects which are least adapted for the camera, are views on plains, over sands, and generally all subjects of *low horizon*, in which the *sky* or water form a large portion of the picture. When trees are introduced, calm days must be selected, as then there is little or no movement in their branches; or situations chosen—such as glades in woods—where shelter is afforded by the contiguity of masses of foliage. Picturesque "bits" of landseape, with water and other mills,* ruins, cottages, &c., selected with care, will come well, these objecte giving point and incident to the subject; a large field is yet fallow of studies of useful details of foreground, for the treatment of which the camera is eminently qualified, and such subjects will be very useful to art.

If in photography the entire landscape is to be attempted as a complete work, which shall satisfy the critic, it is to the instantaneous process we must look, if even the result, as regards *size*, is limited, as by that treatment alone the combination of *sky* with hill and dale, and river or lake, will be obtained, and all the captivating effects of passing cloud shadows, and gleams of sunshine on different portions of the landscape represented. These are effects of light that have seldom been photographically rendered, and the difficulties are of course greater from the greens of foliage offering impediments to rapid exposures, but which, however, *at small sizes*, are not insurmountable if skilfully treated.

Skies.—If a necessity from circumstances arises to represent photographically a landscape subject where, from its low horizon, the sky in art would play a leading part, especially in any sizes above the smallest—printing from two negatives appears to the writer the only method of rendering a satisfactory and artistic representation of nature. Nor, apart from the expense in printing and rather delicate manipulation required, can such practice be condemned by any canon of taste, but rather the direct contrary. Landscapes are generally the result of considerable exposures, for the reason that unless the lens is used at small aperture the distance fails to be included in the picture; and, next, that the greens of the foliage being as a colour intractable, are apt if not well worked into to come out black and bare on the glass. The above conditions infer solarisation of the sky; to a greater or less extent to 'stop it out' therefore altogether is desirable. The landscape negative having been finished it would be well that the one of the sky should be at once proceeded with; provided always that the appearances were favourable, as it would certainly not do to copy any poor-looking clouds that happened to be overhead. Still, if at all picturesque, the sky taken immediately subsequently to the lower picture will have this advantage, namely, that from the same point of view, and at quasi the same moment of time, the effect of light or shade will be homogeneous upon it, and the subject to which indeed "if right were right" it properly belongs. To take this sky proceed thus:—The best lens to employ for the purpose is a triplet—well stopped down, *i.e.*, to half or one-third of its diameter, which has a greater penetrating power of delineation for this purpose than any other lens; the collodion a high-coloured sample, and for any other use an insensitive one, but which for this purpose tends to avoid weakness and fogging, and gives sufficient details in drawing; the exposure nearly or quite instantaneous, according to circumstances; if the sky is composed of blue sky and white scirri or cumuli, it will not photographically give a satisfactory result; the best one to be anticipated is from a sky well covered with rolling grey clouds, some of very great and threatening depth of colour well varied and modelled in their forms, side lighted with vivacity and piquante effects, and little, or, better still, *no* blue patches showing. It is indeed a very great chance if such conditions, which generally imply wind, rain, and anti-photographic light, will find the landscape photographer at work at the subject; so, failing that, he must proceed in the most artistic and homogeneous manner as regards the quarter whence *both* were lighted, to adapt a previously or subsequently taken sky to his landscape, which will have one advantage—that he will by selection be able to adapt one which

* No better illustration could be given than Mr. Bedford's picture of *Holy Street Mill*, recently printed in carbon by Swan's process.

shall compose properly with the leading lines of the composition of his landscape, and not place one which is a mere repetition of the forms seen beneath it.

General Treatment.—He must not *follow* the lines of his subject or *double* them, as it were, by the adapted cloud forms, but antagonise and vary the lines of the composition. This may be illustrated thus:—The great masters of landscape painting of the Dutch school, from the nature of the country which gave them the subject of their pictures, generally have a flat, low horizon occurring in them; under these conditions, Wm. Vandervelde or Backhüysen in their sea-pieces, Jacob Ruysdael, Wynants, &c., in landscape, always make the forms of their skies play a very leading and important part. * * * *

To pursue the subject further would lead beyond the scope and limits of this volume, and into the domain of art-composition; these few suggestions are merely thrown out to point out to the student the desirable direction—intelligent reference to the works of great painters, either from the originals or prints, must do the rest. In treating landscape subjects with the camera the dimensions proposed must be studied, and in accordance with those the treatment is governed very considerably by the class of lens employed, which must be adapted to it. Thus, in small pictures six by four to nine by seven inches, the greatest finish and delicacy of definition will be requisite. No 1 triplet gives this beyond any other lens; in larger works, eighteen by fourteen, such minute delineation would be erroneous and misplaced. Here a single or orthoscopic lens of an appropriate size to cover the surface with bolder treatment is the description to employ.

To illustrate the foregoing by the true standards of excellence in artistic representations—it would be as palpably absurd for an historical painter to give the minute finish of a Terburg or Metzu on a canvas of vast dimensions, as it would be for Meisonnier to aim at coarse executions on his tiny panels. In engraving, the delicate lines of a small subject in an annual give place to bold, vigorous, trenchant scorings in the treatment by Doo of John Knox preaching. From a want of knowledge of the principles of art in many photographers, a morbid admiration and reverence of unnaturally *minute definition* tends to lead the operator away from what should really be the end and aim of his study. Instead of "going in" for the broad vigorous effects of *light and shade* in the landscape, he is led to look upon a mechanical "organ-grinding" kind of exposure consequent upon absurdly reduced aperture as the correct thing, whilst to the eye of the artist the much-vaunted result appears like a landscape carefully black-leaded, and then executed in minute needlework—qualities which are no compensation for the want of the broad and vigorous effects of light and shade which have been given by the lens when skilfully applied to this class of subject.

The student should note distinctly that, however astonishing and captivating good definition and detail may be in *studies of foreground*, &c., in the *general* landscape, fine broad effects of light and shade will supersede it all. Mere clean mechanism on the plate grows monotonous, and will always succumb to the sentiment conveyed to the mind of the spectator by representations — photographically less perfect — in which any of the changing effects of light and shade may have been successfully rendered. The artist should likewise consider that *careful and discriminating selection* will make itself felt in this, as in every other description of subject, and must not go out with his camera as to a sort of photographic battue in which *one well-studied picture* seems not to be the desideratum, but *quantity* not *quality* is sought for. Now, the truth is, that one little bit of well-selected foreground, a bank with a few docks and thistles, with the bright sun-ray glancing from the tufted grass to the grey ivy-grown stump of the gnarled pollard, is worth a hecatomb of such things.

The execution of landscape pictures entails the necessity of having a tent, van, or some other means of manipulation of them, since *very few* operators have been so sufficiently successful with any of the dry processes that the results of their manipulation can be regarded with the requisite certainty of a satisfactory issue, or have rendered the recalcitrant greens of the landscape with anything at all approaching the power and sensitiveness of the ordinary wet collodion. Whilst at the same time the photographer may, in these railway times, be several hundred miles distant from *the* pet subject of which he fondly imagines he has a transcript safely in his baggage, but of which illusion subsequent development proves the fallacy, the only certain way is to *see the result* before leaving the spot. * * * *

(To be continued.)

PHOTOGRAPHY IN COURT.

SYSTEMATIC ROBBERY FROM A PHOTOGRAPHIC WAREHOUSE.

The magistrate, Mr. Tyrwhitt, has recently had brought before his notice at Great Marlboroughs-treet Police Court, a case of robbery from a photographic warehouse, and as the particulars have been but very imperfectly reported we propose to state them more accurately. The immediate sufferer is a gentleman well known in photographic circles, Mr. Jabez Hughes, of Oxford-street, London.

For some time past goods have been known to disappear from Mr. Hughes's warehouse in an unaccountable manner, and neither his manager (Mr. Werge) nor himself could discover how or in what manner they were taken. They were never removed in large quantities so as to be immediately missed, but were taken in small quantities. One day a 60-grain tube of chloride of gold disappears, the next it is a pound of Mawson's collodion; again, it is five ounces of nitrate of silver, a quire of albumenised paper, an ounce or two of pyrogallic acid, a few bottles of Sœhnée varnish, and so on. As all the *employés* bore the character of irreproachable honesty, and had been for several years in the establishment with unblemished reputations, suspicion could scarcely be cast upon them. Yet as the goods continually disappeared and were adroitly removed in comparatively imperceptible quantities, it was evident that the thief must be some one conversant with the interior of the establishment.

Neither Mr. Werge (the manager) nor Mr. Hughes could detect anything in the behaviour of the people they employed so as to tax them with the delinquency. They invited the aid of the detective police, who, with their characteristic shrewdness, surmised that there must be a *receiver*, whose business it was to dispose of the goods thus systematically abstracted. These "limbs of the law" discovered, what Mr. Hughes had not known before, that the porter, Joseph Ricketts, had a brother-in-law, Frederick Smith, who was a photographer, in a very humble way, in New-street, Covent-garden.

Further inquiries showed that this man, Smith, was in the habit of selling photographic materials to low-minded photographers at about half the usual trade price. The clue to the mystery was now furnished, and, the movements of the porter, Ricketts, being watched, on the morning of March 30th he was observed to come an hour before his time, and to enter the fanlight over the shop door. After being in the shop for about a quarter of an hour, he emerged again by the fanlight with a parcel of four quires of albumenised paper and two keys, which he had also taken out of the shop, and which would have given him access to the upper warerooms. The two detective officers and Mr. Werge, who were watching his movements, immediately arrested him. These keys he tried to throw away on the road to the police station. They then went to Smith's residence, and there found a quantity of photographic goods with Mr. Hughes's private trade marks on them, and some with special marks put on them to aid in the detection of the goods. When the particulars were stated to the magistrate, he remanded the prisoners for a week.

On Tuesday last the men were brought up again for examination. In the interval of the remand, the porter Ricketts sent for Mr. Werge, to whom he confessed his guilt, and to having stolen all the articles found at Smith's. He further stated that he had been incited to the theft by Smith, who gave him one shilling and sixpence per ounce for the nitrate of silver, and equally low sums for the other articles. Both the prisoners were committed for trial, the magistrate declining to dispose of the case summarily, it being too serious. An application was made to admit Smith out on bail, but this the magistrate distinctly refused.

This is only another example which the police courts have too frequently revealed of the many "black sheep" that disgrace the photographic calling, for the purchasers of these stolen photographic materials are wholly as bad as the original thief and the direct receiver. Mr. Hughes has good reasons for believing that this robbery has been carried on for two years past, but so cunningly and cleverly has it been managed that it has not been detected till now. As it is known that this Smith had his regular customers who relied on him for the supply of the goods they used, we cannot help asking the question, in the interest of honest and upright photographers who are struggling on, whether these facts do not suggest an explanation how some persons are enabled to supply the public at such ridiculously low prices? And, further, we ask the question—Is Mr. Hughes the only photographic dealer from whom goods are obtained by like questionable means?

PIRACY OF ENGRAVINGS.

This case (in which Thomas Ritchey, a picture dealer in St. Swithin's-lane was charged with infringing the Copyright Act by making and selling copies of certain valuable copyright engravings, the property of Mr. Henry Graves, of Pall Mall), reported in our last and preceding number, was again heard before Sir Benjamin Phillips, on Monday last, at the Mansion House, when, as formerly, Mr. George Lewis, Jun., solicitor, appeared for the prosecution; Mr. Chipperfield for the defence.

Mrs. Mary Ellen Freer, of 23, Pelham-place, Brompton, was called by Mr. Chipperfield. She said her maiden name was Edwards, and that she painted the picture called *The Last Kiss* some time in 1865. She sold it to Mr. Troubridge in February, before it was finished, and received a deposit from him. She signed an agreement to let him have the picture. Nothing was said at that time about the copyright. She sent the work to the Royal Academy Exhibition in April, and she first saw Mr. Graves a few days after the private view. He wished to have the picture, and he promised to arrange everything with Mr. Troubridge. The picture was afterwards bought by Mr. Graves at Mr. Troubridge's price, and witness received an increased sum for it from Mr. Graves. Nothing was paid by Troubridge except the deposit. She supposed Mr.

Troubridge made a profit by the sale. She signed a document in which the copyright was mentioned. Mr. Graves took the picture from the Academy and told her that the paintings and copyrights always went together.

Mr. Ernest Gambart said he was a picture dealer and print publisher, at 1, King-street, St. James's. He bought *My First Sermon* from Mr. Millais before it was completed. He saw it at the artist's house, and agreed to buy it when finished. It was then only an imperfect sketch. He did not commission Mr. Millais to paint it. They agreed to a price, and the exact sum was adhered to. The picture was begun in 1862, and appeared in the Royal Academy Exhibition in the following year. He would not buy the copyright, as he was disgusted at the expense to which he had been put in prosecuting persons for piracy. He then contemplated giving up his publishing business on that account. The copyright was mentioned, but he declined it. He signed an agreement reserving to Mr. Millais all copyrights of pictures that he might buy. He could not tell the date of that. It was after the passing of the Act, as Mr. Milliais had been advised by a solicitor what he should do to comply with it. It was not signed to cure any defects in former purchasers. It was a general reservation of the copyrights of all pictures bought then and thereafter. He paid Mr. Millais for *My First Sermon* on the 28th Jan., 1863. He had bought pictures constantly of him, and several since that date. He bought two pictures from Mr. Faed, called *I Take This Opportunity* and *Perfectly Satisfactory*. They had since been respectively called by Mr. Graves *Accepted* and *The Offer*. *Accepted* represents a country girl sitting on a tea-chest and commencing a letter "I take this opportunity." Its size was 22 by 31¼ in. It was bought from Mr. Faed on the 26th July, 1865, together with the copyright. It was begun in May, and was not painted on commission. There was also a replica 16½ by 23½ in., being a free reproduction of the subject. That was commenced a week or two before the completion of the original. They were both registered as originals. The replica was paid for in February, 1866, and registered on the same day. Witness sold the larger picture and the copyright to Messrs. Moore, M'Queen, and Co. (Limited). He purchased *Perfectly Satisfactory* on the 1st of February, 1866. It represented a girl reading a letter, and being satisfied with its contents. It was sold on the same day. Witness bought all the pictures when they were mere sketches. The agreements with Mr. Faed were merely verbal. The copyright of *Perfectly Satisfactory* was included in the purchase. Its size was 22⅛ by 31¼ inches. It was registered two days after its purchase. He bought the replica on the 21st of February, and registered it also as copyright. They were sold to Messrs. Moore, M'Queen, and Co. (Limited).

Mr. J. A. Spencer, photographer, Shepherd's-bush, proved to having photographed four of the engravings in dispute, by agreement with Mr. Graves in 1867, and to their being registered at Stationers' Hall. The negatives were in Mr. Graves's possession.

Upon that evidence Mr. Chipperfield applied for a remand in order to produce as witnesses Mr. H. Graves, Mrs. Flatow, Mr. William Agnew, Mr. Lucas, Mr. Frith, R.A., and Sir Edwin Landseer, R.A., all of whom, as he contended, were most important to the prisoner's case.

Sir Benjamin Phillips remanded the prisoner until Wednesday last, when he was again placed at the bar.

Various witnesses having been examined,

Mr. Chipperffeld took objections to the title of Mr. Graves to the copyrights—that his proprietorship was not sufficiently proved by a certified copy of the entry of the last assignment being produced; that photographs of engravings taken from paintings were not original; that sufficient descriptions of the works had not been entered; that the copyright was not created at the time of the first sale; that the copyrights, if created, were never assigned to the complainant; that the correct dates of the agreements were not given at registration, nor the names of the parties correctly inserted; that the painting *The Railway Station* was sold before the Act of 1862, and that a registry of *The Last Kiss*, in May, 1865, displaced that of the prosecutor in August. He cited judgment of Mr. Justice Blackburn in a similar case to show that minute descriptions of paintings should be registered. Mr. Lewis, in reply, said the objections had been decided against in nearly every police-court in London.

Sir Benjamin Phillips said the defendant was charged under the Act 24th and 25th of Victoria for selling unauthorised copies of copyright drawings, and there were in all 31 cases against him. After duly considering all the circumstances, he was of opinion that Mr. Graves was by law entitled to the copyright in his pictures and photographs. In 1862 a wise and just law was passed to protect artists, and it was monstrous and absurd to allow quibbles to over-ride the true spirit of the Act. An important question arose as to whether photographs under those peculiar circumstances were original. He had come to the conclusion that the Act was quite clear upon the subject, and that within its meaning photographs could be original. Photography was a beautiful and interesting art when confined to its legitimate range, but if it was to take the place of valuable labour, and labour spread over years, its introduction would be most fatal to the interests of a most meritorious class. Mr. Graves had substantially proved his right, and he (Sir Benjamin Phillips) ordered the prisoner to pay £5 for each of the 31 cases, £155 in all, with the alternative of two months' imprisonment in the first case, and seven days in each of the others. The pirated photographs would be destroyed.

The prisoner did not pay the fines, and was taken to Holloway gaol.

Contemporary Press.

PHOTOGRAPHIC LEAF-PRINTS.

[Philadelphia Photographer.]

As you have been kind enough to notice some humble experiments of mine on the action of sunlight on glass, I thought it might interest some of your readers to know what might be accomplished by your beautiful art in showing forth the more beautiful productions of nature in the forest and the field.

In pursuing my sunlight investigations I was led into an examination of the comparative power of different coloured glasses—of ground glass, and of the various kinds of colourless glasses—to transmit the chemical or actinic rays. In this course of experiments I made several photographic sheets, illustrative of this interesting power of the sunlight, to which, during the past year, attention has been called in photographic journals at home and abroad.

During my last vacation, spent in the country, I took some pressure-frames and sensitive paper, in order to carry on my experiments with glass. It occurred to me, one day, that differently-coloured leaves would probably have a similar effect to that of the different glasses in transmitting or cutting off, in different degrees, the action of the chemical rays on the sensitive paper. I gathered some fresh green leaves, and some red, orange, and yellow autumn-tinted ones, and, placing them in my pressure-frame, was pleased to find a very interesting picture produced, showing that the red leaves cut off nearly all of the chemical effect of sunlight, while the orange, yellow, and green passed a greater or less amount of the actinic rays. These first experiments were, of course, quite crude, but, on my return to Boston, I continued them, by the kindness of Messrs. John A. Whipple and A. Marshall, at their rooms in Washington and Tremont-streets. Calling to my aid gentler hands than my own, I obtained some beautiful wreaths of autumn leaves and of ferns, and have been much pleased with the charming and exquisite photographs which have been made by the pencil of the sun. I have sent copies to several photographic friends, and have been much gratified with the universal testimony to the interesting character of the self-printed leaves and ferns.

Your readers will understand, of course, that all that is necessary to make these pictures is to gather the leaves and place them as negatives in the pressure-frame, and to expose them until a strong, dark print is produced. The time of exposure must vary with the season of the year and with the brightness of the day. In a pleasant day of summer or autumn, an exposure of ten minutes will sometimes make an excellent picture. After being toned and fixed, the print will show, under a magnifying glass, the most delicate veins and ribs of the leaves.

A camera-picture of the leaves would show no detail and no distinctive shading, giving only a dark and flat impression of the shape of the leaves. By using as a negative the sensitive-paper sheet taken directly from the leaves we obtain an interesting print, showing the leaves with different degrees of shading upon a light background. When the leaves are so faded as to be useless, this second sheet can be used as a negative to reproduce the first one, although the impression is not so sharp, and does not show the details so finely as the print taken directly from the leaves. These leaf-prints can be copied by the camera, and make very beautiful card and cabinet pictures.

To the lover of nature, to the botanist, and the amateur photographer, it seems as if leaf-printing would open an interesting field for pleasant work and research.

Possibly, it might afford new material to the artist in making designs for printing calico and wall papers, or carving in wood or stone.

The amateur photographer can find in it an infinite fund of amusement in his summer rambles through gardens, fields, and woods. The professional photographer can obtain a few paper negatives every year, which, if they present a tasteful arrangement of leaves, ferns, or flowers, can be sure to furnish him a source of occupation in his days of dull business, and to give him a pecuniary return in the sale which I think they must always command.

After working a long time upon these interesting leaf-prints, I ascertained that I was not alone in my admiration of their beauty, and I was surprised to learn that a work upon the subject had been lately issued, with a specimen print, by the publishers of the *Philadelphia Photographer*, edited by Professor Charles F. Himes, of Carlisle, Pennsylvania. This is a very neatly-printed and quite an interesting volume, and should be purchased by all who desire to pursue this work by themselves, or by the aid of some friendly photographer. Thomas Gaffield.

Our Editorial Table.

Photographic Labels. — Chemical Labels.

Leeds: Harvey, Reynolds & Co.

We have received from this well-known firm two books of gummed labels. One contains a complete series of the solids and solutions used in photography, the other an equally comprehensive series of

general chemicals, with symbols arranged according to the new notation. From the fact of these useful books being sold for a few pence, they will doubtless attain much popularity among those requiring such labels. We observe that there are duplicates of the substances more commonly used—indeed, in some instances, such as "Negative Developer," "Pyrogallic Acid Solution," "Fixing Solution," "Toning Bath," "Collodion," &c., we find four or five of each.

THE MONTHLY MICROSCOPICAL JOURNAL. London: ROBT. HARDWICKE, 192, Piccadilly.

WE have before us the third and fourth numbers of a new candidate for public favour in the microscopic world. We must congratulate its talented editor, Dr. Henry Lawson, F.R.M.S., for having got together so many valuable papers as those in the numbers before us. We may specially refer to a series of articles on a subject of the greatest importance to men of science, and one which, so far as we remember, has not been systematically treated of late years. We refer to the articles *On the Construction of Object Glasses for the Microscope*, by Mr. F. H. Wenham—a gentleman whose name is intimately connected with this subject. Without here describing any of the object glasses so well treated of by Mr. Wenham, we extract a chapter entitled—

ON THE OBSERVATIONS REQUISITE FOR CORRECTING OBJECT GLASSES.

For this purpose, a particle of mercury is placed upon a slip of black glass. A piece of watch-spring, or the thin handle of a spatula, is held up at its end by the fore-finger of the left hand, and slapped smartly down on the mercury, which is thus beaten into powder, in the form of numerous minute globules. Of these, a larger size is selected for correction for colour, and a minute one for ascertaining the errors of figure and centering, and state of the oblique pencils.

The globule must be illuminated by direct candle or lamp light, *and not by daylight*, as the latter will not allow perfect correction to be obtained. The light requires to be set as close as it can be, and, of course, in the highest powers, where there is little distance in front. It must be very oblique; but this is of no consequence, as it is not the globule itself, but the spot of light reflected from it, that is required to be seen.

The lens to be tested is adapted to the microscope, having the ordinary Huyghenian eyepiece. On placing the globule either in or out of focus, the luminous point expands into a ring. If the object glass is under-corrected for colour, as in a single lens, the bright ring appears within the focus—the outer margin is red, and the inner circle green. If the lens is over-corrected, the bright ring appears *without* the focus, with the colours in the same order as before. A practical knowledge only, derived from these appearances, can determine the amount of concavity to be given to the flint, or difference of convexity in the crown, for obtaining the desired correction; but even in the most experienced hands it generally involves several alterations to secure perfect achromatism. When this is corrected as far as practicable, a pale-green colour only is perceptible beyond the focus. This arises from the secondary spectrum, or relative difference in the width of the prismatic colour-spaces of the crown and flint, and seems to be a variable condition, according to the composition of the glass employed.

Though correction for spherical aberration is intimately related to that of colour—a single lens, when finally achromatised, being also nearly free from spherical error—yet, in a combination of three pair, when matched so as to be achromatic, this may be so considerable as to render the object glass useless, and is oftentimes exceedingly troublesome to remedy. The error may arise from an improper proportion between the relative foci of the lenses—as the back being too long. I have before stated that in the form that I have advocated, the spherical aberration is mainly corrected by giving thickness to the front lens, and by properly adjusting the distance between them. In a glass spherically under-corrected, the light from the globule is greatest within the focus, and when set out of focus speedily vanishes and becomes diffused; in the case of spherical over-correction the contrary appearances result. When the relative distance of the lenses is rightly adjusted, the light spot expands equally, and is of the same intensity, for a short distance on either side of the focus, in which the globule should appear with a clear bright margin. The object glass is now in a proper condition for testing errors of construction and workmanship.

To examine the condition of the oblique pencils, and consequent flatness and distinctness throughout the field, a small globule is selected, and brought to the edge, using the lowest eyepiece; if the bright point in the centre of the globule, when a little out of focus, approaches to the inner side of the concentric light-rings, it is termed "outward coma," and indicates that the front incident surface of the back triple is too *convex*. If, on the other hand, the bright spot is on the outer side of the rings, or next the margin of the field of view, there is "inward coma," which shows that this same surface is too flat. I have previously remarked that this curve has a powerful effect on the flatness of field and perfection of the oblique pencils, and for these no other correction is generally requisite than an alteration in this radius.

Before the glasses are finally cemented in their cells they should be carefully tested for centering. For this purpose a very minute globule is selected, and placed exactly in the centre of the field. If the bright spot appears eccentric, the pair of lenses which occasion the error should be shifted on each other while warm enough to cause the Canada balsam—by which they are cemented together—to yield, till, on repeated trial, the error is corrected. This is important, as the least fault of centering materially impairs the performance of an object glass. But, with the precautions that I have adopted in the construction, to be hereafter explained, errors of centering cannot occur.

There is yet one other globule test for object glasses, to indicate accuracy of workmanship, or whether the lenses are worked to true spherical surfaces. If the rings from a minute globule appear of an irregular wavy outline, either approximating to a polygon or triangle, it shows that one of the surfaces at least that refracts the rays is of this form. Such workmanship is inexcusable, and those that cannot avoid it had better let glass-grinding alone.

Finally: there is an appearance that I have sometimes seen in our best object glasses, when focussed away from a globule, viz., "Newton's rings;" this shows that in the contact surfaces of one of the pair of lenses the convex is deeper than the concave; and bears hard in the middle. This may have no worse effect than loss of light, but still it is as well avoided.

HUMAN NATURE. London: JAMES BURNS, Camberwell.

THIS is a monthly journal of zoistic science and popular anthropology, in which are discussed "things hard to be understood" by the general reader. We observe in it a review of a *Treatise on Light and Colour*, by Dr. Johann Ferdinand Jenckin, newly translated and prefaced with an historical and critical essay by Mr. H. D. Jenckin (of London), Barrister-at-Law, &c. Concerning this treatise we may have something to say on an early occasion.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 13th......	Society of London	9, Conduit-street.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE ninth meeting of the session was held in the Hall, 5, St. Andrew-square, on the evening of Wednesday, March 24. The President, Sheriff Hallard, occupied the chair.

The minutes of the former meeting having been read and approved of, Mr. Councillor Field and Mr. Charles Sandeman were admitted members of the Society.

Mr. George Slight, V.P. then read a paper on an *Improved Form of Burner for the Oxyhydrogen Lantern*. [See page 170]. After the reading of the paper,

Mr. J. NICOL said that much more depended on a really convenient burner than was usually supposed; and the uniform success which had attended the meetings of that Society was mainly due to the various improvements which Mr. Slight had from time to time made. The burner which they had been in the habit of using for some time was, no doubt, as nearly perfect as it was possible for a thing to be, so far as its light-producing power was concerned. The burner, however, then exhibited was, mechanically, a decided improvement on it—in the first place, because the adjustments were much more easily made, and in the second place, because, as it was made almost entirely on the turning-lathe, it could be made much cheaper, without sacrificing its efficiency. The only thing he would suggest was, that the pipes to which the flexible tubes were attached should be about a couple of inches longer, as he had found, from experience, that the rubber had a tendency to get injured by the heat. He would also take that opportunity of advising lantern-workers to discard all idea of safety-valves and safety-burners as useless complications, tending to lead to the accidents they were intended to prevent, by producing carelessness, and inducing trust where no trust should be placed. True safety lay in looking to the pressure.

Mr. Macbeth then read some observations in reply to Mr. Bow's *Remarks on the Mutual Reaction of Pictorial Art and Photography Upon One Another*. [See page 167.] Mr. Macbeth was very warmly thanked for the trouble he had taken in so clearly bringing before the members the question of art in connection with photography, and, as Mr. Bow was not present to take part in the discussion, it was considered advisable to let the subject lie over for consideration till a future meeting.

A number of card-pictures by Fritz Luckhardt, which have been introduced lately as articles of commerce, were exhibited by Mr. Macbeth, and were very much admired. The general impression was that the negatives had been very much worked up, and he stated that such a method might do very well for kings, queens, and actresses, where effect was more desired than likenesses; but for ordinary mortals and ordinary photographic work it was not desirable, as the likeness was sacrificed to artistic effect.

A considerable time was occupied in the discussion of what was truth in drawing and photography, in which Messrs. Macbeth, M'Glashon, Ross, and the Chairman took part. In the course of the discussion,

Mr. M'Glashon stated that the objections urged against the touched cards or negatives could be and were now brought against painting. He gave as instances the portraits in the Royal Scottish Academy's Exhibition then open, in which, he said, not one would be found which did not in one way or other violate truth of drawing with the evident desire of creating effect.

Mr. M'Glashon then exhibited a number of prints by the Woodbury process of various sizes and subjects, and among them was a very fine print on glass for the lantern, which proved the capability of the process in colour, clearness, and definition for all kinds of glass transparencies. They were much admired.

Votes of thanks were then awarded to the gentlemen who had contributed to the interest of the evening, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A general meeting of this Society took place on the 5th ultimo,—M. Balard in the chair.

After the election of some new members, and other private business, M. Valette presented to the Society a description of an apparatus for operating in the open air without tent or shade of any kind.

M. Chardon made the following observations on the employment of carbonate of silver paper:—The paper prepared with carbonate of silver offers on the one hand certain advantages, and on the other serious difficulties. Its qualities are as follow:—1. The paper thus prepared will keep a very long time before being employed. The printed sheets also retain their brightness and their whiteness for at least fifteen days, so that the fixing bath can be economised considerably, this manipulation not being required to take place until a large number of proofs have been printed.—2. This paper is easily strengthened in the different baths now in use, and the tones desired can be obtained just as well as with the chloride of silver paper. As to the rapidity of the printing, it is quite equal to that attained with the ordinary paper. This process, therefore, would be very advantageous, particularly in summer, when papers turn yellow so easily, if the drawbacks attending its employment were not of a nature to render a better acquaintance with it necessary, prior to its being practically adopted. In order to impress this paper everyone knows that it is indispensable to charge the pads which compress the frame with ammoniacal vapours. Now, in the first place, if they have not accumulated sufficiently in the sponges, the proof does not come well out and the paper generally assumes a rose tint. In the second place, if the vapours have been sufficient and the light becomes defective, as happens in winter, the effect is the same as that of a hard negative which may not have given a proof in a whole day, the same being stopped in its coming by the evaporation of the ammonia in the surrounding air; whence we may conclude for the present, that, without a great quantity of ammonia—without a fine light, and with negatives which are not transparent—it is impossible to obtain good results. A still more serious contingency is presented in this process. It is known with what facility alkalies decompose resins, and consequently how they are likely to affect the varnish employed to protect the image obtained on the collodion. By the repeated employment of ammonia—I say "repeated," because in printing many proofs the accident I am about to point out may not occur—but after the printing of a large number from the same negative, I have been surprised to find that it has been completely destroyed owing to the action of the light on the varnish which I generally use, and with which I have previously had reason to be satisfied. When the negatives are not entirely destroyed, the varnish with which they are covered undergoes (according to the experiments at present made) an alteration, which is manifested by an intense yellow colouring, and which renders any subsequent printing therefrom impossible. When, after having employed the carbonate of silver paper, and consequently the ammoniacal vapours, it is desired to use the chloride of silver paper, the negatives must not only be placed in the open air, but it is indispensably necessary to change the sponges or pads completely, and also to change the frames, or the paper will, almost immediately, assume a deep yellow, and cannot be toned. I have mentioned these precautions as necessary, because I have found them so from experience.

M. Schaeffner replied to the preceding observations as follows:—I am about to offer a few words in reply to M. Chardon. I affirm that none of the difficulties cited by him have presented themselves either in the thirteen months during which we have made use of the sensitive carbonate of silver paper, or the last five months since it has been offered for sale. It appears to me that the discussion raised by M. Chardon has no direct reference to the carbonate of silver paper. The carbonate of silver salt being completely insoluble, the paper containing it cannot, in any manner, react either upon the negative itself or upon the varnish that protects it. It is, therefore, against the ammoniacal fumigations that he makes his attack. We have nothing to answer respecting the qualities of our sensitive paper; they are what its daily employment has shown them to be, and as M. Chardon himself has stated in his communication. As to the rest, our respect for the Society to whom we have the honour to belong would have deterred us from presenting our discovery to you if it had been marred by the signal defects mentioned by the author of the preceding note. As to the difficulties of the ammoniacal fumigations (not the carbonate paper) I will also reply to M. Chardon, in order not to withdraw from the discussion; and I will say, with regard to the first difficulty cited, that in our description of the mode of employing our sensitive paper we state that the abundance of ammoniacal vapours is the essential condition necessary to success. If, therefore, these results ensue from the employment of an insufficient quantity of these vapours, the operator has only to attribute them to the non-observance of our instructions. We have never remarked that it was necessary to leave a negative exposed to the light an entire day in order to obtain a proof on our paper. A negative so hard as to necessitate so long an exposure is quite an exception—an isolated case. This misfortune is not aggravated by the employment of our paper; everyone knows that a proof on ordinary paper which has been obtained in two days, as may happen, is only too frequently defective. As to the question of the influence of ammoniacal vapours on the varnish of negatives, to that we have no difficulty in replying. The employment of these vapours is not novel. Ammonia fuming has long been practised. Practitioners of great merit have made use of weak silver baths and ammoniacal fumigations during, at least, the last five years, and without a single accident of the kind mentioned by M. Chardon. I can bring evidence in support of what I state. If it has happened that the varnish of certain negatives has turned yellow, that may be ascribed to a series of causes which I cannot now discuss *in extenso*. But through the ammoniacal vapours alone no negative can be lost. As to the cry about the negatives, the cushions of the press frames, and the press frames themselves (which have served for transfer by ammoniacal vapours), being rendered useless until after they have undergone special purifications, that is completely at variance with the practice observed daily in the employment of ammonia. In conclusion: I can only say that the results of M. Chardon's experiments are at variance in every point with the satisfactory testimonials we are constantly receiving from the numerous photographers who make use of the carbonate of silver paper.

M. Davanne said he thought the results pointed to by M. Chardon could perhaps be explained by the employment of a benzoin varnish. For his own part he always employed lac varnish. He added further that he had left some ammoniacal liquid in contact with a varnish of this kind for eight hours, and at the end of that time he found the varnish totally unaffected.

The meeting was then adjourned.

Correspondence.

Foreign.

Paris, April 5, 1869.

On Friday evening last I was able to attend the monthly meeting of the French Photographic Society. M. Peligot occupied the chair.

A letter from a photographic artist of Bergen, in Norway, was read, announcing the despatch of some photographs for the Exhibition of the French Photographic Society, to open next month, and containing a short account of his system of blinds for lighting his sitters. When I see the pictures I shall be able to judge of his plan and to report upon it.

Another letter was read from Signor Casinol, giving a description of his process for producing what he terms "heliochromographs." These he is going to exhibit, and they are, judging from the specimens submitted to the meeting, well-coloured photographs on paper, and by no means what are generally known as heliochromographs—a name which is more properly applied to photographs in which the various colours are produced by the direct action of the light. Signor Casinol gave an outline of his process for colouring the photographs. He first half fixes them; whilst wet he applies certain liquid colours, and then the after fixing finishes the operation and modifies the tints. I do not think this plan is original, but I hope to have more details for your readers in a future letter.

Curiously, from showing how the same subjects occupy different minds in different places at the same time, two sets of specimens of transfers of carbon pictures on to glass, &c., were exhibited, and I read in your pages that the same process is occupying attention in England. The pictures shown by M. Gaumé, of Le Mans, were upon paper, to show how such pictures could be used for negative or positive *clichés* for all the carbon, engraving, and enamel photographic processes. The mode of operating was not divulged, and I only judge from the appearance of these transparent pictures that they were produced by a carbon process. M. Gaumé intends to compete for a prize medal of the Society to be awarded in April, 1870.

The other specimens were shown by M. Despaquis, who read a description of the process by which they were obtained. M. Despaquis mentioned his process at the last meeting of the Society, on the 5th March, 1869, wishing the public announcement of it to date from that day, and he promised to bring more complete details to the present

séance. A plate of glass is cleaned, and coated with a warm solution of pure gelatine; a number are prepared at once, and, when dry, are plunged into a weak solution of alum to render the gelatine insoluble—of course, any other substance than alum can be used if it have the same property. A picture is printed upon a piece of carbon paper, either Swan's, Marion's, or any other "tissue;" it is placed upon the insoluble gelatine film, and subjected to pressure. The insoluble gelatine should be moist, and freshly prepared just before use. Care should be taken to wash the gelatinised plates after the alum bath, so as to free them from this salt. The picture is brought out as usual on the glass, after the sheet of paper has been removed. M. Despaquis says the gelatine can be applied to any substance, and suggested linen as a suitable medium for enlargements obtained from his sensitive carbon paper, which is used for obtaining an image upon in the enlarging apparatus. Obtain your carbon picture in any way you like, and it can be transferred to anything capable of supporting a film of insoluble gelatine.

Specimens upon glass of portraits were handed round, and, although showing the great capabilities of this process, did not equal the beauty of some transparencies shown by M. Rousselon, the manager of the photographic establishment of MM. Goupel, and produced by Mr. Woodbury's process. More care had been bestowed upon the transparencies by Mr. Woodbury's process than upon the transfers; and before making a comparison between the merits of the productions of each process, we should see the *best* of which the transfer is capable. M. Rousselon also exhibited a number of very fine mounted specimens of the process now in use by his firm, and they were much admired. M. Rousselon stated that at present, when their workmen were not thoroughly conversant with the manipulations of the process, they could print as many as 500 daily from a metallic plate, and that he expects to be able to turn out 700 to 800 a day when in good working order. His firm has chosen this process from its greater simplicity and practicability on a commercial scale, in comparison to the known carbon processes. The pressure they used for obtaining their pictures was about one ton to the square inch.

M. Pinel-Peschardières showed some new specimens of photographs in printing-ink, which were very creditable. Some interesting photo-engravings by the process of M. Fizeau upon the Daguerreotype plate were much admired. This meeting was, it will be seen, chiefly devoted to the discussion of different modes of producing positive photographs without the use of nitrate of silver.

M. Vidal's new book, which I referred to in my last, was presented, and the meeting terminated by a communication from M. Davanne upon the alkaline bichromates of potash and ammonia. M. Davanne has constructed a useful table, giving the quantities of each of these salts in solutions of various densities, thus enabling an operator to tell at any time the strength of his bichromate solutions by the aid of a hydrometer. He explained a ready method of distinguishing bichromate of potash from the ammonia salt, and illustrated it by a pleasing experiment. Taking two phials of the salts, a spirit lamp, glass flask, and box of matches from his pockets, M. Davanne put a little bichromate of potash into the flask and exposed it to the heat of the lamp; the salt fused with decrepitation, and in a short time was melted into a ruby-red liquid, no other effect being produced. When this liquid had cooled and become solid again, a few crystals of bichromate of ammonia were placed in the flask, and the process of heating was recommenced. A very moderate heat quickly produced a curious effect: the ammonia salt, instead of quietly liquefying, swelled greatly, and emitted flame and smoke like a miniature volcano, and this reaction took place when the flask was removed from heat, and continued till the salt had been converted into a chromic oxide having a great resemblance in appearance and colour to green tea. This experiment is well known to chemists, although perhaps it will be new to many photographers who are daily using the alkaline bichromates. The experiment is free from danger, yet a certain quiet, half nervous expectation was to be felt in the meeting as it proceeded, but which was dispersed by some one uttering the thoughts of every member, saying, he supposed there was no *picrate of potash* in the flask! The recollection of the catastrophe of the Place de la Sorbonne was fresh in our memories.

A few words upon a letter of Mr. F. W. Hart, and upon your leader in the last number. Mr. Hart must know as well as anyone that no sensible person would have a valuable picture taken upon such a fragile surface as glass if any other material could be substituted. It seems to me that the fact of there being thousands of mezzotint transfers all over the country, of which I confess I was not aware, has nothing to do with the real point at issue—is glass, or some less fragile material, the better support for valuable pictures? No one will advocate glass if we can find something better; till that substitute be found use glass by all means, but do not contend that glass is the best. Those quantities of mezzotint transfers to be found in country public houses, &c., have lasted to this day in spite of their fragility, and not in consequence of it. In case of fire I would not give much for a picture on glass after five minutes' exposure to the flames, and I fancy an oil painting would last the longer of the two, if there be any difference. The question of enamels has nothing to do with pictures on glass; the enamel is upon copper plates, and will stand fire anyhow. I hope the weak objections of our Editor and self will not bar the almost certain success of Mr. Sarony's photographs; on the contrary, I hope our feeble efforts to render them more lasting will have the effect of making them more popular, and will give them still greater value in the eyes of photographers and the public.

Our Editor recommends Parkesine plates, which have *not yet* been made for the purpose, for the enlarged photographs of Mr. Sarony; they might probably be just what is wanted. Till they are ready, why not try the "pellicle," which is ready and waiting for use? There is "one" difficulty in the Parkesine—there is one in the pellicle. In the former it is the solvability of the plate itself; in the latter the difficulty of perfect transfer. Perhaps a transfer carbon process will cut the knot and be better than anything; if so, we will sink our Parkesine and pellicle, and till the right medium be found will say to the enlarged collodion positives, "stick to the glass plates." R. J. Fowler.

Home.

TRANSLUCENT PAPER.

To the Editors.

Gentlemen,—In an article in the last number of your Journal by your interesting contributor, "A Peripatetic Photographer," I observe that he makes reference to the "translucent paper" which I attempted to introduce some years ago, and offers to give some account of his experiences with it. I hope he will do so; for, although I am still satisfied that this paper can be used for a variety of photographic purposes, I hardly think it has been turned to account as it might have been. Had it been patented, and people *forbidden* to use it, it might possibly have been more anxiously looked after. Nothing so sweet as forbidden fruit. At all events, whatever may have been privately done with this paper, very few, if any, have given us an account of their attempts to utilise it.

I mentioned formerly that I had taken very fair negatives upon it; but when used bare—that is, without a superstratum of albumen or some other substance—it showed a tendency to decrease the sensitiveness, except when an alkaline developer was used, and there appeared also to be more risk of stains. These, I have no doubt, could be got over by using a superstratum of some suitable material between the paper and the collodion, and probably India-rubber dissolved in pure benzole would answer the purpose. I found albumen to answer quite well so far as the obtaining of the picture was concerned, but it showed a tendency to crack in drying. For the purposes of transfer, however, I found this paper all that need be desired. I have sent transferred negatives upon it all the way to America in a common envelope.

When I first made this paper I also tried carbon pictures upon it, and obtained some passable prints, but sometimes failed, in consequence, as I now know, of improper management. I have since renewed my experiments with it and find that it is capable of some interesting applications, which I propose noting and explaining in the small publication which I have advertised; but whether this shall ever see the light is still a problem. The progress of this little experiment in the publishing line, up to this time, leads me to think that, although there is and must be a growing interest in carbon printing, the number of those who take an interest in the practical working of it is as yet comparatively small.

I, for one, shall be looking forward with interest to what your "peripatetic" friend has to say respecting the translucent paper. If he has found it useful, I shall be glad; if not, I shall be glad to know the reason why.—I am, yours, &c., Wm. Blair.

Bridgend, Perth, April 5, 1869.

P.S.—I enclose a negative in which albumen was used. It was a good one, but you see it has all got cracked like a spider's web. This took place by the strong contraction in drying; I am not quite sure, however, but that I may have put the albumen uppermost. I also enclose a small bit of the varnished paper itself, now two or three years old.—W. B.

[Our correspondent has omitted to enclose the negative and sample of paper referred to. Mr. Blair will, doubtless, have by this time discovered the omission and remedied it, although too late for us to examine the enclosures named before going to press. Respecting the varnished or translucent paper introduced by our correspondent, we have long entertained the opinion that it might be made useful for many purposes. Never having seen any translucent paper prepared by Mr. Blair himself, we are not in a position to speak concerning it; but our own experiments have been mainly confined to employing what we ourselves made from his directions as a substitute for glass in dry negative processes. Dry-plate photography is still imperfect, and so long as we are dependent upon such a heavy and brittle substance as glass it must necessarily remain so. The essential requisites of a substitute are transparency to a certain extent, facility of preparation, flexibility, and cheapness. All these are embodied in the translucent paper of Mr. Blair. We shall be glad to receive the experience of our "Peripatetic Photographer;" but at our earliest convenience we

shall resume some experiments in this direction which we left off rather suddenly upwards of a year ago, and which, as if verifying the old adage, being "out of sight" were also "out of mind," although we trust only temporarily. We may also take this opportunity of correcting an error into which our "peripatetic" correspondent has fallen with respect to Mr. Blair's forthcoming volume. The reader will see from an advertisement on page iii. of our advertising sheet that the work is not to be solely (if at all) a *history* of carbon printing, but is to form a practical treatise on this important department of our art-science.—Eds.]

ENLARGED TRANSPARENCIES FROM DENSE NEGATIVES.

To the Editors.

Gentlemen,—Until I saw your correspondent's letter in the last week's impression of The British Journal of Photography, I was unaware that I was considered any authority in photographic matters.

I am glad to find that such a diversity of opinion exists amongst photographers, especially regarding the matter of transparencies; without such we should have great difficulty in coming to a correct conclusion. "I am perfectly open to conviction, but show me the man that can convince me."

Doubtless, what Mr. Cobb calls a dense negative I call a soft one. A photographer cannot have any idea of the difference of opinion regarding the densities of negatives till he advertises to produce an article for the trade that requires a special negative. A photographer's idea of density depends entirely on his method of printing—whether in the shade or the sun, strength of silver solution, amount of chloride in the albumen, &c.

I have had numerous (so called) soft negatives sent me for the production of enamels, from which I have totally failed to obtain a transparency sufficiently soft to produce an untouched enamel. Your correspondents must not forget that the style of transparency reintroduced by Mr. Sarony is *not* to be viewed by transmitted light, but by reflected light. I sincerely hope I am yet to be enlightened on the subject of soft transparencies. I am still unconvinced.

It may be of some interest to your readers to know that I intend to explain, at the May meeting of the South London Photographic Society, a simple and inexpensive method of producing engraving and crayon-like effects in photographic portraits.

One remark, in reply to Mr. F. W. Hart. How can he imagine that Mr. Sarony could work his so-called process in secret? Anyone possessed of the smallest amount of photographic knowledge could, by dissecting one of the pictures, at once see how they were produced.—I am, yours, &c.,

49, *King William-street, E.C.*, A. L. Henderson.
April 5, 1869.

To the Editors.

Gentlemen,—I should like to offer a remark or two in corroboration of Mr. Cobb's experience connected with transparencies from dense negatives, as given by him in your Journal of yesterday.

Within an hour after reading his letter yesterday forenoon, I had an ordinary printing negative, to which could not for a moment be applied any other term than that of *dense*, placed in my magic lantern, and directed to a 12 × 10 plate, which was placed in correct focus. Not having any oxygen at hand, I extemporised a strong light by inserting at the door in the side of the lantern the nozzle of one of Solomon's magnesium lamps, its flame occupying the same position as the lime would have done had I employed it. Owing to the great density of the negative I gave it three times the exposure recommended by Mr. Sarony, or about a minute altogether. In developing I found that no special precautions were required. The image appeared slowly, it is true, but quite evenly. There was neither hardness, patchiness, nor any peculiarity of light and shade, but what was naturally to be expected in a print, small or enlarged, from a negative of the class.

The great point to be observed in the development of enlarged transparencies is to have scarcely any free nitrate of silver on the film when the developer is applied. With much silver you get much density; and the converse is equally true.

To prevent density when wet collodion plates are employed, it is well to pour over the surface of the sensitive plate such a quantity of distilled water as shall reduce the proportion of nitrate of silver to less than a twelfth part of what it originally was. When this is done, the pyrogallic solution will develope the picture clean and evenly, but quite devoid of density.

Had the same plate been allowed to retain its original quantity of bath solution on its surface and then been developed by means of iron, a dense and worthless image would have been the result.—I am, yours, &c., Aliquis Secundus.
April 3, 1869.

WASHING MACHINES.

To the Editors.

Gentlemen,—In looking over the back numbers of The British Journal of Photography, in No. 407, February 21, 1868, I came across the article by "Aliquis," describing the "Collier" washing machine. On reading the article, I thought to make one would be a very simple affair; but when I had one made and came to try it, to my great disappointment the syphon would not empty the tub in the way stated.

Will you kindly try and illumine my dark mind. I have had it made to the description given, with one exception—I have a wooden tub instead of a zinc pan. The supply pipe and the zinc syphon is exact to the size given. The elbow of the syphon is nearly level with the top of the tub, and the end at which the water runs off is below the bottom of the tub. I have the cell at the bottom 6 × 4 × 3, and the aperture through the bottom of the tub into the cell is the same aperture as the syphon pipe. As soon as the water rises to the level of the elbow of the syphon it runs off, and thereby interferes with the central action, causing the prints to fall to the bottom, and they then lie motionless on the perforated zinc.—I am, yours, &c., Worcester.
April 7, 1869.

[The syphon must "choke" before it will act. The choking is most readily effected by having the syphon as flat as possible at the bend. We once saw one which would *not* work, but which was effectually cured by a slight blow with a large key on the bend of the syphon. Try this course.—Eds.]

Miscellanea.

A Convenient Battery.—A galvanic battery, which will be found very convenient under some circumstances, is described by M. J. Ney. A plate of amalgamated zinc is immersed in solution of chloride of ammonium, or, if the battery is to be carried about, may be set in sand wetted with a solution of the chloride. The copper plate is set in a porous vessel, filled up with carbonate of copper; the common mineral carbonate will answer the purpose, it is said. This combination, which is certainly cheap, gives, we are told, a lasting and strong current. It bears some resemblance to Jacobi's chamber battery, and, like that, is available where acid batteries are objectionable. The action consists in the decomposition of the salammoniac, the chlorine of which goes to the zinc, while the ammonia passes to the carbonate of copper. When exhausted, the action is revived by the addition of salammoniac.

Refining of Alloyed Gold.—Certain kinds of gold, especially from Australia, are alloyed with antimony, by which they are rendered brittle and unfit for use in many practical applications. One method of removing this ingredient has been to melt the gold with oxide of copper, which converted the antimony into a volatile oxide, but left the gold alloyed with copper, which has to be removed by a subsequent operation. Another method consisted in melting the gold with corrosive sublimate, by means of which both antimony and mercury were driven off as volatile chlorides, involving, however, serious loss of mercury. A new and much improved plan has finally been adopted in Australia, applicable to the purification of gold from silver and the baser metals, and which consists in passing a stream of chlorine gas through the melted metal for an hour or two, and after allowing the gold to harden the still liquid chlorides are poured off. A subsequent operation recovers the silver and every remaining proportion of gold.

Ground Glass for Studios Imperfectly Lighted.—Mr. D. Duncan, in a communication to our Philadelphia contemporary, says:—It is not generally known nor believed by the majority of photographers that exposures in the camera are remarkably short in studios which are lighted by ground glass, yet it is a fact. Whether a studio glazed with ground glass would work quicker than one glazed with *plain glass* only, I have not yet ascertained. Much, of course, would depend upon circumstances, *e.g.*, quality of the glass employed, &c., &c. It is a problem I don't pretend to solve. The principal fault with most studios is, that too much light is admitted. But for studios imperfectly lighted at the side, by being built in a valley of tall chimney-pots, or in a garden surrounded by trees, or between the brick walls of neighbouring houses, the following is valuable:—If plain glass is used in the "side lights" of studios situated as above, it will admit of very little light, that which it admits being only the reflections from the surroundings. Instead of using plain glass, let rough ground glass be substituted; the rough side of the glass should be outside. The light from the whole of the visible sky, and from the remotest parts of the opposite walls, &c., will be introduced into the studio, reflected from the innumerable faces or facets which the rough grinding has produced, the whole of the side light will appear as if the sky were beyond it, and from every point of this luminous surface lights will radiate into all parts of the room. Ye who strive to get art out of a "well," try it.

Spirit Photographs.—A correspondent has sent us a copy of the *Daily News* for March 27th, with a portion marked for our perusal. We find that it is a leading article on spirit photographs; but it has been written so many weeks after his perusal of our article on the subject [*ante*, page 49], that the writer, in giving a "re-hash" of the article in question, has forgotten the "points," or, more probably, has not understood them—hence an extensive publication of an article that cannot be ranked as either scientific or reliable. It is a matter for

regret that clever leader-writers, such as those of our daily contemporary, should so often indulge in their "fatal facility of writing," without considering it worth their while to acquire the requisite knowledge of technical subjects. From the able article in question we extract the following:—"On the outskirts of the ever-widening circle lighted up by science there is always a border-land wherein superstition holds sway. The arts and sciences may drive away the vulgar hobgoblin of darker days; but they bring with them new sources of illusion. The ghosts of old could only gibber; the spirits of our day can read and write, and play on divers instruments, and quote Shakespeare and Milton. It is not, therefore, altogether surprising to learn that they can take photographs also. You go to have your photograph taken, we will suppose, desiring only to see your own features depicted in the *carte;* and lo! the spirits have been at work, and a photographic phantom makes its appearance beside you. It is true this phantom is of a hazy and dubious aspect, the "dull mechanic ghost" is indistinct, and may be taken for any one. Still, it is not difficult for the eye of fancy to trace in it the lineaments of some departed friend, who, it is to be assumed, has come to be photographed along with you. In fact, photography, according to the spiritualist, resembles what Byron called

'The lightning of the mind,
Which, out of things familiar, undesigned,
When least we deem of such, calls up to view
The spectres whom no exorcism can bind.'"

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A wide-angle, quick-acting *carte* lens, four and a-half inches focus, by Shepherd, together with 130 numbers of the *Photographic News*, and the last volume of the *Journal of Photography*, will be given in exchange for a half-plate or *carte* lens, by a good maker, of longer focus.—Address, CURTIS, Photographer, Sleaford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

O. SARONY.—Communication received, but too late to make the desired alterations in the advertisement, the "forme" being worked off when your note reached the Publisher. The notice, however, appears as a separate announcement on page iii. of the advertising sheet, to which we also direct the attention of all interested in the new photo-crayon process.

P. C. REMONDINI (Genoa).—Your favour and enclosure received. Your wishes shall be attended to in the course of a few days.

INQUIRER (Hull).—You may decolourise your red collodion by inserting in the bottle some turnings, shavings, or plates of either silver or zinc.

DRY PROCESS.—The Fothergill process was introduced by Mr. Thomas Fothergill, who published it in a letter to *The Times*, eleven years ago.

J. ROBERTSON.—Until the specification is published we cannot, of course, tell exactly in what the patent consists. We have stated in general terms all that we know.

HYDERABAD.—Thanks for your kind expressions. The volumes you mention are in stock, and may be obtained either through a bookseller or by addressing a note direct to our Publisher.

DIAPHRAGM.—We willingly give all the information that we can respecting lenses in the abstract, or even any special class or form of lens, but we never recommend any particular maker.

P. A. J. (Salford).—It will entail a little larger outlay to procure a good moulded glass bath instead of building one up of glass plates yourself; but depend upon it the former is the cheaper and better in the end.

PETER PHOTOGRAPHER wishes to know if there is in the market a series of lantern transparencies illustrative of the life of John Wesley, and a similar series of the monuments, farms, &c., on the field of Waterloo.

F. JORDAN.—The cause of the destruction of your collodio-albumen plates lay, without doubt, in your having fixed them with cyanide of potassium instead of hyposulphite. Avoid in future the use of cyanide when albumen forms part of the film.

JAMES R.—Place the bath solution in a clear glass bottle, and set it where it will be exposed to the sun's rays for a day or two. There will probably be a slight black precipitate. After that proceed in the manner indicated on a former occasion.

J. B. AND S.—1. The best glass for the studio be a hard, thin crown, of a slightly greenish tinge. It lasts well and does not become discoloured.—2. If the glacial acetic acid be good, purchase as much of it as you can, provided the price be such as to render the speculation a safe one.

DRY PLATE (Bradford).—1. The quality of the collodion for the collodio-albumen process is not of much consequence. A collodion of a slimy nature, that adheres closely to the glass, is considered best. We advise you to use a substratum of albumen diluted very much.—2. In our next number.—3. The patent expired upwards of two years ago.

P. R. (Glasgow).—If the diaphragm be placed close to the front lens of the portrait combination, the field will be flatter than when it is placed midway between the lenses; but the field of delineation will not be quite so large in the first as in the last-named position.

S. A. W. (Ipswich).—Two years since, there was much talk about Chambay's pictures, and we then devoted an article to the various methods of rendering prints transparent. [See vol. xiv., page 48.] Wax is not good for this purpose, neither is paraffine. If you have access to our former article on the subject read it, and if you do not there find the information required, write again.

R. POLSON.—A sheet of blotting-paper may be placed behind the plate in the dark frame from two motives—first, to absorb the liquid, which would otherwise cause stains and messes; and secondly, to prevent halation. In the latter case the blotting-paper should be of a deep colour, and it must be wet in order to secure optical contact with the glass; otherwise it would not be of any use for this purpose.

S. TENNANT.—The convergence of the lines in the church does not indicate any such defect in your lens as you appear to apprehend. We have examined the print somewhat carefully, and conclude that the instrument is a really good one. Why, then, the distortion? you will ask. Instead of having the camera standing level, you have pointed or tilted it upwards. The vertical plane of the ground glass was thus different from that of the building, and hence the distortion. Twist or turn the lens as you please, only take care that the sensitive plate stands in a perfectly vertical position, and there will be no such convergence as that which in this case has destroyed what would otherwise have been a very fine picture.

OXONIENSIS.—In order to answer your first question correctly we should like to know *how* you purpose producing the enlarged transparencies; for, while the wide-angle lens named can be used for the purpose, you may have others which might be much more suitable. In this kind of work the width of angle goes for nothing. If you intend to employ artificial light a portrait combination would answer better. A good way to obtain the vignette effect is to have an opaque board, with a hole of suitable dimensions in it, suspended at a little distance from the lens. By causing this to vibrate in the direction of the axis of the lens, during the time of exposure, a very soft outline of any shape may be obtained. We are preparing another article for our next number on the production of Sarony's pictures.

HIBERNICUS (Dublin).—We cannot give you the "best" formula for whitening glass positives; but we can give you one which is said, by some who have tried it, to be as good as any other. Mix together—

Saturated solution of bichloride of mercury in hydrochloric acid	12 minims.
Protosulphate of iron	20 grains.
Nitrate of potash	12 ,,
Alcohol	½ drachm.
Distilled water	1 ounce.

When this solution is poured over the collodion positive—which must have been fixed and well washed, but not allowed to become dry—the image at first darkens and almost disappears, but gradually reappears of a delicate pearly white. It is sometimes half-an-hour before the full effect is produced. By warming the plate the operation is accelerated.

☞ Editorial Communications should be addressed to "THE EDITORS;"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.

LONDON GAZETTE, *April* 2.

NOTICE OF SITTING FOR LAST EXAMINATION.

M. A. TIMPSON, Charles-street, City-road, photographer.—May 6.

METEOROLOGICAL REPORT,

For the Week ending April 7th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
1	29·93	49	35	37	40	ENE	—	Fine
2	29 83	50	32	41	44	SW	0·08	Fine
3	29 52	52	38	42	46	SW	0·01	Fine
5	30·11	53	34	41	44	W	—	Fine
6	30·13	53	43	46	49	SW	0·17	Fine
7	29 99	58	47	51	53	SW	—	Dull

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 467. Vol. XVI.—APRIL 16, 1869.

THE DECOMPOSITION OF COLLODION.

Those photographers who occasionally make their own collodion in preference to purchasing it ready prepared, and who have occasion to keep pyroxyline stored away, will not unfrequently have had their attention directed to the fact that many samples of it have undergone spontaneous decomposition.

It is only a few months since a correspondent sent us a sample of soluble cotton which he had procured from makers whose names are well known. It was wrapped up in ordinary blue wove writing paper, and, although judging from the post marks on the letter, scarcely more than eighteen hours could have elapsed between the time the letter was sent and that at which it was opened by us, the blue paper surrounding the cotton had been bleached to a sickly white and yellow colour, and the odour of the cotton was strong and pungent. When the pyroxyline was first obtained it appeared to be all right, but decomposition soon set in, and advanced rapidly.

From the experiments made at Woolwich arsenal to arrest the decomposition of gun cotton—a decomposition due to the presence of acid—it appears that a simple washing of the cotton for an hour or two after its preparation proves quite inadequate to eliminate the acid so thoroughly as to prevent the decomposition which, sooner or later, would set in. Repeated trials revealed the fact that it was necessary that the cotton should be washed not merely for an hour or two, but for *some weeks;* and not only was it so washed, but it was further subjected to treatment with water containing a slight trace of alkali.

We have no intention, in this article, of stating the reason why it is so difficult to remove the last traces of acid from gun cotton, but rather, by adducing the above practice (which is found to be absolutely necessary), to indicate to photographers and makers of pyroxyline a probable cause of the decomposition which occurs in connection with many samples of soluble cotton.

From the foregoing it might be inferred that a collodion film is a very unsafe medium indeed to which to trust a valuable picture, whether positive or negative. It is, however, well known that collodion pictures have remained exposed to the influences of the atmosphere since 1852 without any change being apparent. It has even been observed that a picture made of collodion the cotton in which had been very *imperfectly* freed from acid has remained unchanged for years, even although unprotected by varnish.

Mr. Spiller, at the last meeting of the Photographic Society, when alluding to this circumstance, suggested, as a reasonable way of accounting for it, that the collodion film, being treated just before the final washing with a strong alkaline solution, viz., the hyposulphite of soda or cyanide of potassium employed in fixing the picture, the acid reaction so destructive to the pyroxyline film was entirely destroyed.

We have made these hurried remarks, which arise out of the subject discussed at the meeting of the Photographic Society on Tuesday evening, in order to reassure those who are dubious about the permanence of collodion pictures—whether these be on paper as prints, or on glass, either as transparencies, negatives, or collodion positives.

A NEW "PHOTO-ENGRAVING" PROCESS.

We lately had the pleasure of examining some very interesting silver prints upon albumenised paper, obtained from negatives of a peculiar kind, and which were produced by Mr. J. V. Robinson, of Sackville-street, Dublin. We have been for some time acquainted with the process employed in producing these prints, but we did not feel ourselves to be at liberty to state it, as Mr. Robinson informed us that it was his intention to obtain "provisional protection" for his method. This protection has been obtained, and we are now free to bring the subject before our readers without prejudice to Mr. Robinson's interests in the matter.

At present we content ourselves with giving merely an outline of the new process, as we hope soon to be in a position to describe the details of the several operations involved.

Our readers are, no doubt, well aware that the collodion film has often been used as a basis for an engraving. The plan is simply to coat the plate with any good bromo-iodised collodion, sensitise in the usual way, and expose to diffused light. The plate is now treated with pyrogallic acid, and then fixed with hyposulphite of soda. We thus obtain a film of reduced silver on, or rather in, collodion which, when washed and then thoroughly dried, can be easily engraved with the ordinary tool.

There has always been a difficulty in obtaining very delicate lines on such plates, owing to the tendency of the collodion film to tear with the graver, and so render it impossible to obtain delicate effects of shade in this manner. Mr. Robinson discards the collodion plate, and uses instead a film of metallic silver deposited on glass by any of the ordinary chemical processes at present in use for this purpose. This is the point which we understand Mr. Robinson to claim as the feature of novelty in his process.

The specular film of silver, when obtained on the glass plate, can not only be easily engraved with almost any sharp-pointed instrument, but it will also bear the very finest lines to be produced without danger of blurring or tearing; so that in this way we obtain a fine line engraving upon glass which can be printed from as an ordinary negative.

Some years ago Dr. Strethill Wright, of Edinburgh, discovered some very singular electrical figures, which he called "electrical cohesion figures." It was found to be a matter of some difficulty to fix these curious patterns, and Dr. Wright preferred to employ the reduced collodion film and to make accurate tracings of the various forms on this surface. We repeated the experiments, and employed the same material on which to produce the tracing, but were often much troubled by the tendency of the film to tear even when the collodion used to coat the glass plates was of the powdery kind. When we lately tried the same method of engraving or etching on one of the silvered plates which Mr. Robinson employs, we found no trouble whatever in producing lines which even bore examination with a tolerably high magnifying power without showing irregularity. We can also realise the value of Mr. Robinson's plan as applied to the production of tracings with the camera lucida. Microscopists will, therefore, now be enabled to obtain an "etching" of any rare specimen, and then use the engraving as a negative, from which an indefinite number of positive proofs can be obtained.

We understand that Mr. Robinson intends applying his plan to relief printing, but we have not yet seen any specimens of the work done in this direction, and cannot, therefore, say anything as to the results. But of the prints obtained from designs drawn on the silvered glass we can speak very favourably. One print which we lately examined impressed us particularly. It represented the head of a dog, and had evidently been boldly etched on the plate. The

expression was admirable, and the half-tone better than we expected. A small *carte* was also shown to us, and we had no difficulty in recognising it as a very close imitation of a *carte* obtained in the ordinary way from a well-known engraving. These specimens were merely intended to exhibit the peculiarities of the process, and, from what we have seen of the results obtained, we should entirely be disposed to consider that Mr. Robinson's process admits of many useful applications.

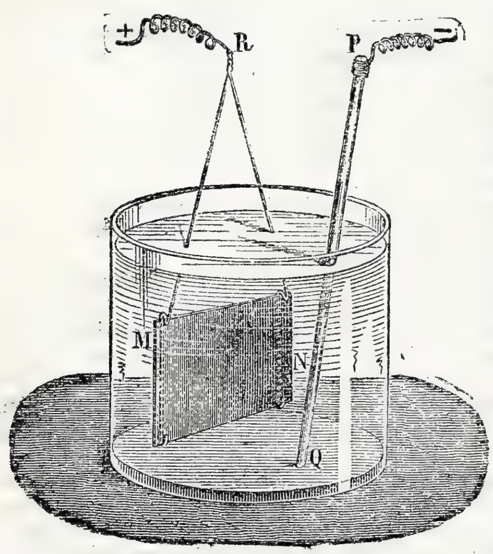
ON THE PRODUCTION OF PHOTOGRAPHS IN THE NATURAL COLOURS OF THE OBJECTS REPRESENTED.

II.

The best method of rendering a silver plate sensitive to coloured radiations proceeding from objects is to prepare a film of subchloride of silver upon its surface by means of a galvanic process. The special advantages and the philosophical beauty of this way of proceeding will be evident as we examine it.

A glass jar, *fig.* 1, is filled with distilled water acidulated with hydrochloric acid, in the proportion of one part by measure of the latter to eight of the former. A perfectly clean and well-polished *good* Daguerreotype plate, or plate of pure silver, M N, is suspended in the acid bath by means of the little hooks, and in the way represented in the diagram. These hooks are made of copper wire, and must be attached to a triangle of the same piece of wire, R, in such a way that the plate can be plunged into the middle of the glass jar, and taken out at pleasure. The copper wire is attached to the positive pole of the battery, and the silver plate must only be plunged in the bath at the moment of operating. The bar P Q represents a piece of pure copper or platina wire, which is kept in communication with the negative pole of the battery. The battery to be used should be that known as Bunsen's nitric acid battery. One cell is required to prepare a silver plate $4\frac{1}{4} \times 3\frac{1}{4}$, two for half plates, three for whole plates, and they must be well charged.

FIG. 1.



All being ready, the silver plate M N is plunged into the liquid, and the wire of copper or platina P Q is moved backwards and forwards in it, in front of the plate, at about three or four inches distance from its surface and in a direction parallel to it. The current being established, minute bubbles of hydrogen gas are seen to rise from the wire P Q, and the surface of the silver plate begins to be discoloured from the formation of the subchloride of silver, produced by the chlorine of the decomposed hydrochloric acid. It is necessary to keep the little bar of wire P Q in constant motion in front of the plate, or else the film of subchloride of silver becomes unequally thick. It will also be observed that the colour of the silver compound changes as the film grows thicker.

The shades of colour taken by the subchloride resemble those of thin films, or the brilliant but very thin layers of some metallic oxides. A soap bubble will give a good example of the former, and the colours sometimes seen on bits of old glass which have been buried for many years of the latter. It is well known that the colours of a soap bubble are continually changing, according to its thickness.

The first colours produced upon the silver plate exposed to galvanic action in the way described are greys, then yellows, violets, and greens, as the films thicken. To judge these tints, in order to tell the proper time to stop the action, the operation should be performed in a dimly-lighted room, and the silver plate should be frequently taken out of the bath and examined. When the desired tint is obtained the plate is well washed with distilled water, drained, and dried carefully over a spirit lamp, all the moisture being blown away as it dries.

The shades of the colours of the films are best observed by examining those parts of the edge of the plate which are nearest to the little metallic hooks by which it is suspended in the bath. A succession of coloured rings is here seen which succeed each other with great regularity, and soon disappear in the general colour of the surface of the plate. This surface is found to be covered with a light whitish powder, like a slight fog. This must be removed by a careful polishing with a velvet burnisher. The plate then becomes brilliant, is found to be of a rather dark wood colour, and is eminently adapted for receiving coloured impressions. The final polish for removing the "fog" is necessary for giving a proper brightness to the colours which are to be received upon the plate.

It will be seen from the foregoing that it would be very desirable to be able to produce a film of subchloride of silver upon the plate in a more definite manner, so that we might be able at any moment to say whether it was of the proper thickness without having to constantly examine its surface, and to trusting only to the eye for judging its condition. The movement of the bar of wire in front of the plate is also a rather uncertain operation for producing a regular surface of subchloride.

M. E. Becquerel has imagined a most beautiful arrangement for overcoming these difficulties, and rendering the process for coating the silver plates both certain and easy. All that is necessary to accomplish this is to place a voltameter in the galvanic circuit between the battery and the bath of acidulated water. By this instrument the quantity of galvanic action is registered by the quantity of hydrogen gas collected in the voltameter. From the quantity of hydrogen it is easy to calculate the amount of chlorine liberated from the decomposed hydrochloric acid, and which is used in the formation of the film of subchloride of silver.

We cannot measure the *exact thickness* of the film, as we do not know the precise density of the compound of which it is formed, but we can determine how much chlorine it requires to produce a film of a certain tint, and this is the object of the voltameter arrangement.

I would advise all who incline to make this experiment, to use tubes for collecting the hydrogen which are graduated in cubic centimètres, *not* inches. The calculations will be found to be much facilitated, and the following table of M. Becquerel can be consulted without any change in the quantities or denominations:—

For every square decimètre (*about* four inches square), of metallic surface it requires—

2·80 cubic centimètres of *chlorine*, in order that the *violet tint* of the film of the *second* series shall commence to appear.

From 3·80 cubic centimètres to 3·90 cubic centimètres for the *violet tint* of the *third* series, giving good coloured impressions.

From 6·50 cubic centimètres to 6·90 cubic centimètres for the film of the *fourth* series, sufficiently thick to give fine impressions of luminous spectra.

Hydrochloric acid is composed of equal volumes of hydrogen and chlorine, united without condensation; hence a cubic centimètre of chlorine will equal a cubic centimètre of hydrogen collected in the tube of the voltameter.

For general experiments it is not necessary to correct the volume of hydrogen collected for pressure or temperature, but the latter should be maintained at about 50 to 53 degrees Fahrenheit.

If we suppose that the subchloride of silver is of the same density as the white chloride fused, and that this is 5·277, then it is found that every cubic centimètre of chlorine gives upon one square decimetre of silver plate a film of chloride of the thickness of $\frac{1}{4120}$ of a millemètre; four cubic centimètres of chlorine give a film $\frac{1}{1030}$ of a millemètre thick; and seven cubic centimètres give a film $\frac{1}{588}$ of a millemètre in thickness. This is only theory, for, as before observed, we do not know the exact composition nor the density of the compound of which the film is formed.

When the voltameter is used it is necessary to employ greater battery power to overcome the extra resistance produced in the galvanic circuit. Thus, for quarter plates, at least three Bunsen's cells, well charged, are required; and for half and whole plates four, five, and six cells must be used. It will be seen that, by this method, not only is a greater certainty introduced in the preparation of these plates, but it affords a means of producing a *number* of plates *precisely alike*, which is a very great desideratum in this class of delicate photographic operations.

I should have mentioned that, when the voltameter is used, the back of the plate, if it be a Daguerreotype plate, must be covered with varnish, so that the *silver alone* shall be acted upon by the liberated chlorine. Of course, almost any thickness of subchloride can be formed upon the surface of silver; but if the electric current be continued beyond a certain time, the silver becomes black from the great thickness of subchloride, and this thick film does not give good results under the action of light.

It is necessary to operate between the limits of four to seven cubic centimètres of chlorine per square decimètre, according to the film required. The *thinner* the film the *more sensitive* is it, but the shades of colour impressed upon it are not so fine.

Plates prepared in the manner described can be kept in the dark ready sensitised as long as necessary, and will always be as fit to receive any coloured impressions as if newly made. The more sensitive of these plates can be used in the camera under favourable circumstances. M. Becquerel says:—

"It is very remarkable that the film thus formed is sensitive between the same limits of refrangibility as the *retina of the human eye*, and it is the *only* sensitive film which presents these conditions. If the solar spectrum be projected upon one of these prepared plates the action is observed to commence in the yellow and green rays, then it goes on forward on the red side, and on the other side towards the violet. The most energetic action is found at the point of greatest luminous intensity. In the red portion the subchloride takes a red tint, in the yellow a yellow tone, and in the green a green shade; the blues are very fine, and the violet is the same as the violet of the spectrum itself."

If, instead of projecting the whole spectrum upon the plate, a bundle of the red rays alone are allowed to act upon it, the impressed portion of the plate changes to a red tint:—

"If the action be continued the tint remains the same, and if the experiment be much prolonged the sensitive compound can be decomposed altogether, and nothing but metallic silver is left where the light has acted."

The same results are observed with each colour of rays when a bundle is allowed to act upon a prepared plate. M. Becquerel extracts from these facts the following important conclusions:—

"These effects demonstrate, therefore, that it is not by an action of the kind which produces the phenomena of thin coloured films that the subchloride reproduces the coloured impressions of light, but that it is really in virtue of a *special action* which gives to this curious substance the property of only reflecting or diffusing the rays of the same refrangibility as those which have acted chemically upon it."

The subchloride of silver is the only body, says the same authority, which has, up to this time, been found to enjoy this remarkable property. The iodides and bromides of silver not only do not give any colour, but if the chloride be mixed with a small quantity of either of these substances no colour can be obtained upon it.

The colours, it will have been observed, are produced by the direct action of light without any development. From the peculiarity of being only impressionable within the limits of the *visible* spectrum, this sensitive film is sometimes called the "mineral retina." The action of *heat* upon this mineral retina is remarkable. If heated to about 300° or 400° Fahr. it becomes of a rose-tint when cold. If the spectrum be projected upon this modified film, the results are different to those seen under ordinary circumstances. "The limits of its action are about as usual, but the yellow and green, although pale, show themselves light on the background, which remains darker."

The coloured impressions produced upon the usually prepared plates for the most part disappear when the plate is heated to 300°; but if they be exposed to a temperature of 85° to 95° for four, five, or six days at a time, the coloured impressions are improved in beauty. "Not only are the different colours found where the same coloured rays have acted, but they 'stand out' from the background, which remains dark, and a ray of white light gives a white colour on the part where it has acted."

If the extreme red rays are allowed to act upon the mineral retina an effect as curious as that from the action of heat is produced. Place one of the sensitive plates in a pressure-frame under a dark red sheet of glass coloured by protoxide of copper, and expose to sunlight for fifteen or thirty minutes. The plate becomes blacker than before, and a red tint is manifested. The sensitive matter has been physically modified under the action of the red rays, probably in the same way as under the influence of heat; for if a spectrum be now projected upon the exposed plate, an image is produced in a few minutes with all the colours "admirably reproduced, and even the yellows and greens, which before this operation would have been dark and scarcely indicated, are very distinct." If the action of the red rays be too prolonged the mineral retina becomes less sensitive.

Coloured impressions once obtained can only be kept in darkness; but then they will keep any length of time, as recently proved by a coloured plate which was prepared by M. Becquerel many years since, given by him to the late Professor Faraday, and bequeathed by Faraday to Mr. Warren De la Rue in its pristine brightness. If these coloured images are exposed to the light they change, and little by little they disappear. M. Becquerel says:—

"It is very remarkable that it may be only in a state of passage that this sensitive substance enjoys the property of reproducing the colours of the active luminous rays, so that in setting out from a certain physical condition (that of the unaltered substance), and going on towards the extreme limit (complete decomposition), the substance manifests different physical arrangements, according as it has been acted upon by such or such coloured ray."

The chief difficulty in obtaining coloured images in the camera on these plates is, that the colours which then act upon the plate are so much mixed with white light; but this can be overcome, to some extent, by "stopping out" the white light, so to speak, or neutralising its action by preparing the plates under red glasses, as before described, or submitting them to the action of heat. It takes hours, and sometimes several days, to obtain coloured images in the camera, so slightly sensitive is this subchloride of silver.

In the next article I hope to take up the processes for the production of heliochromographs on glass, paper, &c., and to consider other matters connected with this interesting subject. R. J. Fowler.

LANTERN JOTTINGS.*

The growing importance of the oxyhydrogen lantern as a medium for amusement and intellectual enjoyment, together with its peculiarly intimate relation to photography as a means of exhibiting glass transparencies, coupled, also, with the thought that a description of a home-made piece of apparatus upon which a considerable amount of time and thought have been spent for the purpose of making it as easily and quickly available for use as possible, has led me to choose this for the subject of my paper tonight.

There are many here, probably, more experienced upon the subject than myself, who could do much more justice to it than I can, but in this Society, as elsewhere, what is everybody's business is nobody's business; and, unless some of the less qualified set a good example to the older hands and create a spirit of emulation, we are in danger of meeting month after month with no subject for discussion. In the hope that my rough apparatus may create a discussion which will give us all a large amount of information upon the subject of lanterns and transparencies suitable for exhibition in them, I will go on to notice the points which call for attention.

The lanterns exhibited may be described as of the vertical kind, the optical arrangements being situated directly one above the other. This form was chosen for the advantages which it possesses over two distinct lanterns situated side by side, seeing that both lanterns can be worked from one side, the exhibitor having no necessity to move from one position to another to work the lanterns right and left. This incidentally gives it a great advantage in the case of a private exhibition, where the length of the room which can be used is often very limited. The passage which must be left behind a pair of lanterns side by side is saved, and the vertical lantern can be placed close against the wall. An increase in the size of disc is thus gained, which is due to the increased distance of the lanterns from the screen.

Another advantage arises from both optical arrangements being carried upon one body. The position of the burners and direction of the lenses being once adjusted, remains so when the lanterns are put away; they are, therefore, ready for use at a moment's notice. There is no necessity for adjusting before an exhibition, nor for unlimbering afterwards.

The optical arrangements contain nothing new. The condensers are four inches diameter, being made by Chadburn, of Liverpool, and, I believe, were first introduced by our worthy President. The objectives are a pair of very common French portrait lenses, but they answer very well indeed.

The burners have been specially arranged for the vertical lantern, for which they are well suited. The tubes for conveying the two gases are arranged to pass through two holes drilled parallel with one another in a guide. They fit easily in these holes, and can, therefore, be drawn in or out to adjust the position of the light to the focus of the condenser.

The guide is situated outside the lantern at the back, and is pierced with two holes vertically, one of which fits upon a screwed upright, and the other upon a pin parallel with it. These uprights being one and a-half inch apart, and true with the centre line of the lantern, hold the burner in such a position that, whether drawn in or out, it is in the true centre line, and requires only to be adjusted in height. This adjustment is effected by a milled nut upon the screwed upright, which raises or lowers the burner according as it is turned to the right or to the left. At present these burners are arranged for using the hydrogen from the gas main, but, with an extra nozzle, they may be easily adapted to use both gases under pressure.

A point worthy of attention is the means used to preserve the lime cake after use. This is simply effected by a brass cap, turned to fit the outside of the lime holder and exclude the air; the stem of the holder is screwed, and a plate is laid loosely in the body of the holder

* Read at a meeting of the Manchester Photographic Society, April 8, 1869.

at the back of the lime. After the lime has been used and pitted by the flame, in order to renew the face for another exhibition it is only necessary to push it forward by turning the stem and to file the face till the surface is even again. In this way one cake may be used for several exhibitions.

For dissolving a simple two-way tap is used, with a groove gradually tapering away, filed partly round the plug from each aperture, so as gradually to shut off the oxygen from one burner while gradually admitting it to the other—the hydrogen being always full on to both burners. This arrangement is very inexpensive, and answers perfectly. Where only one gas is under pressure it has an advantage, in that it diminishes the risk of cracking the condensers by change of temperature in the lantern.

The dissolving tap is screwed to the lantern at the back with the handle in a convenient position for working; no connections, therefore, have to be broken when the apparatus is placed away, except those connected with the main for the admission of the gases.

Before concluding I wish to draw attention to a point connected with the toning of transparencies worthy of the consideration of those who are working the collodio-albumen process, and which involves very little trouble, but greatly increases the beauty of the results. It is this: after developing, and before fixing, flow over the picture—

Bichloride of mercury (sat. sol.)	1 part.
Water	4 parts.

As soon as the colour changes to a foxy hue by transmitted light, which takes place very quickly, wash thoroughly and fix with—

Hyposulphite of soda	2 ounces.
Chloride of gold (sol. 1 gr. to drm. of water)	50 minims.
Water	5 ounces.

The tone cannot be judged of while the print is wet, but if the operations have been judiciously conducted it will be very satisfactory. In this case, as with paper prints, the tone is dependent very much upon the negative. ARTHUR COVENTRY.

APPARATUS FOR PRINTING ENLARGED TRANSPARENCIES.

ABOUT a fortnight since we ascertained from Mr. Sarony that he had devised a very simple method of obtaining enlarged transparencies. Having now been favoured by him with a model of the apparatus, we shall proceed to describe it.

We may premise, in the first place, that it is adapted for working either with daylight or artificial light, and that, although simple and handy, there is no claim made for its being entitled to rank as a new invention. But it will serve its purpose well, and can be made by any ordinary carpenter.

It consists of a couple of deal boxes made like an expanding camera, which it indeed is. The smaller box has an end or front to which the *carte* or other lens is fixed, and it slides inside of the larger box, which has neither front nor back. Both top and bottom of this outer box project behind about an inch beyond the sides, and, being grooved, permit a piece of deal board, which in camera parlance we must designate a " slide," to be inserted at the side, and to slide from one side to the other with facility. In the centre of this board there is an oval hole cut, over which is to be placed the negative, or rather that portion of it which is to be enlarged, the oval aperture being about three and a-quarter inches in its greatest dimensions.

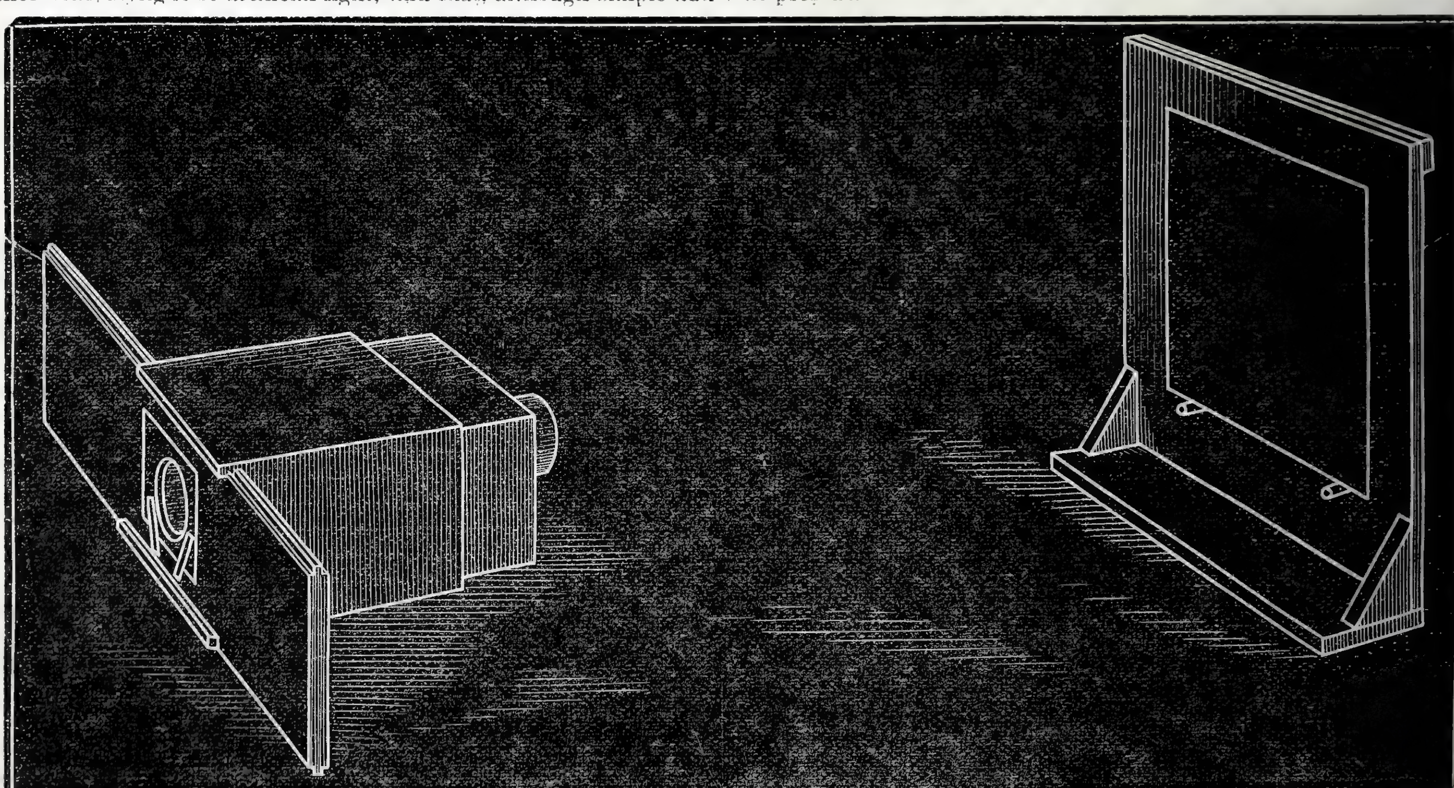
The means for keeping the plate in its position over the aperture are both simple in the extreme and exceedingly effective. There are two steel springs, similar to those sometimes employed on the stage of a microscope, for retaining the objects in position, and these permit of the negative being adjusted to any requisite extent; at the same time they give such an amount of pressure with their padded ends as to render it quite impossible for the negative to slip or shift its position.

Having given this explanation of its construction, we present a diagram from which and the previous remarks its parts will be readily understood.

Standing in front of the camera is a plain board about eighteen or twenty inches in height and proportionably broad; this is provided with a foot, so as to enable it to stand firmly in a vertical position.

The manner of using this apparatus is as follows:—The negative having been placed in position, and a lamp, if artificial light be employed, placed at a little distance, the focus is received on the vertical board, for which purpose a plate of glass covered with white paper is attached to the board by suitable means. On this white surface the adjustments relating to size, focus, &c., are made—this being aided by the white paper in question having crayon hatchings similar to the intended backings, by which the exact relation of one to the other is more readily determined.

The adjustments having been made, a sensitive collodionised glass is made to take the place of the focussing plate, and the exposure is then proceeded with. In order that the light may be equally diffused, which would not be the case if the lamp were stationary, a plate of ground glass must be interposed between the lamp and the negative, and as near to the latter as possible, care being taken that it is quite out of focus, otherwise the picture would be granular. There are so many expedients which may be adopted for equalising the light—such as the employment of a condenser, reflection from the surface of a sheet of white paper, &c.—we do not require to dwell on them at present.



If daylight be employed, the room in which the apparatus is placed should have a closely-fitted shutter containing a small aperture, against which the negative may be placed. No light wi

therefore be admitted to the room but that which passes through the lens. The camera may either be inclined upwards and directed to the sky, or the lighting may be equalised by means of a plane mirror, a sheet of white cardboard, or a piece of ground glass placed in the aperture of the window.

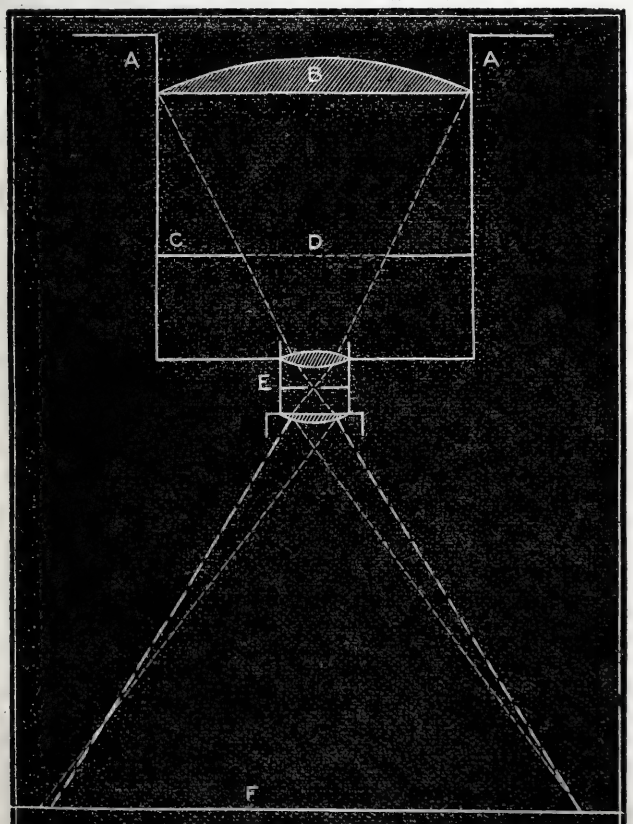
As we have already said, the apparatus here described forms a very simple and efficient appliance for obtaining enlarged transparencies. We need scarcely observe that if a *transparency* instead of a *negative* be inserted in the sliding "holder" the resulting enlargement will be a negative. For those who desire to produce duplicates of their negatives on an enlarged scale, so as to be employed for ordinary silver printing, the apparatus now described offers an excellent means of accomplishing the object. For either producing enlarged transparencies or negatives no artificial light will be found to be so handy, energetic, and manageable as the magnesium lamp.

Another Method.

Our readers may probably recollect a diagram which appeared in volume xiv., page 335, and which represented the arrangements for effecting enlargements which we saw employed in the studio of Messrs. Millard and Robinson, of Dublin. The plan which Mr. Robinson adopts is very simple, and appears to us to be well suited for the convenient production of large photographs on glass, when the operator cannot easily obtain Mr. Solomon's excellent enlargement apparatus for use with the magnesium lamp. We have little doubt that many will now be obliged to produce enlarged positives on glass in order to carry out Mr. Sarony's photo-crayon process who would otherwise have paid little attention to this branch of photography.

For the information of such of our readers as are interested in this matter we will mention some of the main points of Mr. Robinson's arrangement, since the apparatus possesses the important advantages that it may be very easily and cheaply fitted up and is most conveniently worked with the light reflected from clouds, thereby rendering a heliostat or mirror for reflecting the sun's rays in a constant direction unnecessary.

A hole is made in the roof of a shed or of an operating room, so as to enable a flanged wooden box, about ten inches square, to be fitted light-tight in the aperture. The upper part of the box—that



end towards the sky—is closed by a large condensing lens, which concentrates the light on the negative to be enlarged. The latter is placed in a slide running through the side of the box, between the condenser and half an ordinary double stereoscopic combination fitted at the bottom. The image is then projected on a table placed below the box, and upon this table the plate to be printed on can be laid during exposure. In fact, this solar camera may be considered as an ordinary camera turned with the lens towards the ground, while the plane of the focussing screen is occupied by the condenser.

AA is the flanged box of about ten inches square. This is fitted against the aperture in the roof by screws passing through the flange. The longer axis of this box is strictly vertical to the earth's surface. Just within the upper portion of this box is placed the condenser B, being, in the case we are describing, nine inches in diameter. At C is placed the slide for conveying the negative D to be enlarged. The position of the latter can be satisfactorily adjusted from without the box by means of a rack and pinion. At E is fixed a small portrait lens—in this instance half of a stereoscopic double combination. F is a table arranged so as to be truly at right angles to the vertical axis of the instrument. This table is covered with a black cloth, and is used for the reception of the plate or paper, in the manner already described.

The chief matter to be noticed in the above arrangement is the absence of a reflector. This is an important point, as the management of a reflector is often attended with considerable trouble owing to the necessity for frequent adjustment, unless the mirror be worked by clockwork, and then the expense is, of course, very considerably increased. Again: in Mr. Robinson's plan, the condenser is the only additional piece of apparatus required beyond that which every photographer possesses, and we believe there are very few who practice the art will find any difficulty in making the necessary arrangements for the support of the condenser, negative, and lens. The box may be a portion of an old camera of sufficient size, but elongated so far as to admit of the internal adjustment of the condenser and negative, the final focussing being made with the rack of the portrait combination.

It will readily be seen that the condenser, although a desirable adjunct in this method of enlarging, is not really necessary. Its absence will, however, lengthen the time of exposure.

SPIRIT OF THE AMERICAN JOURNALS.

Ventilation.—The *Scientific American* has some observations on ventilation which, now that the "hot season" is setting in, will prove interesting to photographers, many of whose studios are excessively inconvenient in this respect. A few days ago, we visited a studio in which the atmosphere was so hot and close that we were compelled to beat a hasty retreat.

"First, then, the fundamental law upon which ventilation is based is, that hot air rises and cold air descends. It follows if the pure air admitted to a room be heated by a furnace, the impure air which is cooler will settle to the bottom of the apartment, at which the registers for its escape ought to be placed. If the room be heated by radiation, as with steam apparatus, stoves, &c., and the pure air be admitted cold, the registers should be at the top of the room.

"Second, good ventilation cannot be secured by using long flues, unless mechanical appliances, as fans, &c., or apparatus for heating them are employed. The air gets cold before it passes through them, and consequently ceases to rise, or rises but slowly. The best thing for this purpose is an open grate at the bottom of the room having for its chimney the flue through which the foul air is desired to pass.

"Third, strong winds over the unprotected external mouths of flues are apt to reverse or obstruct currents. The mouth of every flue should be covered with a hood so adjusted that it can rotate with the wind. The winds blowing from any quarter will thus aid rather than impede the egress of air from them.

"Fourth, they, as well as the flues for the admission of pure air, should be made of a size proportionate to the requirements of each particular case.

"Fifth, the admission of pure air should be so adjusted when the air is not previously heated that all sharp drafts shall be avoided. This can easily be done by causing it to enter through wire gauze, breaking the currents by screens, &c., in the application of which means common sense is of much more value than large scholastic acquirements."

The Coffee Process.—Professor Towler, in the *Philadelphia Photographer*, gives the following instructions for preparing the preservative solution in this process:—

"No. 1.—Coffee Solution.

"Water (rain)	60 ounces.
Coffee, roasted and ground	$4\frac{1}{2}$,,

Boil the water, then add the coffee, and boil again for five minutes, and, when cold, filter the decoction; the quantity, when filtered, will be about thirty ounces. Keep the coffee solution in a stoppered bottle.

"No. 2.—Sugar Solution.

"Water	15 ounces.
Refined (loaf) sugar	$2\frac{1}{4}$,,

"Filter the solution, and keep it in a stoppered bottle for use.

"Why do you not keep the two solutions together in the same bottle? Because saccharine solutions, containing organic matter, ferment, first becoming wine, and then vinegar.

"For present use, make the following mixture:—

Coffee solution .... 4 drachms.
Sugar ,, ... 2 ,,

"Mix intimately, and then pour sufficient of this solution upon the plate previously sensitised and washed as to cover the film well; tilt the plate so as to move the solution from end to end and from side to side over the film for about a minute; finally, allow the plate to drain, and rear it away to dry on blotting-paper in a place where there is no dust and no light. During the summer season, spontaneous drying I find to be quite sufficient; but there is certainly an advantage to dry the film by artificial heat, that is, before a hot stove or by steam. We have a contrivance by which the plates are dried by steam. At this stage, the film has a fine polish as if varnished. The plates are now stored away in the changing-box for use on an excursion, either of pleasure or of business."

LANDSCAPE PHOTOGRAPHY.

In introducing the following excellent remarks of Mr. Lake Price, we would merely take occasion to endorse his statement as to the importance, in the artistic treatment of landscapes, of the student's carefully studying the works of our great masters in this branch of art. Engravings of artistic works of recognised merit can now be easily obtained at a trivial cost; and the young photographer who, before setting out on a landscape tour, spends a few hours in carefully and intelligently studying works of the kind indicated, will certainly find his reward in so doing.

Lenses for Landscapes.—The lenses proper to employ for landscape pictures are both single and double; the first to be used when the subject is of that nature that some size is required, and that it will not suffer by a lengthened exposure; the best diameters are two and a-half, three and a-half, and five inches, covering respectively eight inches by six, twelve inches by ten, and sixteen inches by twelve; the aperture to be used will be better *reasonably* small if the subject is well illuminated, since under that condition the extreme planes of distance will be more perfectly rendered. The triplet, especially when refinement of treatment is desirable, Ross's wide-angle doublet, and Dallmeyer's wide-angle rectilinear, in *many situations* where it is necessary to take the subject at close quarters, and the double portrait combination where, at small sizes, a favourable opportunity is seen for quasi-instantaneous treatment of passing effects of *chiaroscuro*. Many very charming effects of aërial perspective, marking the different planes of distance, in undulating or mountainous country, are obtained by working *towards the sun*. This must be done when it is not *too near* the horizon, as then the light would look directly *into* the lens. Such treatment of the subject requires precaution to avoid fogging; it is well to shield the lens, whether single or double, by a dark cloth, which can be held above it.

If the student has no previous knowledge of *artistic* treatment of landscape, he should make himself familiar with the works of Claude, Turner, Vandervelde, Ruysdael, Wynants, Both, and our own great living talents in this department. As has been previously said, mere skilful mechanism will not suffice; if photography is to stand as an *art* those who practice it must qualify by study for artistic requirements. A short time will suffice for an intelligent mind to imbue itself with as much knowledge of the subject as will prevent egregious blunders; careful practice from nature will do the rest.

Architecture.—Of all the subjects offered to the camera, none are more facile of execution than those from architectural originals; their rigid and immovable forms, the large area of the surfaces reflecting light to the lens, in open air and sunshine, present advantageous conditions, which enable *larger* sizes to be covered, smaller apertures to be employed, and longer exposures to be given than any other class of objects.

It may, indeed, be said, with considerable confidence, that in the close imitation of the originals by Baldus, Bisson, and the Roman photographers, a limit has in this direction been attained which it will be difficult if not impossible to surpass.

At the same time that we feel that the mechanical excellence shown in these subjects has been such as to delight by its clear definition and precision, regret has been experienced by artists and amateurs at the "geometrical elevation" effect which has characterised some of the best subjects hitherto executed, and which has rendered them much more fitted as *documents* for the office of the architect, than complete and agreeable as *pictures* to the lover of art.

In looking at a series of architectural photographs of the foregoing description, it is impossible not to wish for the completion of the *subject* by the selection of a more picturesque point of sight, the infusion of more artistic qualities into its composition, and its completion as a whole, by the representation of that foreground and accessories which in nature made it captivating by contrast, and formed a base from which the edifices represented rose.

The *mere size* of some of the large subjects of architecture does not compensate to the artist for the loss of those incidents of perspective and composition, and qualities of light and shade, he would have preferred seeing in the picture, and which at *less dimension* were quite within the scope and province of the lens.

If very large sizes are undertaken, they are of necessity from *plane* or nearly plane surfaces, the wondrous manner in which the lens draws every minute break, angle, or varying surface in the perspective view is not seen; and though our first impression is surprise at the *dimension* attained, our subsequent feeling is indifference to the subject, which, by its mechanical treatment, ceases to interest as soon as its mere novelty has subsided.

Medium and even small sizes, therefore, are desirable, which shall enable the photographer to produce *pictures* having the composition of line, and qualities of light and shade we are accustomed to admire in the works of the painters who have treated this class of subject, Canaletti, Panini, &c.—the photograph possessing, in addition, the interest given by its being the actual reflex of most interesting localities, and the gratification imparted by the delicacy and minuteness of its execution.

The mediæval remains of our own country, historically so interesting to us; the florid Gothic edifices of Spain, her mauresque architecture, the intricacy of whose details bewilders the eye of the draughtsman; the cinque-cento arabesques of Italy, sculptured in marble with an artistic grace and finesse which defy the pencil; all can, with the utmost facility, be rendered by the camera. We have, indeed, had evidence of what photography is capable of producing in the Egyptian pictures which have been executed by means of the camera; the hieroglyphic-covered surfaces of those colossal ruins never could have been rendered by any other means. We must hope that *well-directed* study on the part both of professors and amateurs will give us further interesting and useful subjects.

However, in whatever manner they may be treated, it is certain that the facilities for near comparison and study given by photographic transcripts from remarkable architectural examples will produce as striking results, by the advancement of taste and knowledge, in this as in any of the applications of the art.

In the earlier practice of photography, the *single* lens alone was employed to execute this class of subject; subsequently, some of the most perfect representations of edifices have been made by using the *double* lens, at very small apertures. There is much more rotundity and realisation of the forms of the subject in the latter mode of treatment. The size of lenses employed, if double combination, is considerable when *large* pictures are desired; six and eight inch diameters were used by French photographers for some of the elevations of portions of the Louvre. The single lens giving a much larger picture at the same diameters, has the advantage of greater portability for the amateur, who would find an eight-inch double lens a cumbrous companion.

More recently new lenses have been introduced, and the writer has used them on subjects of this nature. For large sizes he found that the Petzval orthoscopic offered great advantages; its portability, compared with the double portrait combination, was very great, whilst it worked better up to the margins of the subject. It far exceeded in delicacy of definition, and discrimination of textures, and working into deep shadows, the single or landscape lens, and was even more portable than that; whilst at the size of twelve inches by ten, the pictures produced may be considered, in delicacy of finish, quite equal to those executed by the triplet. The writer used this form of lens, made by both Ross and Voigtländer, in several sizes. The largest dimensions he produced were 18 × 14 inch plates. The following are the most useful memoranda:—the Forum, Rome; foreground, the Temple of Saturn within fifty yards of the lens, distance Colosseum half a mile, both included in the picture: size 18 × 14; lens No. 3, Ross orthos.; ⅝ diaphragm; Thomas's collodion, iodised three weeks; bath, thirty grains recrystallised nitrate, just acid; three minutes' exposure; development, pyrogallic 1½ grain, *when well out*, the picture being large, strengthened with twenty minims nit. sol. thirty grains strength Result: fine creamy negative. For such a picture as the above, the pyrogallic developer is decidedly better than iron; since the size requires bright vigorous, treatment, and iron, *at these sizes*, is apt to give an over-detailed weak-looking picture. Size 12 × 10, if *near*, treat with No. 1 or 2, according to quantity of subject intended to be included, and vicinity of objects to camera. If *distant* No. 3 or 4; all were done by the writer with such modifications of the above treatment as might be necessitated by light, &c., being in the main very similar. Note, especially, that in using the above lens, it is *most necessary* to shade its surface very completely, so as to avoid fogging. Dallmeyer's triplet has been also used for about the foregoing size, on Roman subjects, by Soullier, developed by iron; the results show great finesse of detail. In confined situations, it will often be necessary to have recourse to wide-angle lenses, in order to obtain, photographically, the subject.

When the operator desires to produce a detailed representation of a flank of an edifice, as a geometrical elevation, the mode of proceeding is as follows:—If windows in buildings immediately opposite permit, endeavour that the lens shall be placed at about one-half the height of the subject, instead of on the ground, whereby the proportions will be

better observed in the picture. Carefelly *level* the camera with the spirit-level, to preserve the lines in the perpendicular, and use the *smallest diaphragm* the nature of the light will allow. These pictures will be perfectly calculated for the use of architects, as, if skilfully taken, they may be considered as *exactly drawn to scale.*

If it is desired to produce works of a more artistic character, in which various masses of buildings, at different planes of distance, are introduced, *less dimensions* must be attempted. In some such subjects, as for instance, views of Florence looking down the Arno, of Paris from the Seine, &c., the want of figures in the picture is not so much felt as when the squares and streets of populous cities are represented; here, if anything approaching the appearance of the originals is to be shown, it can only be by combining in the picture the moving panorama, and not giving a Pompeian aspect to the most crowded and busy thoroughfares. For the first, single or stopped-down double lenses may be employed indifferently; the resulting pictures will be distinguished by the less size and greater definition in those taken with double lenses. For the second double lenses can alone be used. The operator must avoid *large masses* of shadow, and, if skill is shown, pictures of ten by eight inches may be thus obtained. Not but that very considerable difficulties must be contended with and overcome; but if *a picture* of this class of subject is to be presented to the spectator which shall impress him with the aspect of the original, as seen in nature, it is to this treatment alone we must look for success.

"AN IMPROVED LAMP."

We find the following, to which allusion has previously been made in our pages, among the specifications of patents recently published. The patentee is Mr. James A. Hogg, Jun., of Edinburgh. As will be seen, this is another of the many "platina-gauze lamps" which have, within the last ten years, been ushered into existence.

The object of this invention is an improved lamp or apparatus for producing light. This apparatus is constructed as follows:—Two tubes are employed on the Bunsen lamp principle, one of which is of smaller diameter than the other, and the said smaller tube is placed within the larger tube. One tube is placed in communication with condensed gas or air, or with both, such gas or air being compressed by a pump or other suitable apparatus for compressing or condensing air or gas or aëriform or gaseous fluid. This pump or apparatus may be of ordinary construction, and may be worked by hand, steam, or other power. The other tube is placed in communication with ordinary arrangements for the supply of atmospheric air or gas thereto. The gas or the air, or both, may be supplied at any determined pressure, or it or they may be condensed or compressed (before reaching the tube or tubes) in a pump or apparatus for the purpose of ordinary construction. The mixture of gas and air is passed through a perforated plate of platina or other suitable material, or a tissue of platina wire gauze, or other suitable wire gauze, by which it is divided into numerous small jets. The mixture of gas and air is obtained thus—that is to say, one of those agents is conducted through the smaller tube and discharged through the opening thereof into the larger tube, into which also the other agent is admitted. The tubes thus act as a sort of blowpipe. The aëriform or gaseous mixture passes through the larger tube to a piece or surface of fine platina. Pierced plate, or wire gauze, or woven platina wire, or other suitable metal may be substituted for the platina. The minute jets pass through the interstices of the platina or other material, and are ignited. The metal soon becomes incandescent, the supply of air being duly regulated combustion is made perfect, flame disappears, and the platina or metal becomes a surface of intense light.

Sometimes, instead of using a mixture of gas and air, I use compressed or condensed gas by itself and air at the ordinary pressure.

Sometimes the gas and air may be heated before burning to obtain a maximum effect.

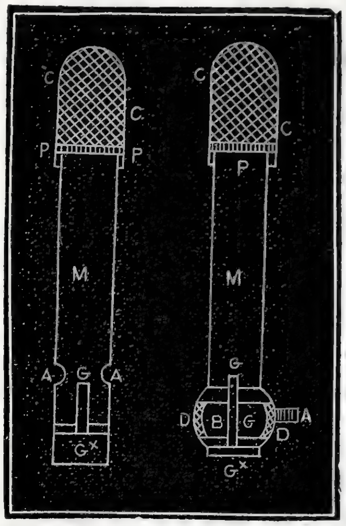
What I understand by the expression "suitable" above used is a substance having the property of becoming incandescent like platina.

In order that the mode of carrying the invention into effect may be well understood, I proceed to describe the same with reference to the drawings, which represent lamps constructed according to my invention.

Fig. 1 is a vertical elevation in section of a lamp, in which are used compressed gas and air at ordinary pressure. *Fig.* 2 shows the lamp constructed for using slightly-compressed air and gas at ordinary pressure, or both agents at the same pressure; this is also a vertical elevation in section.

M is a tube forming the external tube of the lamp. It is screwed at bottom to the gas fitting or gas supply pipe G^{x}, which terminates at top in a small pipe G, which projects into the interior of the tube M, and forms an inner tube concentric therewith, but extending only for a small portion of the length of the tube M. This inner tube G is nearly closed at its upper end, but it has in this end a small hole made by a needle drill for the passage of the gas, and the gas under pressure of about seven to ten pounds on the square inch rushes through this small orifice into the tube M. The air is admitted into the tube M through two holes A A. The tube M thus forms a mixing chamber, whence the mixture of gas and air passes through a metal or other plate P pierced with a large number of small holes; or this plate may be a diaphragm of metal gauze. This plate or gauze is fastened to the top of the tube M, whence it can be removed when actinic light is required for photographic or other purposes. C is a chamber or cap fitted on to the top of the tube M. It constitutes the combustion chamber, and is formed of a tissue of iridio-platina wire, platina wire, or other metal or substance capable of becoming incandescent like platina. The mixed gas and air or gaseous mixture passes through the plate P into the chamber C, and issues through the interstices or meshes of the tissue of the chamber in small jets, which are lighted, and the result is an intense white light produced without flame.

FIG. 1. FIG. 2.



The lamp, *fig.* 2, is similar to that in *fig.* 1 except as regards the under portion—that is to say, the air enters through the pipe and orifice A and passes through a diaphragm of fine gauze, lining the interior of the ball-shaped chamber B, and then meets and mixes with the gas in B, whence the mixture passes into the tube M as before.

I usually adopt the following method for lamp, *fig.* 1:—I place a small pump near the meter, and I attach the gas pipes thereto. This pump can be worked by hand, turbine, water wheel, revolving shaft, or otherwise. The gas on leaving the pump enters a holder or reservoir provided with a pressure gauge indicating pounds. When the pointer shows 7 lbs., for instance, the lamp can be lighted. Sometimes in place of a holder and pressure gauge I use a cast-iron tube bored out and a piston fitted with concentric rubber rings, which become air-tight when placed in the tube. The top of the piston is loaded to give the required pressure. When the pump is working the piston will not rise until the necessary pressure is on, and while the gas is being consumed it is delivered at the same pressure until all is exhausted. For this cast-iron tube two inches inside diameter and three feet high are good dimensions.

I use the following arrangements with advantage for lamp, *fig.* 2:—An ordinary air-holder sealed with water as used in gasworks is filled with air, and a tube communicates with and is joined to the lamp at the side or sides. The air may conveniently have a pressure of two inches to one and a-half inch of gas. The holder can be filled with air by reversing the counterpoise weights, or by pump or other ordinary means. The air-holder having been duly adjusted to weight like a gas-holder, the light will be maintained in efficiency so long as the supply of air and gas is kept up in abundance.

Sometimes the due influx of air for compounding the igniting mixture of air and gas may be obtained by rarifying a column of air by heat, whereby an adequate supply of air may be forced into or drawn through the burner.

Having now described the nature of the said invention, and in what manner ths same may be performed, I declare that I claim the improved lamp in which two tubes placed one within the other, and a perforated or a wire gauze surface, tissue, or chamber which is capable of becoming incandescent and of emitting intense light are constructed, arranged, and combined substantially in the manner and for the purpose hereinbefore described. JAMES ALLISON HOGG, JUN.

Contemporary Press.

WRINKLES AND DODGES.

[PHILADELPHIA PHOTOGRAPHER.]

NEGATIVES packed between dark tissue-paper, double thickness, same size as negative, or any soft paper that has not been bleached too much, may be handled quite roughly without injury, and will travel well. I have tried it for the past five years.—*H. R. Lindsly.*

I have always found trouble in getting paper in solar printing to lie down. It will kink more or less, even when it is tacked well. I have a very simple remedy: I get 16 × 20 plate-glass, get it framed and hung by hinges, and my printing-board then padded. All I have to do is to slip my paper in and shut the door, and fasten it with three sound hooks, and the paper is all smooth and stays in its place. It works splendid, no trouble, and I cannot see but what it prints just as fast.—*L. H. Freeborn.*

For restoring or forming a black surface on the interior of lenses or other brass tubes, I can find nothing better than the following:—Make a saturated solution of copper and nitric acid; put this upon the surface

to be blackened, and apply sufficient heat to burn the solution off or turn it black. Brush off any particles which may adhere to the surface, and you will have a dead black surface that will not reflect light nor rub off. Sometimes it may be necessary to apply several coats, but it can be done in a few minutes. Of course, this recipe will not do for tubes that are soft-soldered, but for others it is perfect.—*D. Edson Smith.*

There is a compound of silver which a photographer might unwittingly produce—the fulminate of silver. If a solution of nitrate of silver containing nitric acid be warmed, and alcohol added, a white precipitate is formed, which is the compound in question. A photographer evaporating to dryness an acid bath which had been long in use and contained alcohol, might find himself and his dishes elsewhere towards the termination of the boiling down of the solution.—*M. Davanne.*

M. Vinois presented the following formula for negative varnish at a late meeting of the French Photographic Society. The plates to be warmed when varnishing.

Alcohol	100 cub. cents.
Gum sandarac	10 grammes.
Benzoin	10 ,,
Gum elemi	10 ,,

The materials are dissolved upon a water-bath, and the solution clarified by standing, and then decanted. After applying, dry the negatives at the fire.

My method for keeping up an even temperature for my bath in winter is as follows:—I set my bath (10 × 12) in a box two feet long, ten inches deep, and twelve inches wide, covered, except where the bath sits in the end of the box. Behind the bath I have a square tin vessel eleven inches long, ten inches wide, and eight inches deep, with a place at one corner for filling and emptying about the size of a common bottle-mouth. This vessel I fill with water and set on my stove until it is hot, and then set it behind my bath, and it will keep warm for twenty-four hours. Not being near enough to touch the bath, it will not overheat it. Besides, it is an excellent thing to set the toning-dish on when toning, being just about the proper heat for that purpose after sitting behind the bath all day. Another thing I have been using, with good results for weak negatives, is a varnish made by adding a saturated solution of gum gamboge in alcohol to any good negative varnish. This will make a weak negative print as slowly as one of ordinary intensity, and I think it a very good thing. Hoping these ideas may do some poor photographer good, I am, yours, &c.,—*A. D. Wiles.*

Will you allow me to describe my plan of filtering collodion, or of making a collodion filter, for the benefit of us photographers? Take a bottle that will hold one pound, with a neck one inch or more long; remove the rim by the alcohol string, and with a file wet with dilute sulphuric acid (acid one ounce, water one ounce), dress off the edges of the bottle inside and out. With a round file make the inner edge, bevelling out a little; now take a glass tube the proper length, and a strip of Canton flannel (best) one and a-half inches wide, and long enough, so that when it is wound around the tube, it will fit snugly into the mouth of the bottle; then fill the bottle with the collodion to be filtered, insert the tube to the bottom of the bottle, and carefully twist the roll of Canton flannel to its place; select a wide-mouthed bottle the proper size, and with glue or mucilage stick a fold of wash-leather or two around the neck of the bottle No. 1, and insert it in the wide mouth, after inverting it, and giving it a quick downward shake to clear the tube of unfiltered collodion. The Canton flannel may be wound so as to be tight or loose, and if it don't filter the collodion clear, what will (if properly fixed)? A clean piece of flannel can be used for every filtration, and it is not so easy to get it too tightly wound. If you are not in a hurry for your collodion, you can glue the wash-leather on the first bottle and let it dry, and dress it to fit the neck of the other bottle with sand-paper. A good thing always costs something, but this is the best thing I have that costs—*not much.*—*National Photographic Association.*

Our Editorial Table.

THE MAGIC LANTERN: ITS HISTORY AND EFFECTS.
London: A. N. MYERS & CO.

THIS is a nicely-written little manual, and although it does not contain that technical description of information which our readers look for, it is yet well calculated to interest the general public. Much of it is a good deal behind the present age. For example, the self-adjusting phantasmagoria lantern, which is described as new, has not been made for some time back, and we do not know any instance in which it has even been exhibited for some years. A somewhat singular omission, too, seems to have been made when, in treating of pictures for the lantern and the means of their production, no mention is made of photographs. We recommend the publishers to direct attention to this in subsequent editions, and also to at least recognise the existence of achromatic object glasses. There is so much otherwise that is good in this little work, we should like to see it made still better.

Although we have in this Journal contributed on one or two occasions to the history of the instrument, and although much of what we now subjoin is known, yet there are some matters of detail which we have not previously seen; we accordingly give a brief extract from the opening chapter of the book:—

"The first notice that we meet with of the magic lantern occurs in an old Latin work of the seventeenth century, written by a Jesuit, named Kircher, and entitled *Ars Magna Lucis et Umbræ*, or, *The Great Art of Light and Shade.* In this work we find that the term 'magic lantern,' which we still use, was applied to it by its inventor, if such Kircher really were. We may here remark that the word 'magic' is derived from *magi*—a set of men who, in ancient times, were the sole possessors of the scientific knowledge of their day, and used it in a variety of cases to deceive and delude the common people; often blending scientific effects with religious rites, and obtaining by their superior knowledge that hold on the superstitious reverence of the people, which cannot exist in countries blest with free institutions and a free press. In later times the word 'magician' was applied to the possessor of scientific knowledge, and, by a strange perversion, it was long supposed by the common people that the man who studied the wonders of the starry heavens or the marvels which chemistry reveals was leagued with the powers of darkness, so that the name magician implied reproach as it inspired terror.

"When Kircher introduced his lantern, with the term 'magic' applied to it, he was not unwilling, by this word, to stimulate the fears of persons who witnessed its effect; for we learn, by the work above referred to, that the spectators gazed on the shadowy forms on the wall with amazement, for the means by which they were produced were concealed from view. This was done by means of a screen which separated the room into two compartments, in one of which was the lantern, and in the other the spectator. The light from the lantern was passed through a hole in the partition, and the optical image of the picture was allowed to fall upon a smooth white surface in the other compartment.

"Kircher's apparatus will be described presently; but we must first refer to certain effects noticed in the *Autobiography of Benvenuto Cellini*, the Florentine engraver, which could scarcely have been performed without the assistance of some such instrument as the magic lantern. Cellini died in 1570, and Kircher was born in 1601, so that Kircher may only have re-discovered that which was known before but had not been described. Cellini gives a curious account of the part he took in some incantations which were performed at his request by a Sicilian priest, whom he describes as a man of genius, well versed in necromancy. Cellini was anxious to become acquainted with the mysteries of the priest's art, and was promised that he should be gratified if he would bring with him a companion or two, one of whom was to be a simple-minded boy. Cellini and his companions accordingly repaired to the Amphitheatre at Rome, the spot chosen by the priest, who drew circles on the ground, and burnt a quantity of perfumes and some very noxious herbs and composition which appear to have been intended for the double purpose of raising a great smoke and stupefying his guests. The priest continued his ceremonies for an hour and a-half, when the amphitheatre became apparently filled with strange figures, and four giant-like forms seemed to advance in threatening attitudes towards the astonished party. The poor boy was terribly alarmed, but the sagacious Cellini seemed to have suspected the real nature of the appearance, for he encouraged the boy, and told him that he need not be frightened, for all he saw was 'smoke and shadow.' There is no doubt whatever but that the priest was acquainted with the effects produced by the use of lenses or of one or more concave mirrors, and that he so arranged them that the images of the objects presented to them should be made visible only when the wreaths of smoke were rising from the fire. Thus the figures would appear and vanish as the smoke rose or faded, and by pushing the objects nearer to the mirror their images would become suddenly enlarged to a gigantic size, and would seem to be rushing towards the spectator. The effects described resemble those which are formed by the phantasmagoria, the means for producing which will be described hereafter.

"In the construction of his lantern, Kircher is said to have been assisted by a mathematician named Walgenstenius. The lantern appears to have been rudely made; it consisted of a large square wooden box, with a door on one side, and an opening in the front side for the reception of a tube containing a lens. Within the box was an oil lamp, with a polished brass reflector behind. From the top of the box proceeded a tube for carrying off the smoke; and that the lamp was a smoky one is evident from the representation of it which accompanies Kircher's description, for the lamp with a glass chimney and double draught was only invented in 1789, by a Frenchman, named Ami Argand. Kircher's sliders was similar to those now used in common lanterns, each slide containing three or four circular paintings on glass, consisting of rude figures of spectres, skeletons, &c. In the tube which contained the lens there was a groove for receiving the sliders, and the effects must have been very imperfect, although, from their novelty at the time, they excited great astonishment in Rome; and, for a long period, Kircher's room in the Jesuit's College was thronged every night by noble and

wealthy persons, who assembled to witness these new optical phenomena.

"Walgenstenius constructed magic lanterns for sale, and they were eagerly bought up by the Italian princes. The instrument continued for a considerable period to belong to the cabinets of the learned and the wealthy, and at length it got into common use and ceased to excite surprise or even admiration."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 21st......	Edinburgh.....................	Hall, 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on the 13th inst.,—James Glaisher, F.R.S., President, in the chair.

The following gentlemen were elected members of the Society:—Messrs. Henry Bailey, G. Salting, Henry Ashdown, and John Waller.

Mr. Brown, of Woolwich Arsenal, then read a paper *On the Manufacture, Properties, and Applications of Gun Cotton.* He (Mr. Brown) stated at the commencement of his paper that, as he had investigated gun cotton only from its explosive point of view, he would be unable to say anything concerning its photographic or collodion-making properties. As we shall probably give an abstract of this paper next week, we will not now attempt to indicate its leading features. Several experiments were made, which were all very successful.

Mr. Sebastian Davis asked for information respecting the method of drying explosive gun cotton, as it would be useful to them when preparing soluble cotton. He presumed that it was dried at a low temperature.

Mr. Brown said that a temperature of 120° Fah. was perfectly safe. They dried their cotton in stoves, and the heat might be carried up to even 150° Fah.

After some questions by Dr. Mann on certain features connected with the explosion of gun cotton, which were answered by Mr. Brown,

The Chairman, on behalf of the Society, thanked Mr. Brown for the instructive and pleasing lecture he had given them.

Mr. Spiller said that for some years past Mr. Brown had been working in a somewhat different groove to that in which photographers carried out their researches. The collodion used by photographers was made from a kind of cotton which sensibly differed from that then before them. There was, however, an analogy between the spontaneous decomposition which both underwent, if not carefully washed. Mr. Brown had found that gun cotton, before being stored away, should not merely be subjected to a prolonged washing, but should also be washed in dilute alkali. Without a trace of alkali there can be no guarantee of permanence. From the fact that the collodion picture was fixed by immersion in cyanide of potassium or hyposulphite of soda, any acid which might have remained in the film, and which thereby might have conduced to its deterioration, was thus effectually got rid of. He then spoke of the great solubility possessed by some soluble paper prepared by Liesegang. It dissolved perfectly, he said, in equal parts of ether and alcohol. The proportions required to make collodion, he added, were similar to those when cotton was employed.

Mr. Solomon then exhibited a large collection of photographs printed on Obernetter's sensitised collodio-chloride paper. They were very fine and brilliant. Specimens of the paper were given to the members with a request that they would try it. This paper, it seems, will keep for three months if properly taken care of. It should not be over-printed. From the instructions accompanying the paper we extract the following formulæ for the toning bath:—

No. 1.

A.	Distilled water	50 ounces.
	Sulphocyanide of ammonium ....1 ounce	$2\frac{1}{4}$ drachms.
	Hyposulphite of soda	46 grains.
	Carbonate of potash..............................	15 ,,
B.	Distilled water	50 ounces.
	Neutral chloride of gold............................	30 grains.

When the toning bath is required mix equal parts of A. and B.

No. 2. Add one drachm of neutral chloride of gold solution to an ounce of water. Dissolve forty grains of sulphocyanide of ammonium in three ounces of water, and add the gold solution gradually until the whole is thoroughly mixed.

No. 3. In fifty ounces of distilled water dissolve—

A.	Sulphocyanide of ammonium............1 ounce	2 drachms.
	Hyposulphite of soda	45 grains.
	Bicarbonate ,, ...	15 ,,
B.	In fifty ounces of distilled water dissolve—	
	Pure chloride of gold...................................	30 grains.

If the double salts of gold and sodium or potassium are used, take the double quantity. The two solutions keep any time. When the bath is required mix equal parts of them; the mixture can be used at once. The prints never become *yellow* in this bath. In two to ten minutes the prints are toned. Wash them in water, and fix in—

Hyposulphite of soda	1 ounce 2 drachms.
Distilled water	32 ounces.

Five or ten minutes will suffice. For washing, two or three hours will be sufficient.

For a bath yielding warm black and rosy tones the following is recommended:—

Water	2 ounces.
Sulphocyanide of ammonium	50 grains.
Hyposulphite of soda	240 ,,
Acetate of soda	15 ,,
Chloride of gold..	1 grain.

Dissolve the gold in a small quantity of water, and add it to the other solution. The bath may be used immediately after preparing. The prints are not washed before putting them into the bath. They become yellow at first, but afterwards recover their force. The toning and fixing takes about ten or fifteen minutes, but can be continued for some hours. The benzoate, the phosphate, borate, citrate, or any other such salt, may be substituted for the acetate of soda for the purpose of modifying the tint described.

It seems of importance that the toning bath be neutral, as acid baths not only do not tone, but cause the collodion film to come off from the paper. If the collodion film leaves the paper, it is owing to one or other of the following causes:—(*a*). The paper has been broken. (*b*). The prints have not been sufficiently washed before toning. (*c*). The gold bath was acid. (*d*). The solutions were too concentrated: if the solutions are too concentrated the film will surely come off.

If the prints become brown in the gold bath, and do not tone, it is probable that there is too much hyposulphite in the fixing bath, or the chloride of gold is not pure. If the gold bath be acid, add bicarbonate of soda until it is neutral. Acid gold baths do not tone, and make the collodion film come off from the paper. If the gold bath be not acid, and does not tone, it does not contain sufficient gold.

A vote of thanks was accorded to Mr. Solomon for exhibiting the pictures.

At the close of the meeting a gentleman, whose name we could not ascertain, exhibited a small model of a three-wheeled velocipede, which, he said, would be suitable for carrying the apparatus of the wet-plate photographer when in the country.

The meeting was then adjourned.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

The meeting of this Society on the 7th inst. was, as previously intimated, devoted to the exhibition of transparent photographs. Mr. J. Cooper presided.

The Chairman observed that they were indebted to Mr. J. T. Taylor for the exhibition with which they were about to be favoured. The pictures were, he said, choice specimens of the works of the Messrs. Pumphrey, of Birmingham, and Mr. J. Stuart, of Hammersmith, and, from the high character of these artists, he anticipated that those present would have a rich pictorial treat.

About eighty transparencies were then exhibited by means of the lime light, Mr. J. Barnett, the Secretary, managing the lantern in so admirable a manner that there was no semblance of a hitch from beginning to end. The pictures were much admired, and elicited frequent applause.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on the 8th instant,—Mr. T. Sebastian Davis in the chair.

Mr. Cobb exhibited some enlarged pictures taken from dense ordinary printing negatives. Two of these were transferred collodion films, originally taken on glass, but now attached to paper. They were toned by gold, and the transferring had been effected while the pictures were still wet. They were on white paper, but (as the Chairman remarked) they could equally well have been transferred to tinted paper, and probably with increased effect.

The Chairman exhibited a piece of apparatus by which the difficulties of transport, when working in the fields with a tent, were very greatly reduced. It consists of a flat box a few inches deep, which, when opened out, displayed a couple of wheels and the means for attaching them to the box so as to convert it into a wheelbarrow, together with an iron handle which could be attached by thumb screws in a minute or two. By means of this little barrow, he (the Chairman) said he had been enabled to work wet collodion in the field, and to move his tent from place to place with a great degree of comfort and convenience.

In connection with this subject one of the members submitted for examination some photographs of a three-wheeled velocipede, which he considered well adapted for the use of photographers who wished to carry to the country a weighty tent and camera, or similar *impedimenta.* These photographs were inspected with much interest.

Mr. J. T. Taylor exhibited some specimens of the new carbon printing process recently patented by Mr. J. R. Johnson.

The CHAIRMAN said that he was present when Mr. Johnson described the process before the members of the Amateur Field Club, and it was characterised by great simplicity and excellence.

The CHAIRMAN then stated that, in accordance with an intimation made at the previous meeting, the subject to occupy their chief attention on that evening would be a discussion of the question—*What is it that Confers Density and Sensitiveness upon Collodion?* He called upon Mr. Blanchard to open the discussion.

Mr. BLANCHARD said that he would not enter into the subject at any length, but would just set the ball rolling, and leave it for others to keep it going. The first point of importance in securing sensitiveness consisted in maintaining the bath at a proper strength. In the old days, when simply iodised collodion was commonly employed, a thirty-grain bath was sufficient for all purposes; but now, when bromides were largely employed, a much stronger bath was necessary, from forty to fifty grains per ounce at least being required, where as much as two grains per ounce of bromide were employed in the collodion. He would call attention also to the importance of constantly replenishing the bath, which became more exhausted by use than was supposed. Next came the consideration of the collodion itself. For some years he had been suffering from what he might term "Hardwich on the brain," and Mr. Russell Manners Gordon had recently told him that he had slowly recovered from a similar malady. The instructions of Mr. Hardwich were utterly mistaken and misleading. The use of acids at a high temperature was, in his experience, quite wrong in every way. He preferred a low temperature and weak acids, as giving a far superior and more sensitive result. Then, as to the salts to be employed: he thought that, with a suitable cotton, four grains of iodide and two grains of bromide would give a stable and sensitive collodion—better after keeping for six months than when first mixed. For immediate use half-a-grain of bromide would be sufficient; but such a collodion would not usually be so stable. With those few suggestions he would leave the matter to the meeting, and probably in the course of the discussion he might have something more to say.

Mr. HENDERSON asked if the forty-grain bath to which Mr. Blanchard had alluded was iodised or not.

Mr. BLANCHARD said he never iodised his bath.

Mr. HENDERSON found that an iodised bath was more sensitive than a plain uniodised one.

The CHAIRMAN, alluding to Mr. Blanchard's observations about the low temperature of the acids when preparing pyroxyline, asked if 120° would be suitable.

Mr. BLANCHARD considered 110° better.

The CHAIRMAN said that, in order to obtain a collodion possessing the best and most useful qualities, two kinds of pyroxyline should be employed, one of them being made at a high and the other at a lower temperature. By the admixture of these was obtained a better film, both in its chemical and physical structure, than would be possible from any one kind of pyroxyline. It was well known that many photographers who did not make their own collodion mixed together the productions of two different makers, and in that way obtained a collodion of better quality than either of them used singly. With reference to an observation by Mr. Blanchard, that he had used four parts of iodide to two of bromide, he (the Chairman) inquired if that gentleman recommended an increase to the proportion of bromide for the purpose of gaining sensitiveness.

Mr. BLANCHARD said he had tried in a bath weaker than forty grains the collodion of an eminent maker against one containing four grains each of an iodide and bromide to the ounce. The latter gave a feeble picture, the other was good. He then strengthened the silver bath up to fifty grains, and again tried it. On this occasion the collodion containing the four grains of bromide gave a fine picture, and the other was bad. The gain in respect of sensitiveness was enormous. It was, therefore, of importance that the strength of the silver bath should be considerably increased when strongly-bromised collodion was employed.

The CHAIRMAN had tried a collodion containing bromide of cadmium alone against one containing the iodides of potassium and cadmium. The difference between the results was inappreciable. He thought at the time that he was using a forty-grain bath, but he had tested it a few days ago and found that it really contained fifty grains to the ounce.

Mr. BLANCHARD (in reply to questions by Mr. Pearce and others) said there was a great increase of sensitiveness when using a strong bath compared with one that was weak. He used his bath as nearly neutral as possible. When it was necessary to add acid he preferred nitric acid. In his bath, containing upwards of forty ounces of solution, there would not be more than a quarter of a minim of nitric acid. In making collodion he never mixed together a powdery and horny batch of pyroxyline; he advocated the use of a pyroxyline made at a very low temperature. Generally speaking, that collodion proved to be the best which was not in the best condition for working until it had been kept some little time after being iodised. Collodion could be made to suit every special requirement of the photographer. If it were intended that a plate should remain for a very short time in the bath, a collodion containing only half-a-grain of a bromide would answer better than one that contained two grains. He had noticed a curious effect from varying the proportion of bromide in the collodion. If he took two collodions—one containing half-a-grain of bromide and the other containing two grains to the ounce—and immersed the plates in the bath for a short time, exposing and developing them as soon as possible after preparation, the plate prepared with the smaller quantity of the bromide would prove the most sensitive; but if, on the other hand, the plates were allowed to stand for some time before exposure, then the more strongly bromised collodion would be the most sensitive. This was accounted for by the slower formation of bromide than the iodide of silver.

The CHAIRMAN having spoken of the greatly increased effects that could be obtained by an instantaneous exposure, and having conveyed the thanks of the Society to Mr. Blanchard and the other gentlemen who had taken part in the evening's proceedings, the meeting was adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday evening, the 8th inst.,—W. T. Mabley, Esq., V.P., in the chair.

The minutes of the previous meeting were read and passed.

As Mr. Coventry had some apparatus to arrange before reading his paper,

The CHAIRMAN said he had great pleasure in introducing Mr. Cussons, of Southport, who had kindly undertaken to exhibit to the members some specimens of Mr. Sarony's new photo-crayons.

Mr. Cussons then placed the specimens on the table, and took great pains to give the members all the information they required on the subject. The pictures created much interest, and were greatly admired for their beauty and the simple means by which they were produced.

Mr. Coventry then read his paper, entitled *Lantern Jottings*. [See page 181.]

No discussion followed, but as Mr. Coventry had arranged to work the lantern for a few minutes for the benefit of those interested, many members retired with him to the adjoining room for that purpose.

The Chairman showed a collodio-albumen plate, prepared by Mr. Petschler in January, 1865. It was sent during that year to the West Indies, kept there three months, and then returned. It was exposed and developed by Mr. Forster on the 16th ult. The subject is dark foliage, and the exposure, after midday, was twenty minutes. The details were all well out, and the negative absolutely without a stain or the slightest fog, and of the peculiar brown colour of a new and good collodio-albumen plate.

Messrs. Atherton, Coote, Underwood, Warburton, and Sanderson were then appointed a committee to conduct the Summer out door meetings.

The meeting closed with the usual complimentary votes to Messrs. Cussons, Forster, Coventry, and the Chairman.

Correspondence.

Foreign.

Paris, April 12, 1869.

IN the work of M. Vidal on the carbon processes, to which I have already referred, I find a chapter devoted to the description of an actinometer, invented by M. Arthur Taylor, which appears likely to be a practically useful instrument for estimating the proper amount of exposure necessary for printing photographs on paper, and especially those by the carbon or other processes where the progress of the sensitised sheet cannot be watched. M. Taylor takes a block or brick of wood 108 millemètres long, fifty-eight wide and forty-one thick (these measures can be nearly reduced to inches by reckoning twenty-five millemètres to an inch). This is pierced by eight round holes, each twenty millemètres in diameter. One of the ends of these holes is closed by a very thin metallic diaphragm, and both this and the interior of the little cells thus formed are coated with dead black colour to prevent all reflection of light. The light is admitted through orifices in the diaphragms, each orifice being of precisely the same size; each diaphragm is pierced with a *different number* of these little holes. Thus, in the instrument already made, and which is described in the work of M. Vidal, there are eight cells, each forty millemètres deep, disposed in two parallel series of four. The first of these is pierced with three holes of two millemètres in diameter; the second with four; the third six; and so on—eight, ten, thirteen, sixteen, up to the eighth, which is pierced with twenty. If this instrument be placed upon a piece of sensitised paper, diaphragms upwards, the latter are exposed to the action of the light, which, penetrating the cells through their orifices, acts upon the paper with an intensity proportional to their number, and the paper is found impressed with two rows of coloured circles of the diameter of the cells, forming a scale of graduated tints. It was imagined that the intensity of action in each cell would be in direct proportion to the number of orifices in its diaphragm, and so on exposure to a constant light for a given time

certain tint would be obtained upon the paper under each cell. Varying thus, under the twelve-hole diaphragm the paper would be coloured in half the time required under that with six holes; and under the cell with the four-hole diaphragm the paper would require three times more exposure to arrive at the same tone it would have taken under that with twelve holes. "In short," says M. Vidal, "in order to produce the same tint under each cell, the time of exposure multiplied by the number of orifices of each will give a constant quantity."

The experiments made with this instrument confirm these calculations. With these indications I think your readers will be able to form some estimate of this ingenious little instrument; and I will only add that the comparison of tints with the normal tint required by each negative is recommended to be made under a light yellow glass—firstly, because it can be done in daylight; and, secondly, because the "small differences of shade which might exist between the normal tint and that of the print will disappear, the yellow glass being a substitute for the monochromatic lamp employed by Roscoe for a similar purpose." The diaphragms should be covered with a piece of *exceedingly fine* ground glass to prevent the little orifices acting as lenses, as they would without this precaution. M. A. Marion, 16, Cité Bergère, Paris, wishes me to state that the work of M. Vidal can be procured from his establishment, at that address, for the sum of two shillings and sixpence in stamps, so I will leave further notice of it, and hope that those requiring it will send for it.

I learn that the oxyhydrogen zirconia light has been such a success at the Tuilleries, having been worked without interruption since the 21st of January, that the Emperor has ordered measures to be taken to render that mode of illumination permanent in front of his palace. During the interval required for getting these new arrangements ready, the court will be lit up with ordinary gas as before. In connection with this fact, M. Tessie du Mothay has had the Order of Chevalier of the Legion of Honour bestowed upon him, and well has he merited it for his many useful and practical inventions. Whether the process introduced by this gentleman for the commercial manufacture of oxygen from the manganates is the best that can be used for the purpose may, perhaps, be open to discussion; this, at any rate, is true, that it is the only process that has succeeded on a large practical scale up to the present time.

There is a competitor in the field now, in the shape of a process for extracting the oxygen from the air after the manner of the respiratory organs of animals. MM. Laire and Montmagnon propose to take advantage of the well-known property of wood charcoal, alkaline solutions, and blood of absorbing oxygen from the surrounding air, and condensing it between their molecules, either by a physical or chemical affinity. It is proved, by experiment, that 100 measures of wood charcoal, freshly burnt, absorb 985 of oxygen, and only about 705 of nitrogen. The blood of animals and solutions of phosphate and carbonate of soda absorb rapidly, according to the amount of surface exposed to the air, about twelve per cent. of oxygen, and only two per cent. of nitrogen. The proposed method of using these facts is this:—Pump out the oxygen and nitrogen from the substances used to absorb it by means of an air pump; pass the mixture through fresh absorbing media in vacuo; re-extract, and repeat the operations as often as required. In this way an oxygen is obtained very free from nitrogen, and at an extremely cheap rate. The reservoir which contains the charcoal, &c., may be compared to the lungs of animals, and the air pump to the pulmonary apparatus of the same nature. If this process should succeed upon a commercial scale, it will be a beautiful example of the imitation of one of nature's great processes, and its adaptation to the wants of man.

M. Ferdinand Vigier communicates a notice upon the manufacture of hydriodic acid which some of your readers may find useful. The general method consists in introducing a quantity of amorphous phosphorus, water, and iodine into a stoppered retort, to which is attached a bent tube terminating in a bottle of distilled water. Upon the application of heat the acid comes off as gas, and is condensed in the water. The proper proportions of phosphorus and iodine are not generally stated, and one object of M. Vigier is to give an *exact* formula, so that all sources of error, and even danger, may be avoided. If the phosphorus be in excess, the phosphorus acid arising from the decomposition of the iodide of phosphorus decomposes under the influence of heat into phosphoric acid and pure phosphuretted hydrogen. This gas, meeting with the hydriodic acid, forms fine crystals of hydroiodate of phosphuretted hydrogen, which condense in the cooler portions of the tube, and sometimes in quantities sufficient to determine an explosion. The exact proportions to be used to make the hydroidic acid properly, are—one part of amorphous phosphorus, twenty parts of iodine, and fifteen of water. The reaction that takes place is thus represented:—

$$Ph + 5\,I + 5\,HO = PhO_5 + 5\,HI.$$

The receiver should be surrounded with ice in order to obtain a saturated solution of the gas, and when fresh quantities of phosphorus and iodine are added to the exhausted residue in the retort, the solution of hydriodic acid already obtained should be used instead of a fresh quantity of water. The retort should be kept in cold water all the time that the iodine is being introduced, and this substance should be put in in very small quantities at once. The retort should be heated upon a sand bath, and not over a naked flame.

At the last meeting of the French Photographic Society it was announced that an exhibition of photographs was to be opened in Boston on the 4th of June, and that all pictures intended for it should be sent by the steamers leaving the first week in May. This is rather short notice. The French Exhibition, to open the 1st of May in the Palais de l'Industrie, was also spoken of, and intending exhibitors urged to send in their contributions at once.

The weather in Paris is now very bright and hot; the spring has come upon us so suddenly that people are now grumbling because it is too hot. Exposures about twenty to thirty seconds longer than during last month, when we had snow on the ground. R. J. FOWLER.

Home.

SARONYTYPES.

To the EDITORS.

GENTLEMEN,—I have been for the past two weeks devoting my spare time to the production of Sarony positives, or enlarged transparencies from small negatives.

Being engaged in a bank all day, when I am released from duty and get home the daylight is so far gone that I have from the first decided to adhere to artificial light. I have not a magic lantern, but I have obtained one of Solomon's magnesium lamps and a copying camera, such as you have described in your articles on that subject.

Well, I have experienced failure to a certain extent, and am entirely at a loss to know where lies the cause. The centre of the enlarged image, both on the focussing screen and also in the finished picture, is bright and well defined, but every other part of the plate is dark. Kindly let me know the cause.

I have no knowledge whatever of optics, but have placed everything as accurately and centrally as I could. First, there is the light which is placed exactly opposite the centre of the negative, and from which it is distant about three inches. Then there is the lens, a good quarter-plate combination, which, as you suggested, is placed with its back lens nearest to the negative. Last of all there is the focussing screen. Everything seems right, yet I fail. Why is the image bright only in the centre? Is there anything wrong with my portrait lens, and would a triplet combination answer better?

If you will kindly indicate anything which may conduce to my getting over the difficulty indicated I shall esteem it a great favour, for with this exception I have succeeded to an extent beyond my expectation in the production of these enlargements.—I am, yours, &c.,

Kingsland, April 12, 1869. A BANKER'S CLERK.

[We embrace this opportunity of giving our correspondent and others who, like him, may require it a short lecture on practical optics. Let him draw (no matter how roughly) on a sheet of paper a diagram representing the light, the negative, and the object glass or lens. Now let him bear in mind that light, when not interrupted, always travels in straight lines, and, having this knowledge, let him draw from his light several radiating lines which shall pass through the negative both at the top and bottom as well as the centre. Now observe how few of these rays find their way to the object glass. None but those which pass through the centre of the negative ever impinge on the surface of the lens, therefore the centre of the negative alone is depicted in the enlargement. The rays which pass through the margin and then get lost must be so deflected from their course as to be brought within the grasp of the object glass. It is to effect this that a condenser is employed. Having thus stated the optical cause of your trouble, it remains for you to set about applying the remedy. To aid you in accomplishing this read an article in the present number, in which we describe a very simple piece of apparatus designed by Mr. Sarony for producing enlarged transparencies.—EDS.]

GAS BAGS AND GAS HOLDERS FOR THE LIME LIGHT.

To the EDITORS.

GENTLEMEN,—Allow us to fully indorse your article on this subject in your last week's Journal, and to offer a remark on both gas bags and gas holders which, though simple, may prove of value to some of your readers.

1. With regard to gas bags, the cause of oxygen gas deteriorating so soon, especially in small quantities, is generally through keeping it in a *new* bag, because in making a gas bag we use naphtha to dissolve the India-rubber and to make the solution used to stick the inside and outside cloth to the India-rubber. Thus, a great quantity of naphtha vapour is given off from a new bag for some time, which, mixing with the oxygen gas, deteriorates it, and in extreme cases is dangerous. It is, therefore, advisable to fill a new bag with common air, and after

allowing it to stand some time, empty and fill it again, and so on till the smell of naphtha is to a great extent removed.

2. Gas holders possess an advantage where portability is not required; but, as the gases are not used in equal proportions, it is evident that the pressure of the gases would differ not only according to the *difference* of the height of water in the two tanks, but there would be a decrease in the pressure of both, according to the decrease of the height of the column of water in the two tanks which have emptied themselves into the gas holders.

Both these disadvantages, however, can be obviated by attaching a shallow trough furnished with a ball cock at the outlet of each water tank; and from this shallow trough, but not from the water tank, attach the pipe which goes to the gas holder. It is obvious, then, that there would only be the pressure from the surface of the water in the troughs regardless of the difference of the height of the water in the tanks.—We are, yours, &c., C. AND F. DARKER.

Paradise-street, Lambeth, April 10, 1869.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A pair of Harrison's stereo. globe lenses, $2\frac{1}{2}$ inches focus, will cover a five inch circle, will be exchanged for a Kinnear's camera, 8×10, or bellows stereo. for 8×5.—Address, PUMPHREY BROTHERS, 13, Bath-row, Birmingham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

CONSTANT READER.—If you carefully read the article in our ALMANAC by Mr. Griggs, you will obtain the information you require.

W. H. J. TURNER (Pendleton, Manchester).—The Journal may be had from Mr. R. Hampson, 61, Piccadilly, Manchester, or direct from our publishing office.

A YOUNG HAND.—The optician has not deceived you. He has evidently measured the focus from the optical centre, while you have measured from the back surface.

J. T. L.—Have your chairs and other accessories plain and neat, and avoid the high-backed carved chair, whether used for the subject to lean upon when standing or to sit upon. The most simple and natural accessories are the best.

AMATEUR; J. B.—The best remedy for stains on the surface of the glass, is to have a piece of felt nailed to a wooden board or holder, and apply to it some rouge, putty powder, tripoli, or other similar powder, moistened with water, and with this rub the glass briskly.

POOR SKEARTON (Preston).—Yours is a case for a medical man to attend upon, and you should lose no time in having competent advice. Although you will find some useful information on cyanide poisoning in our ALMANAC, we do not think that there is anything adapted precisely to your case.

A SUBURBAN AMATEUR.—As we have more than once before advised, do not attempt to move in the matter until you have, first of all, consulted the district surveyor, and obtained his permission to erect your glass house. If you neglect this, you may find yourself compelled to take down your studio after it has been finished. District surveyors are said to be veritable tyrants, and you may find it to be more expedient "to flatter than to fight" them.

TOURIST.—When you again go out for a day in the country, provide yourself with some small change, such as pence and threepenny pieces. The judicious application of these coins will convert boys that would otherwise prove troublesome nuisances, in a landscape photographic point of view, into most useful accessories. Of course you should pose them properly, and must not forget to impress upon them the fact that if they move in the least degree they get no remuneration. You must not "pay in advance."

P. T. (Bradford).—Guaiacum, or, more strictly speaking, "guaiacin," when pure, is highly sensitive to the action both of light and air. We here state some of its properties, which may aid you in endeavouring to utilise it in photography to a greater extent than has yet been the case. It dissolves in ether and alcohol, but not in water. Air and light turn it green; gum water and such mucilages make it blue. Some acids, such as nitric, also cause it to undergo a change of colour. To employ it photographically, good results are said to have been obtained by brushing an alcoholic solution of it over paper, followed by a similar application of acetate of lead.

A LANDSCAPE PHOTO.—If, instead of indulging in impartially developed anathemas against the wind, and the consequent motion of the foliage, you were to go earlier to bed, and be out with your camera shortly after five o'clock in the morning, you would achieve more success. It is not *always* calm during early morning; but, from our own observation, we are enabled to state that on many days on which the wind has been so fresh as to render the photographing of vegetation quite out of the question, the mornings were so calm that the leaves on the trees have been motionless. To take advantage of this, it is necessary that you make arrangements to be on the field of action soon after sunrise.

SUBALTERN (Deesa).—Your printing bath is much too strong. If you reduce it to little more than half its present strength the paper will keep better, and it will altogether be more manageable. The yellow colour in the whites of the print you enclosed is caused by sulphuration. It is probable that, unknown to you, some hyposulphite of soda may have got into the bath. You should also use your fixing bath a little stronger. With respect to the rapid bleaching of the blacks after being toned, this is the case with mostly all prints and toning formulæ. In the instances you record, the rapidity of action of the toning bath is very remarkable. You should reduce its strength.

A MAN OF KENT.—In stating your ideas of what constitutes the requirements for successful photography you have ignored two of the greatest importance. While we readily admit the necessity for skilful, clean manipulation, this quality will of itself be comparatively valuless if there be an inability to pose the sitter properly, or if the lighting be so badly effected as to render it impossible, even with the best posing and manipulation, to turn out attractive pictures. Successful photography (from a professional point of view) requires good lighting, the ability to pose and manipulate properly, considerable tact, and good business knowledge and habits. These, with a good and extended field of operation, will rarely fail in creating an excellent and lucrative business.

PROVINCIAL.—The letter to which you refer has evidently miscarried, as we do not remember having received it. The following formula for negative varnish has been much recommended by some who have used it—among others, by Mr. H. Cooper, from whom we received the formula:—Dissolve in eight ounces of methylated alcohol one ounce of fused benzoin and twenty grains of sandarac; then add twenty drops of mastic varnish, made by melting gum mastic and adding turpentine to it while in a fluid state. When the impurities settle, the varnish is ready for use. The benzoin may be fused in a porcelain capsule, moderate heat being applied until it is perfectly fluid. Pour it out on the bottom of a cold plate, and when it has become cold it may be broken off in pieces. The sediment referred to is probably owing to the chlorine which has been employed in bleaching the lac.

RECEIVED.—Wm. Blair; R. J. Fowler; George Price, &c.

⁂ We have been compelled to leave over several important articles in type.

☞ Editorial Communications should be addressed to "THE EDITORS."—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.

POLYTECHNIC INSTITUTION.—One of the features in the Polytechnic Institution at present is a lecture, by Mr. King, on Woodbury's photo-relief process, to illustrate which a series of magic lantern slides are thrown on the screen. The process of printing, both on glass and paper, is also demonstrated before the audience.

THE MORPHINE PROCESS.—Mr. Newton read a paper before the Photographic Section of the American Institute, in which he detailed his experiments in endeavouring to secure a good and reliable morphine process. He has found that by the process now to be described plates have kept good for eight months. He takes—

Hot water	6 ounces.
Pulverised sugar of milk	$\frac{1}{4}$ ounce.
Tannin	40 grains.
Tincture of opium	$\frac{1}{2}$ drachm.

These are added to the water in the above order. The sugar of milk dissolves very slowly unless pulverised and hot water be used. The addition of the water causes a precipitate, and it should stand for half-an-hour before being filtered. This solution keeps well.

LONDON GAZETTE, *April* 13.

NOTICE OF SITTING FOR LAST EXAMINATION.

J. FINLAYSON, photographer, Piccadilly.—May 24.

METEOROLOGICAL REPORT,

For the Week ending April 14*th*, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
8	30·00	58	48	51	52	SW	—	Dull
9	30·15	51	44	44	46	E	—	Dull
10	30·10	75	44	44	46	E	—	Dull
12	30·20	74	44	57	62	SW	—	Fine
13	30·33	70	51	51	54	WSW	—	Overcast
14	30·03	76	51	58	63	E	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 468. Vol. XVI.—APRIL 23, 1869.

A PHOTOGRAPHIC LUXURY.

Our readers will ask—"What can this be?" and we must answer, Obernetter's sensitised collodionised paper. Mr. Solomon, the agent for the sale of this ready-sensitised paper in this country, lately forwarded to us some new samples, and within the last few days we have had time to test the working of the paper with a negative of a very difficult test-subject, and the results have exceeded our expectations.

Some time ago, to oblige a friend, we took a series of negatives of dissections of the fleshy part of a large whale. The prints from these plates were employed by the lithographer to the Royal Society as aids in the production of a series of lithographs, subsequently published in the volume of the *Philosophical Transactions* for 1867. It was necessary to secure much detail in these negatives, and, though this was a somewhat difficult matter in consequence of the unsatisfactory colour and condition of each subject, we succeeded fairly in obtaining negatives which printed well, with one exception. This exception was in the case of a dissection of the larynx, or air-passages, of the animal. The negative obtained of this subject was seen, on close examination, to possess details which we had considerable difficulty in getting even tolerably rendered by ordinary albumenised paper; we, therefore, resolved, a few days ago, to try whether Obernetter's paper would succeed in catching the desired points. On making the contrast between results obtained with the new paper and the ordinary sheet, we had no difficulty in seeing that the former rendered details which were invisible with the albumenised paper print, and this result was obtained without interfering with the general harmony of the photograph.

As Mr. Solomon gave away a number of specimens of the paper at the last meeting of the London Photographic Society, we have no doubt that many will now test the paper for themselves who would not otherwise have the opportunity of doing so, and we shall probably soon have the opinions of the experimentalists upon this subject. Meanwhile we have one or two remarks to offer upon the working of the paper.

Putting aside for a moment the question of power of rendering minute details, which is so important a feature of the paper, we have found it to be also very sensitive and easily managed. The only difficulty which the beginner finds in using the paper is the tendency which it has to cockle up when placed in water, but this trifling trouble can be easily overcome by allowing the print to remain in the water for a short time, and then gently rolling it in the opposite direction to that of the curl. But it is to the toning bath that we should more especially direct attention now, since the nature of this solution exercises a most important influence upon the result.

Unfortunately, the best toning bath for these prints is the sulphocyanide bath recommended by Herr Obernetter, and which is prepared by mixing equal quantities of the two following solutions:—

No. 1.	Distilled water	50 ounces.
	Sulphocyanide of ammonium	1 oz. 2 drs. 18 grs.
	Hyposulphite of soda	46 grains.
	Bicarbonate of potash	15 ,,
No. 2.	Distilled water	50 ounces.
	Neutral chloride of gold	31 grains.

This bath must be perfectly neutral. The prints tone well in this solution; but we long since showed that the rich tints obtained with the sulphocyanide and gold bath are really due to "sulphur toning," and on this account we always distrust the results obtained by the employment of the sulphocyanide.

From the experiments which we have made, as yet, on the toning of prints upon Obernetter's paper, we are disposed to think that the neutral chloride of lime bath is likely to work better than most others. On this subject, however, we hope shortly to have some further remarks to offer, and, when our experiments are completed, we shall lay the results before our readers.

A NOVEL MODE OF MAKING AND OF STORING OXYGEN.

In the letter of our excellent Paris correspondent, last week, we were pleased to see the statement that some attempt has been made to render the remarkable absorbent power of wood-charcoal for certain gases practically available, and in a very interesting way, for the purpose of extracting oxygen from the atmosphere.

Fine boxwood charcoal has been found to absorb the following quantities of certain gases:—

Of ammmonia	90	volumes.
Hydrochloric acid gas	85	,,
Sulphurous acid	65	,,
Sulphuretted hydrogen	55	,,
Laughing gas	40	,,
Carbonic acid	35	,,
,, oxide	9·42	,,
Oxygen	9·25	,,
Nitrogen	6·50	,,
Hydrogen	1·25	,,

From this table we can easily see that one cubic foot of this charcoal is capable of condensing in its pores rather more than *nine* cubic feet of the gas oxygen. This amount of gas is held in the pores of the charcoal by virtue of a species of attraction, about the nature of which little, if anything, is at present known; the effects of the operation of this force are all that we are at present acquainted with. These results are sufficiently surprising when we remember that, in the case of oxygen, the gas is condensed in the pores of the charcoal to the same extent that it would be if subjected to a mechanical pressure of about *one hundred and twenty-six* pounds on the square inch. Again: in the case of ammoniacal gas, the condensation is equal to that which would be obtained by subjecting the gas to the enormous pressure of nearly *one thousand two hundred and sixty* pounds on the square inch.

However, the two important gases with which we have to deal are oxygen and nitrogen—the chief constituents of our atmosphere. It is found that charcoal absorbs *less* nitrogen than oxygen, whereas common air contains only one-fifth of its volume of the latter; so that charcoal is capable of acting, to a certain extent, as a separator of the oxygen. This, probably, will be better understood if we remember that the air we breathe contains but little over *twenty* per

cent. of oxygen, whereas the mixed gases extracted from the charcoal, after it has been exposed for some time to the atmosphere, contains somewhat over *sixty per cent.* of oxygen.

MM. Laire and Montmagnon, the authors of the process described by Mr. Fowler, propose to expose this highly-oxygenised air to the further action of charcoal, so as to increase the proportion of the oxygen to a still greater extent. This is an exceedingly ingenious idea, and one which we can only hope may be found to admit of satisfactory application in the manufacture of oxygen on a large scale.

Our attention has long been directed to the possibility of employing the well-known absorbent powers of charcoal as a means of storing up gases, but more especially oxygen. Our plan has been to saturate the charcoal with the gas by exposing the former in a large volume of the latter, and then preserving the impregnated charcoal in a stout air-tight tin case, fitted with an exhausting pump. When a supply of oxygen is needed, the pump is worked, and a supply of oxygen drawn from the charcoal and delivered by a suitable jet fitted to the pump.

It will be obvious, from what we have just mentioned, that the gas escapes from the pores of the charcoal when the pressure of the atmosphere in which the impregnated charcoal is placed is diminished. The same result may be obtained by the aid of heat with most gases, but, in the case of oxygen, the temperature at which it is completely evolved from the charcoal is sufficiently high to make the carbon burn with great brilliancy in the atmosphere of the gas; we could, therefore, only extract the oxygen easily by means of the air-pump.

We now throw out the suggestion here, and hope that some of our ingenious friends will take the matter up and devise a cheap and convenient plan for utilising this singular property of wood charcoal.

HARDNESS.—GRADATION.—ENLARGED TRANSPARENCIES.

What an elaborate work might be written on the subject of "actual *versus* relative density in negatives," provided any one could be found who would read it! Let us here try to compress into a column what might easily be expanded into a volume.

On Saturday last we spent a few hours in the company of Colonel Stuart Wortley, at that gentleman's residence. A portion of the time was devoted to the producing of enlarged transparencies from *carte* negatives. The negatives which we enlarged were of a class pre-eminently adapted for printing by the Wothlytype process, and those who are acquainted with that method of printing will be aware that a considerable degree of density in the negatives is, if not a *sine qua non*, at least a desideratum. What degree of success was achieved in our essays will eventually appear.

What is theoretical perfection in a negative? It is that condition, we presume, in which the very lowest depths in the shadows are represented by clean glass, and the very highest lights by opacity, the intermediate gradations coming in in proper order. Too sudden a bound from the shadows to the high lights constitutes hardness. A hard picture has strong and patchy lights with deep shadows, but no properly-developed intermediate tones. There are some very dense negatives which produce soft and pleasing pictures, and, on the other hand, there are some apparently thin negatives which yield hard pictures. A perfect *thin* negative differs from a perfect *dense* negative, inasmuch as the degree of density of the highest lights is very many grades lower than that of the absolute opacity which we assumed in our theoretically-perfect negative, and the ascent from the clear glass of the deep shadows normal to both is much slower in the thin than in the dense negative, owing to the lowering of the highest lights—the top storey of the elevation.

Returning now to Rosslyn House for an instant, Col. Wortley's *carte* negatives possessed full density, full intensity, and yet full gradation. Now it has been laid down as an axiom that to get the best transparencies, more especially *enlarged* transparencies, the negatives must be thin. But in this instance the negatives were not thin, but rather the reverse. We have always laid it down as a rule that a negative from which by any method of "dodging" or "cooking" it is possible to obtain a good print on paper also yields a good transparency on glass. If an intense negative be employed to print on a piece of paper sensitised on a very strong bath, the resulting picture will be quite different from that obtained on the same sample of paper sensitised on a weak bath—say of twenty to thirty grains of silver per ounce. And again, in connection with this subject, even when the silver bath is of the same strength, and two pieces of paper similar in every respect are exposed under two similar negatives, the one in strong sunlight and the other in diffused and rather weak daylight, a marked difference will also be apparent. According, then, as the printing is accomplished, so may feeble and gentle gradations in the negative be either given effect to in the print or buried in the dark deposit of silver. So is it with transparencies. It may require more skill or more care to produce a fine and softly-graduated enlarged transparency, *à la* Sarony, from a strong negative than from a feeble one, but most assuredly the feat is one possible of accomplishment.

To obtain a soft "Saronytype" from a tolerably hard negative on a dry plate would not occasion us any trouble whatever. More difficult is the task when wet collodion is employed. Under ordinary circumstances Col. Wortley's exquisite negatives would have proved too dense for this crucial test; and, indeed, the first picture tried on the occasion alluded to was by far too strong, dense, or heavy in appearance when finished. The negative was placed in one of the "rough and ready" deal cameras described in our last number, and, by means of a small hole cut in the opaque window cover or shutter, was pointed to the sky. The day was rainy, and the sky obscured by dense, murky clouds. One condition of success was thus perforce imposed; for a long exposure against an imperfectly-lighted ground is more conducive to softness than a bright sky and a briefer exposure. Notwithstanding this advantage, the first picture developed too densely to be quite pleasing. Although the bath was acid and the collodion was old (made at least a year and a-half), the silver was deposited in too dense a body to form a high-class picture.

The remedy for this was obvious, and we applied it. The next picture was placed in a dish of distilled water for a few minutes before the developer was applied, and the image then came out with great softness and beauty. No part was too intense, but gradation and harmony prevailed over all. When fixed in hyposulphite of soda (for cyanide would be apt to remove the more delicate portions) the image was toned by chloride of gold, and, after being washed, was dried and varnished.

No person will be more gratified than Mr. Sarony himself to learn that this first trial of the simple instrument designed by him was so successful that some of the results obtained were by no means inferior to those beautiful specimens which were exhibited by himself.

But not alone with daylight were the experiments performed; magnesium was also pressed into our service. In the absence of a proper magnesium enlarging apparatus, a bit of magnesium wire was held in the fingers and burnt within a couple of inches of the negative, the equality of illumination which is obtained from a condensing lens being secured in this case by moving the ignited magnesium wire all over the surface of the negative, or rather that particular portion which was being enlarged. The light was not confined to a lantern, but was diffused over the walls of the room, attended, as might have almost been anticipated, with a slight degree of fogging, from the light radiated by the white ceiling of the room. If the spare light had been masked by a lantern, an exposure of little more than half-a-minute would have sufficed to yield a fine and clear picture.

All the trials were made on 12 × 10 plates, and we think that Mr. Sarony would do well to adapt a series of his crayon backings for this size; for not only is it a pleasing and symmetrical one, but many photographers already possess the plates, baths, and other requisites for this standard size. We commend this suggestion to Mr. Sarony's attention; and, while not being unmindful of those who aim at a larger size, let him remember that for each photographer to whom the 14 × 10 size originally introduced will prove acceptable, more than a dozen will be found to prefer the old standard size of 12 × 10, and probably even a much larger number would like a still smaller size. This, however, by the way.

With judicious lighting, long exposure, and a copious washing of the plate before applying the pyrogallic acid developer, we affirm that negatives of the kind usually designated "dense" may be made to yield enlargements on glass as soft and perfect as need be desired.

CONCERNING ACCIDENTS ARISING FROM THE EMPLOYMENT AND MANIPULATION OF CHEMICAL PRODUCTS.

[Second Article.]

I concluded my last article with a short reference to the explosions of the mixed gases of oxygen and hydrogen; but I shall not enlarge upon this branch of the subject, as it has so often been specially

treated in these pages. The accidents arising in making the oxygen from chlorate of potash and oxide of maganese have also received the attention of your readers, and the causes and preventions of both have been well discussed.

In connection with the production and the use of gas, I may mention that care is necessary in the employment of the nitric acid or charcoal battery known as "Bunsen's." The corrosive acid fumes given off from a number of cells are very dangerous to persons of weak lungs, and are quite capable of producing great injury to those enjoying strong breathing organs, as I believe the worthy Proprietor of this Journal can testify to. The emanations arising from cyanide of potassium are very poisonous. But were I to enumerate the accidents that might arise from the poisons used in photography, I should require more space than can be allotted to this article; and, although such accidents are strictly within my subject, I do not intend to do more than thus allude to them.

One would scarcely suppose that nitrate of uranium could give rise to an explosion, but I find one recorded in the pamphlet to which I am indebted for much of my information as having been in the experience of Dr. Leconte. He wished to purify commercial nitrate of uranium, and for this purpose dissolved about three ounces of this salt in sulphuric ether; the filtered solution was placed in a retort, which was connected with a glass receiver kept cool by immersion in water. The retort was heated by a water bath, and for some time the distillation of the ether went on well; but, all of a sudden, a detonation like that produced by a piece of artillery shook the laboratory of the College of France, in which this operation was being performed. The windows were blown out, the cast-iron bath was forced into the furnace so firmly that it required heavy blows of a hammer to dislodge it, and the whole quarter was roused. There was no injury done by the ignited ether, for the violent explosion so diffused the liquid that its sudden flame was harmless, like a flash of summer lightning. The cause of this accident was attributed to the formation and explosion of a *fulminate of uranium*, formed by the joint action of the nitric acid, ether, and oxide of uranium, and which, becoming dry from the volatilisation of the ether, exploded at a temperature under that of boiling water. This accident shows that other metals than mercury, silver, and gold are capable of forming fulminates by the action of acids and compounds of ethyle. The chance of accidents from the formation of fulminating silver in evaporating an *old* silver bath down to dryness, and the production of detonating compounds by the action of ammonia upon solutions of salts of silver and gold have been pointed out by M. Davanne, and recorded in the pages of this Journal.

The author of the work which has been so useful to me was dreadfully wounded by an explosion of fulminating silver. He was trying to take the stopper out of a bottle containing about 75 grains of this substance, and the whole went off in his hands. There was sufficient fulminate to charge 5,000 percussion caps—estimating the silver compound of the same power as the mercurial with which the caps are charged. Cold ablutions formed a principal part of the treatment by which the young man was cured. The lesson to be learnt from this accident is that substances which explode from mere friction should not be kept in stoppered bottles, but either in corked bottles or in wide-mouthed bottles tied over with paper or parchment. If the ammonio-iodides of the Rev. J. B. Reade become "photographic chemicals" we shall probably hear of explosions occurring in their preparation, from the formation of iodide of nitrogen from the action of iodine and ammonia. This substance will explode, even under water, by simply stirring with a glass rod.

The President of the French Photographic Society, M. Regnault, was severely injured once whilst heating about twenty pounds of metallic mercury in a vessel terminating in a capillary tube. The tube broke, and the greater part of the boiling mercury was thrown over the face of the professor. His eyes instinctively closed, and were thus saved, although he was compelled to keep his bed for two months in complete darkness, and subjected to continued cold ablutions.

In 1866 I recorded an accident from the explosion of oxalate of silver which was heated in a glass flask. The cause of this was attributed to a fragment of hot glass which became detached from the flask and fell into the oxalate; but Professor Oppenheim tried some experiments on the subject as soon as he had recovered from the effects of the accident, and found this conclusion was incorrect. A train of oxalate of silver was made upon a plate, and a lighted match applied at one end; the salt was decomposed only where acted upon by the match, and then without any noise. It follows from this that the whole mass of oxalate of silver must have been heated to explosion point at once, or to about 280° Fahr., the temperature at which this salt decomposes.

As our Editor so truly remarked in his leader a fortnight since—"If anyone had told us but a very few months ago that photographers would care to know anything about so rare a mineral as the zircon we should scarcely have believed them, and yet today it possesses a considerable amount of practical interest"—so I would conclude this article with an extension of the same sentiments. We find new substances daily pressed into the service of photography. The pursuit of the science has taught us the use of many products that were formerly but rare laboratory specimens, and the very nature of the actinic force to which we are indebted for all our pictures obliges us to search after chemical combinations of comparatively loose affinities, or to use them in transitory molecular states. Thus we have to do with products whose properties have often been but little known till they came under our notice, and to operate upon them in conditions most favourable to their rapid decomposition; and so, if they should be endowed with explosive or dangerous tendencies, photographic students are most likely to experience their effects. If art-knowledge be essential to the production of first-class photographs, chemical knowledge is no less necessary to a photographer who wishes to elevate himself and his profession to the highest rank. The want of the former attainments may only affect the pictures and purse of the artist, but ignorance of the latter science may cost him his life. It is often a matter of surprise to many how the art-science of photography can produce so much periodical literature; but when it is considered that its intelligent study leads the student into nearly every branch of physical science, and obliges him to be acquainted with the rules and application of artistic knowledge, that wonder should cease.

A very good suggestion was thrown out at the last meeting of the French Photographic Society. It was that plans should be organised for obtaining authentic photographic statistics—the quantity of silver consumed, the number of photographers in each country, the value of their productions, &c., &c.; and I would add, let an account be collected of the accidents which have arisen and happen to photographers from the employment and manipulation of their chemicals. I am sure the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY will always be open to these records, and I would call the attention of photographers to the desirability of sending in their experience at once. If by so doing they prove the means of saving one life, those records and this article will not have been made in vain.

I must not conclude without expressing my obligation to M. J. A. Thelmier for the interest afforded me by reading his pamphlet, *Des Accidents dans les Laboratoire de Chemie.*—Paris: J. B. Baillière et Fils.

R. J. FOWLER.

THE CLOUD STOP.

AMONGST other subjects which have lately and deservedly attracted attention may be mentioned that of the cloud stop. At the present time of the year, when landscape photographers are anticipating their summer campaign, any apparatus having for its object the production of atmospheric effect is peculiarly deserving of interest.

The pantascopic camera has for some time enjoyed the almost exclusive reputation of being an efficient instrument for the simultaneous representation of natural skies and more or less deficiently illuminated foregrounds; indeed, so efficacious for such representation has this instrument proved itself, that the addition of an expanding diaphragm situated in front of the sensitive plate, and actuated by clockwork, has become a matter for serious consideration even with those who have never contemplated the use of panoramic perspective.

The cloud stop, however, is so simple in its construction, and, when compared with any clockwork apparatus, so easy of adaptation, that, by those who have read its description, the wonder it was never thought of before is only equalled by their admiration of its evident feasibility. Its full merits, however, do not seem to be recognised with that facility which might be expected.

The oblique stop, however—admirable as it undoubtedly is—whether it be the invention of the Rev. William Read, of Manchester, or Mr. Thomas Sutton, is in several respects certainly inferior to an arrangement invented, constructed, and employed by Mr. Kershaw, of Manchester.

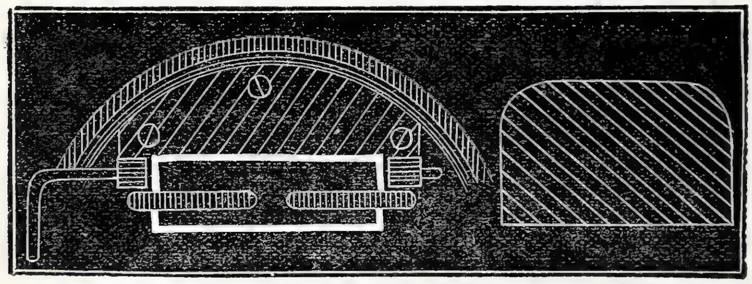
In THE BRITISH JOURNAL OF PHOTOGRAPHY for April 17th, 1868, at page 188, it is stated, amongst the proceedings of the Manchester Photographic Society, that Mr. Kershaw exhibited on the 9th of the month mentioned "a rather ingenious little contrivance that he had adapted to one of Dallmeyer's lenses, its object being to cut off a portion of the light from the sky part of the sensitive plate." Mr. Kershaw, the report continues, "said he had not an opportunity of trying it in practice, but he quite expected to obtain negatives more

justly balanced as regards foreground, distance, and sky than were usually met with;" and with these words all allusion in this report to Mr. Kershaw's stop is brought to an end. The writer, who was not present at the meeting named, is unable to say whether or not the members assembled made any other observation on the arrangement than that it was "rather ingenious;" but it certainly is surprising that this was the only remark they made which was considered worth publishing in the Society's report. "Rather ingenious" is a very inadequate description of Mr. Kershaw's contrivance; "decidedly ingenious," or "exceedingly ingenious" would certainly be much more to the point.

From a conversation the writer has had with Mr. Kershaw, by whom he was desired to describe this arrangement for the benefit of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, it would seem that few, if any, of the gentlemen present when his cloud stop was shown succeeded in understanding the principle upon which it is based. In the writer's opinion, Mr. Kershaw's stop will prove to be by far the most efficacious and convenient arrangement for the production of atmospheric effect which has thus far been introduced, and it would be a pity, when its originator is desirous that its construction should be generally known, not to give a full and comprehensible description of this highly ingenious contrivance. For my own part I shall certainly, and without delay, have it adapted to my own landscape lenses.

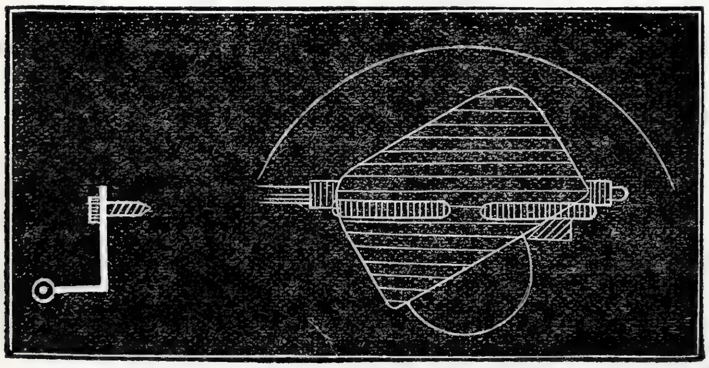
If the reader will refer to *fig.* 1, he will see represented a portion of the circumference of that part of the brass tube which is placed in front of the ordinary stop of a meniscus landscape lens. That

FIG. 1. FIG. 2.



portion of the diagram crossed by diagonal parallel lines indicates the position of the circular plate which covers the rotating disc of stops. On to this plate is screwed a flat piece of metal, shown by the vertical line in *fig.* 3, which is bent at right angles, and subsequently shaped so as to grip a pin in such a manner as to permit it to re-

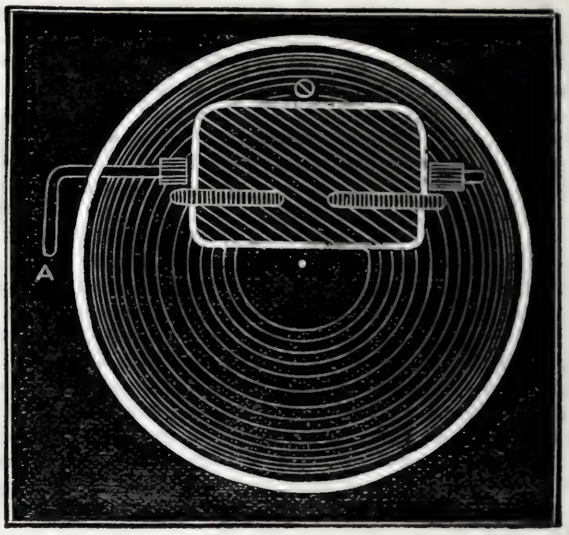
FIG. 3. FIG. 5.



volve freely upon its axis, as is also shown in *fig.* 3. When this pin is inserted in the two bands formed by projections of this metal plate, another flat piece of metal is soldered on to it; and one of its extremities, after passing through a hole drilled in the mount of the lens for that purpose, is bent at right angles, forming a sort of hinge shown in *fig.* 1. Two thin steel springs pressing lightly upon the outer surface of this plate are bent round its edge and soldered to the back. *Fig.* 2 shows the shape of a very thin plate of steel or iron, which can be introduced between these steel springs and held by them on the flat part of the hinge shown in *fig.* 1. This plate (*fig.* 2) we will call the sky plate. It can be placed upon the handle in *fig.* 1 so that almost the whole of it, or, if necessary, only a little of it, shall project beneath the plate upon which the springs are fastened. *Fig.* 4 shows the position it should occupy in all ordinary cases of landscape photography where a large stop is used. By means of the handle A the amount of the stop covered by the sky plate may be varied at pleasure, even when looking on the surface of the ground glass.

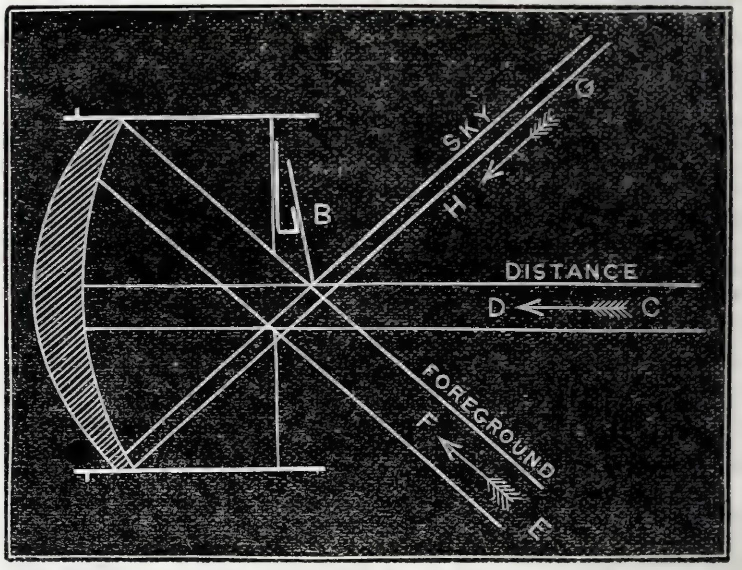
To understand the theory of its action it is only necessary to refer to *fig.* 6, remembering that with the same aperture of diaphragm the brilliant clouds of the atmosphere require a much shorter exposure to reproduce them upon the collodion film than the less illuminated "distance" of the view, which, in its turn, requires a shorter time

FIG. 4.



than the still less illuminated details of the foreground. Some few contrivances are extant by which an actual difference in the time of exposure between the sky and the foreground may, with more or less facility, be produced; as, for instance, the "sky-shade" supplied with some of the modern wide-angle lenses, and the shutter in front of the sensitive plate opening downwards, supplied with some of the older forms of stereo.-camera. Where, however, such a *bonâ fide*

FIG. 6.



differential chronometric exposure is given, what is known as instantaneity in photography is almost, if not altogether, impracticable, inasmuch as the very brief period—amounting only to the fraction of a second—required for the exposure of the foreground has to be subdivided into still less parts in order to obtain the proper relative exposure of the sky.

Supposing with a comparatively large stop that ten seconds of time be sufficient to give the correct amount of exposure to the foreground, we may produce a proper and not over-exposed image of the sky in precisely the same time by making the area of the stop used, when the sky is exposed, exactly as much less than that when the foreground is exposed as the brilliance of the latter is less than the brilliance of the former. The question, then, is simply how to use two stops differing greatly in their areas—the one for the foreground and the other for the sky—at one and the same time. At first sight the practicability of such an idea seems simply impossible. The oblique stop, described by Mr. Sutton and accredited to the Rev. Mr. Read, strikes us with admiration as being an effective solution of this problem—admiration which is increased upon examination of the more perfect arrangement introduced by Mr. Kershaw.

Upon reference to *fig.* 6, it will be seen that the sky-plate B in no way obstructs the passage of the rays from the foreground through

the stop of the lens, but that the full aperture of that stop is utilisable for the exposure of that part of the picture. In the matter of the distance, however, the sky-shade does interfere, and the stop becomes practically contracted in its aperture, so that the amount of light proceeding in the direction C D is less than that proceeding in the direction E F, in the same proportion as the square of the separation of the lines marked "distance" differs from the square of the separation of the lines marked "foreground."

Again: it will be seen that the sky-shade B cuts off a very large proportion of those rays proceeding in the direction G H, and therefore practically reduces the aperture available for the exposure of the sky to the square of the distance of separation between the two lines marked "sky." By placing the sky-plate (*fig.* 2) obliquely between the springs as shown in *fig.* 5, the stop becomes properly adjusted for exposing to such subjects as have the sky and the foreground encroaching upon each other's domain across the diagonal of the plate.

In short, the careful reader of these remarks will perceive that Mr. Kershaw's arrangement is admirably adapted to assist the photographer in his endeavours to obtain many of those varieties of differential exposure which, in the present state of photographic science, are so often necessary for the adequate representation of the beauties of nature. D. WINSTANLEY.

ON LANTERN CONSTRUCTION IN RELATION TO PHOTOGRAPHY.*

As year by year the old magic lantern is getting more closely linked with photography, so that the photographic journals have become the only recognised organs for lantern literature, it would be well if the photographic societies of London, Edinburgh, and the provinces would devote one or two evenings to the thorough and systematic criticism of all matters connected with the practical construction and manipulation of this instrument, and invite those who have given their attention to it to come primed for discussion, by placing the papers to be read, in printed form, in their hands some days previous to the meeting. By practically testing and demonstrating the capabilities of the several principles and modifications of light-giving and optical parts advocated by magic lantern workers, manufacturers, &c., good services would be done, by eliminating the good points of construction for a standard instrument to be used for showing transparent photographs.

In the present paper I will endeavour to set this ball moving. Having recently read a paper before the Society of Arts, *On Photography and the Lantern Applied to Teaching History*—the illustrative slides to which have been shown before your Society—to save repetition, I will ask you to accept as read such portion of that paper as relates to the *sources of light*.

That you may judge of the light attainable with the convenient condensed gas apparatus, I have forwarded a bottle of pure hydrogen of twelve cubic feet capacity and a bottle of oxygen of six cubic feet capacity. I will ask you to compare this with a gas-bag arrangement as to comparative space occupied and intensity of light (*proviso*, that both jets are of *about* equal bore), and I will state my conviction that an explosion with this arrangement is utterly impossible—a matter on which I invite your criticism. [Directions are here given for showing the mixture of the gases at the meeting. We omit two pages of "copy" which follow, and which form pages 552 and 553 of the *English Mechanic* for March 12th, as they are merely reprints of Mr. Highley's article which we published in abstract in our number for February 5th, page 64.]

I will now proceed to the subject proper of the present paper. There are two classes of lantern workers for whom the optician must provide, viz., those who wish to show transparent photographs on a small scale to their families or to small schools, and who cannot or will not use anything that gives the least trouble, or involves a suspicion of danger; and others who will only show on the large scale with the best light and appliances attainable, and though not ignoring trouble to attain the most perfect results, would be well pleased to find their time saved, chances of accident reduced, and their apparatus brought into the most systematic order and the smallest possible bulk for travelling.

I may at once, then, arrange our lanterns into two classes, viz., argand lanterns and lecturers' lanterns. The first are illuminated by sperm, colza, paraffine, or other oils, by solid paraffine, a house gas naphthalised by light or heavy hydrocarbon compounds. The second are illuminated by the lime light or the electric light. We must not forget the magnesium lantern; but, though well suited for photographic enlargements, I think much has to be got over before it can be regarded as perfect for general requirements in the exhibition of magic lantern slides.

Argand Lanterns.—From the great heat given out by argand burners the bodies are best made of stout tin, and so constructed that plenty of air can enter at the basement and find exit through a large uncontracted chimney placed directly over the focal position of the burner.

I prefer making the base of the lantern in wood so as to allow of a solid mahogany slab, sliding in and out freely, by groove and tongue fitting being employed to carry the brass rod on which the lamp is clamped and adjusted, and for focussing the lamp with the condenser. The adaptation of the kaleidoscope to the lantern renders an adjustment for the lamp as well as the jets imperative.

The stage is usually made with a spring plate, and the upper side closed; but, having found wriggling and sticking too often attendant on the introduction of a thick mechanical slide, I have discarded the spring plate altogether, so as to allow a slide of any thickness to glide into its place. All slides of the standard thickness are kept upright, or, if mechanical, clamped, by means of a quick-action screw in the front plate of the stage, which can be rapidly turned back to admit the thickest frame made. A small rectangular arm, working on a pivot, is attached to the side of the stage opposite to that on which the slide is inserted, so as to stop it when central with the optical axis of the lantern.

As there are many mechanical effects that can be introduced, such as balloon ascents, ascending fairies, descending demons, &c., &c., if slides can be worked vertically as well as horizontally, I frame the stage plates, together with four brass pillars, so that the stage is open at the top as well as at the sides—thus leaving great freedom of action for other effects as well.

In place of the clamp screw, I sometimes use a thick vertical frame, with a rolling curtain effect (cut in sheet brass) that fills up the spare space in the stage, behind which the framed views are placed, the solid metal being drawn up to obscure the disc while they are being changed, and lowered when they are replaced. A pleasing effect is thus produced, whether only one or two lanterns are worked in unison with "dissolving curtain" action thus contrived.

Lecturers' Lanterns.—These must be so arranged that they will not only take lime-light apparatus, but also an electric regulator, and every appliance that may be required for microscopic and optical demonstrations. The body should be made of stout mahogany, and the oldest material attainable—preferably old dining-table tops, showy pattern in the wood being rather objectionable than otherwise.

As the heat radiated from these sources of light is not great, a tin lining or chimney is quite unnecessary. The flat dome in the lantern before you is a convenient form, and, when raised at the back of the lantern, allows of sufficient ventilation in connection with the air slots at the base and the opening at the back made to allow the insertion of lime clock jet and electric regulator.

Two pieces of dark glass should be inserted in the sides to allow of the light being observed without having to open the doors. The stage must be fitted to the front by a bayonet joint and flange plate, within which the condenser slides, to allow of its entire removal, not only for the adaptation of the gas microscope, polariscope, &c., but that the condensers may be left free for spectrum and other optical demonstrative apparatus.

The adjusting rod and slide board is the same in this as the one described for the argand lamp. The jet I use is a convertible one recently designed by me; that is to say, it allows the travelling exhibitor to change his arrangement from a *mixed gas* to an *oxy-house gas*, or an *oxy-spirit* jet, according to requirement, or should he be in a place where carburetted hydrogen was not attainable.

The wire that supports the lime cylinder is double the length of lime, for the purpose of keeping a second lime in reserve and warmed through, should the one in use crack. The clock works the lime *upwards*, to prevent the ignited jet shooting over the lime and burning the lantern, and leaving any cracks above the jet. [Having thus described the mechanical parts of the lantern, Mr. Highley concluded by explaining his method of packing and arranging his slides already described in his lecture. See page 65 of this Journal. He then continues:—]

Having placed before you the mechanical arrangements, and the sources of light employed, I must defer what I have to say on the optical parts till a future occasion, as this paper was originally arranged to have been read before your Society on the 7th of April, and, independently of my being confined to a sick room, it would have been impossible to have done justice to the subject or to have completed the apparatus for demonstrating the points for discussion a fortnight earlier than the time I agreed to write a paper on *Lantern Construction*. S. HIGHLEY.

* Abstract of a paper read at a meeting of the Edinburgh Photographic Society, April 7, 1869.

ON THE ATOMIC WEIGHT OF ALBUMEN, AND THE COMPOUNDS FORMED BY SENSITISING A CHLORIDED AND NON-CHLORIDED ALBUMENISED PAPER UPON A SOLUTION OF NITRATE OF SILVER.

IN TWO CHAPTERS.—CHAPTER I.

As positive printing upon albumenised paper is one of the most important branches of photography, we ought to be well acquainted with its chemistry, if such knowledge be attainable; but how stands the matter? Well! it may perhaps be a very humiliating confession to make, but, nevertheless, it is an undeniable fact that we know but little, if anything, about it.

This is, undoubtedly, partly due to the numerous difficulties surrounding the subject; but it is also due to the many assumptions that have been dressed up in the semblance of science, and then palmed upon us as facts. These pseudo-scientific facts, as they may be aptly designated, are more numerous in photography than any person who has not attentively studied the matter would be apt to imagine. And methinks a curious, interesting, and informing paper might be written on the subject.

Most assuredly Mr. M. Carey Lea gives utterance to an undisputable truth when he says—"Incorrect views have done much to retard the progress of photography;" and, also, when he tells us that "in all sciences the foundation facts and principles are so important that no labour should be spared in fixing them beyond question." Therefore, as "light, more light," is wanted upon everything connected with photographic printing upon albumenised paper, let us see whether the darkness which obscures our progress cannot be dispelled in some manner by discussion—I should perhaps have said let us see whether we can cause discussion—so that we may be enabled to see our way a little more clearly, and not have to grope about in the dark as we do at present, and assume things to be facts which perhaps may not be such.

Notwithstanding we need much information upon a preliminary, although very important, branch of the subject, viz., the salting of the albumen, we must pass it over for the present, and first direct our attention to the albumen itself, and the compound or compounds formed by the act of sensitising a sheet of chlorided and non-chlorided albumenised paper on a solution of nitrate of silver.

However, to show how much we need information respecting the salting of the albumen, I will state a few of the many questions which Science has not yet answered satisfactorily, although some of her followers have endeavoured to enlighten us in her name respecting them; nevertheless, their teaching is easily proved to be based on mere assumption and not on fact.

Is it absolutely essential that a chloride should be employed to salt the albumen for our photographic paper? and, if so, which is the best to use, and what should its proportion be? Will a combination of two or more produce better results than a single one? and, if so, which should we employ, and in what proportions? Must these chlorides necessarily be chlorides of the alkalies and alkaline earths, or would it not be better to employ chlorides of some of the metals? Would it be more advantageous to employ other classes of salts than the chlorides? and, if so, what should they be? Could we produce better effects than we do at present if, instead of salting the albumen, we were to introduce a salt or salts into the sensitising solution of nitrate of silver? and, if so, what should that addition be?

It is certainly inexcusable that information is needed upon these and other preliminary matters, inasmuch as many, if not all, of them could have been decided long ago by direct and careful experiment. It is not so, however, with respect to the compound or compounds formed by sensitising a sheet of chlorided and non-chlorided albumenised paper on a solution of nitrate of silver. Here, on the very threshold of our inquiry, we meet with a stumblingblock; for, notwithstanding that the last few years have added very much to our knowledge of organic chemistry, we are still unable, not only to state satisfactorily what is the combining molecule of albumen, but also what is the nature of the compounds it forms with various salts.

There is a peculiar and well-known class of substances—to which albumen belongs—that do not possess the property of crystallising, and, in addition to carbon, hydrogen, nitrogen, oxygen, and a few salts, they contain also a small quantity of sulphur and phosphorus. These peculiar substances are termed "protein compounds," for the following reason:—If they are dissolved in potash lye by gentle heat, and the solution cautiously saturated with acetic acid, a gelatinous precipitate is produced, the proportions of the constituents of which are found to be always the same, no matter what may be the protein substance employed; and in the solution is also found sulphide of potassium and minute traces of hypophosphite of potash. It has, therefore, been supposed that in these substances a body exists which is common to them all. To this body has been given the name of "protein," signifying, "I take the first place."

Although much has been written and assumed respecting the protein compounds, but very little is really known about them. Nevertheless, I think it will not be denied that we have a pretty accurate knowledge of the centesimal composition, or percentage constitution, of albumen, for the results of its analysis, undertaken by various persons at different times, are in such close accordance with each other as to warrant the belief that they are not far from the truth.

A few years back, I wished to construct tables to show the quantity of silver required to furnish the albumenate, chloride, and free nitrate to a sheet of paper albumenised according to various well-known formulæ; but I was obliged to abandon the idea, because no chemical work to which I then had access gave any formula for albumen. However, soon afterwards, in THE BRITISH JOURNAL OF PHOTOGRAPHY, vol. ix., page 251, there appeared an article, *On Albumen*, by Mr. James Martin, in which he said:—"A more accurate appreciation of the constitution of this substance will be arrived at by a consideration of the analysis of protein obtained from different substances, and published by Mulder." He then gave the following table:—

	Vegetable Albumen.	Fibrin.	Animal Albumen.	Cheese.	Atomic Weight.	Calculation.
Carbon	54·99	55·44	55·30	55·159	40	55·29
Hydrogen	6·87	6·95	6·94	7·176	62	7·00
Nitrogen	15·66	16·05	16·02	15·857	10	16·01
Oxygen	22·48	21·56	21·74	21·808	12	21·70

Mr. Martin then proceeded to say:—"The last column of figures on the right hand gives the average constitution of protein obtained from various sources, and the analysis of which has been conducted with great care; and, if to this be added 0·4 of phosphorus and 1·6 of sulphur, we shall have the percentage composition of pure albumen." At the commencement of the article Mr. Martin gave the formula for albumen as being C_{400}, H_{620}, N_{100}, O_{120}, P, S_2, making its atomic weight 5,444.

This was the only formula for albumen I had then met with; but, when I examined it in conjunction with the table given of the percentage constitution of protein, I came to the conclusion, for the following reasons, that it was not to be relied on—in fact, I considered it utterly worthless. In a rational formula for a compound, its constituents should be so represented as to bear as nearly as possible the same relative proportions as they have in its percentage constitution; whereas, in the formula given by Mr. Martin, the numbers assigned to carbon, hydrogen, nitrogen, and oxygen, were those headed "atomic weights" in the fifth column of figures, for the percentage constitution of protein increased tenfold, whilst the added phosphorus was increased eightyfold, but the added sulphur was merely increased by the addition of a fourth.

Upon inspecting the last column of figures, headed "calculation," in the table of the percentage constitution of protein, it will be seen that, omitting the decimals, the hydrogen is exactly one-third of the amount of oxygen; but the "atomic weights" in the previous column give it but a trifle less than two-thirds, and, therefore, very largely in excess—in fact, nearly double what the percentage gives it. Again: in the last column it will also be seen that, omitting the decimals, the nitrogen is less than a third of the amount of carbon; but the "atomic weights" in the previous column give it considerably more than half its amount, and, therefore, also very largely in excess, as it is more than double what the percentage gives it. In short, these two columns, which ought to agree as nearly as possible in their relative proportions, exhibit nothing but inexplicable discrepancies in their relative proportions of the elements.

Bearing in mind, then, that the formula given by Mr. Martin is merely the column headed "atomic weights" multiplied by ten, and, therefore, gives this larger excess of hydrogen and nitrogen, methinks we can come to but one conclusion, viz., that this formula is misleading as representing the constitution of albumen, notwithstanding the high authority from whom it emanated, which, as we shall presently see, appears to have been Berzelius.

I pointed out some of these matters in a letter, under the signature of "An Ignoramus," which appeared in the same volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, page 321; and in Mr. Martin's reply he says:—"Berzelius (who himself quotes from Mulder) has the following in his *Traite de Chimie*:—'On burning albumen in the combustion tube with oxide of copper, mixed with oxide of lead to retain the sulphur in the state of sulphate, the following results are obtained:—

	Found.	Atoms.	Calculated.
'Carbon	54·84	400	54·70
Hydrogen	7·09	620	6·92
Nitrogen	15·83	100	15·84
Oxygen	21·23	120	21·47
Phosphorus	0·33	1	0·35
Sulphur	0·68	2	0·72'"

Mr. Martin then proceeds to say:—"In the second edition of Fownes's *Manual of Chemistry*, published in 1848, at page 536, the preceding analysis of albumen by Mulder is again quoted, but the following formula deduced therefrom:—C_{400}, H_{310}, N_{50}, O_{120}, P, S_2." This gives an atomic weight of 4,434. He also tells us that "the editors of the later editions of Fownes's *Manual*, Doctors H. Bence Jones and A. W. Hoffman, sensible of the caution and reserve with which the formula of albumen has been received by chemists, in the sixth edition of that work furnish only the percentage composition, and abstain from deducing any formula therefrom."

We thus see that the numbers in the formula previously given by Mr. Martin are those in the second column of figures in the table just given,

headed "atoms;" and when we come to compare Fownes's formula with that given by Mr. Martin, we find the discrepancies between them are very incomprehensible; for the carbon, oxygen, phosphorus, and sulphur are represented in both of them by the same numbers, whilst the numbers assigned to hydrogen and nitrogen in Fownes's are half of those given in the other.

The more I pondered over the matter the more incomprehensible did these discrepancies appear; for I could not conceive why one of the constituents of a compound should be represented in its formula as being but little more than one and a-half times the amount of another of its constituents, when its percentage constitution gives it about three and a-half its amount, which is the case with the carbon and nitrogen in the formula given by Mr. Martin. Therefore, still wishing—as I have stated before—to construct the tables to show the quantity of nitrate of silver required to furnish the albumenate, chloride, and free nitrate, to a sheet of paper albumenised according to various well-known formulæ I resolved to deduce a formula for myself. I accordingly took Mulder's percentage analysis of albumen as I had generally seen it given, viz. :—Carbon 53·5, hydrogen 7·, nitrogen 15·5, oxygen 22·, aulphur 1·6, phosphorus 0·4, and proceeded to deduce an *empirical* formula from it.

I shall state here how I arrived at the numbers I assigned for my empirical formula of albumen, and also how I arrived at those which I considered would represent its rational formula. I divided Mulder's percentage of each element by its atomic weight, in order to ascertain the number of atoms that would represent this percentage constitution. The results I shall here give in fractions, as they represent the numbers more accurately than decimals can do. This division by their atomic weight gave, for carbon 8 and $\frac{11}{12}$ths, hydrogen 7, nitrogen 1 and $\frac{3}{28}$ths, oxygen 2 and $\frac{3}{4}$ths, sulphur $\frac{1}{10}$th, phosphorus $\frac{1}{80}$th. As every element, except hydrogen, is here represented, either by a whole number and a fraction or by a fraction without any whole number, it, perhaps, strictly speaking, cannot be deemed an empirical formula; therefore, to prevent cavil, whenever I have to refer to it, I shall call it *my* empirical formula.

We thus see that, in the percentage analysis of albumen, phosphorus is only one-eightieth of its own atomic weight; now, we cannot have part of an atom in a rational formula, and, therefore, to give phosphorus even but one atom, we must multiply by 80 all the numbers of atoms in my empirical formula. This I accordingly did; but when the numbers had a fraction representing more than a-half, I took that fraction as a whole number. Thus, carbon being 8 and $\frac{11}{12}$ths, I considered as 9; oxygen being 2 and $\frac{3}{4}$ths, I considered as 3; but those with a fraction representing less than a-half, I multiplied as they were. After thus multiplying by 80, nitrogen produced 88 and $\frac{4}{7}$ths, and as this fraction is more than a-half, I considered nitrogen to be 89. This gave me the following rational formula for albumen :—Carbon 720, hydrogen 560, nitrogen 89, oxygen 240, sulphur 8, phosphorus 1; which gives an atomic weight of 8,206.

It was not till some months after this that I met with Dr. Lowig's *Principles of Organic and Physiological Chemistry*, in which he gives the following following formula for albumen, but upon whose authority he does not state :—

$$20\,(C_{36},\ H_{25},\ N_4,\ O_{10}\ +\ 2\,HO)\ +\ S\,(NH_2S)\ +\ NH_2P.$$

This equation is equal to—carbon 720, hydrogen 558, nitrogen 89, oxygen 240, sulphur 8, phosphorus 1; giving an atomic weight of 8,204.

Now, I trust I shall not be accused of vanity when I candidly state that I felt rather proud at finding this formula was the same as my own in every particular excepting the hydrogen, which is 558, but mine is 560—being a difference of only two atoms of hydrogen. This extraordinary coincidence, as it must be considered, induced me to calculate, from my own rational formula, the tables I have before alluded to, which were published in the *News*, vol. vi., page 523.

Before we proceed further, let us see what Dr. Lowig tells us about the matter, for he is no mean authority in organic chemistry. Speaking of the so-called protein compounds he says :—"From the analytical results presented, the most different formula may be calculated with equal probability." And again :—"In the present state of our knowledge in respect to these bodies we must abandon every formula by which their atomic constitution is said to be expressed. Generally they contain in 100 parts :—55·16 carbon, 7·05 hydrogen, 21·81 oxygen, 15·96 nitrogen, with one-half to one per cent. sulphur and phosphorus in an unknown form." Respecting the expression, "unknown form," he had previously said :—"In what form sulphur and phosphorus appear, whether as elements united directly with the other elements, or not so united, is not yet ascertained." However, he gives the formula for albumen that I have already quoted.

From various analyses Liebig deduces the following formula :—C_{432}, H_{338}, N_{54}, O_{136}, S_6, this gives an atomic weight of 4,860. Mulder gives the formula as C_{180}, H_{139}, N_{22}, O_{60}, S_2, making its atomic weight 2,039. Lieberkuhn states the formula as C_{144}, H_{112}, N_{18}, O_{44}, S_2, which gives an atomic weight of 1,612.

George Price.

Translucent Paper.—We have received from Mr. Blair a sample of translucent paper, together with a specimen of one of its applications—that of supporting a collodion negative film. On this subject we expect to have more to say in our next number.

THE ROYAL INSTITUTION SESSION.

The session at the Royal Institution—the scene of the labours of Davy, Faraday, and Tyndall—begins at the end of December, and closes early in June each year. A fortnight's recess at Easter cuts the session into two parts, so that one half of the business of the year is now over. Four lectures of one hour each are delivered every week. The subjects include all branches of science, and the speakers, who are usually men of the first ability, have all the experimental apparatus of the Institution at their command. Although the Royal Institution is a place where all the sciences meet, nothing relating to photographic processes has appeared there this session, but several items relating to light, optics, and spectrum analysis have been brought forward; so, from my notes, I now select such subjects as are likely to be interesting to your readers, and arrange them under separate headings.

The Light from the Sky.

The fact has already been published in these columns that, by the aid of the vapours of nitrite of butyl and hydrochloric acid enclosed in a tube, Professor Tyndall has produced incipient clouds of a fine blue colour, rivalling the hue of an Italian sky. But without attention to certain conditions of tension of vapour, his results cannot be obtained. The following are the conditions under which he performs the experiment :—

The air of the room is first passed through a glass tube filled with cotton wool, to clear away the coarser particles of dirt. Next, the carbonic acid is removed by the passage of the air through a U tube filled with pumice soaked in caustic potash; and, lastly, it is dried in another U tube filled with powdered glass wetted by sulphuric acid. The powdered glass is, however, first purified from organic and other contaminations by boiling in diluted nitric acid, and by repeated washings in distilled water. The air, when purified, is allowed to bubble through nitrite of butyl contained in a little Woolfe's bottle, made of a test tube, with smaller tubes piercing the cork. After bubbling through the liquid, the air, charged with the vapour, enters the experimental tube, which has previously been exhausted by means of an air pump. This glass tube is three feet long and two and a-half inches in diameter, with flat glass ends, and a brass ferrule and stopcock at each of its two extremities.

If, when the nitrite of butyl vapour is in the tube, a beam from the electric lamp be sent along the axis of the tube, it has no effect on the vapour, or at least its action is as imperceptible to the senses as the effects of chemical rays upon pure iodide of silver. Still, Professor Tyndall thinks that a motion of separation is set up among the atoms of the molecule.

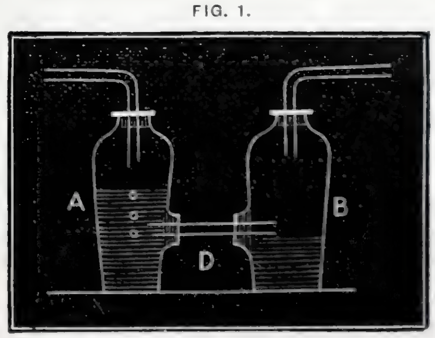
More air, which has bubbled in another test tube through hydrochloric acid, is next admitted. There is then no chemical action till light is sent through the great tube, and then a cloud is formed, at first blue in colour, but instantly afterwards so white and bright as to illuminate surrounding objects. To lessen the speed of this action he has found it necessary to admit so little of the two vapours into the experimental tube that together they exert a pressure of only $\frac{1}{300}$ of an atmosphere. Then, when the beam traverses the tube, the cloud forms slowly, giving a fine blue, which gradually passes to luminous whiteness. Professor Tyndall is of opinion that the cloud is blue because the little lenses of particles of vapour are in this stage only big enough to intercept the short violet waves of the spectrum.

Professor Tyndall considers that the hydrochloric acid has a tendency to decompose nitrite of butyl, and that the decomposition is set up by the separating action of waves of light. The expression "rays of light" he considers a bad one, conveying a false idea, and wishes to see the words "waves of light" substituted. The polarising angle of all substances in this finely-divided cloud state is 45°.

Washing Bottle.

A simple washing bottle which will not let water flow back into the hot retort under any circumstances, is felt to be a want by those who use the lime light. In this place, therefore, I suggest a very simple arrangement, not in use, however, at the Royal Institution. It consists of two bottles, A B, *fig.* 1, each with an additional neck near the centre, and such bottles are, I think, commonly on sale for domestic purposes. The two bottles are half filled with water, and are connected by the tube D. Let the gas flow from B to A; it is washed, but the water cannot escape from the bottles; now let suction be exerted in the opposite direction, and the water cannot get into the retort.

FIG. 1.



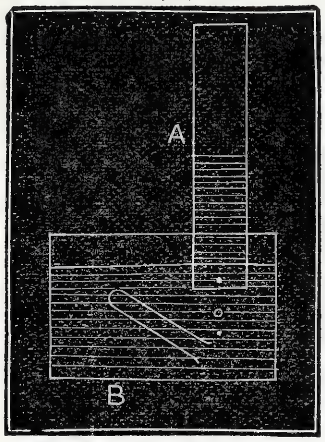
A Brilliant Flashing Light.

A method of burning phosphuretted hydrogen gas in an atmosphere of oxygen was shown by Dr. William Odling, F.R.S., the result being

flashing light of intense brilliancy. Without certain precautions the experiment is a dangerous one.

A strong glass jar A, *fig.* 2, about eighteen inches long and three inches diameter, is *half* filled with oxygen as shown in diagram; its lower half contains water, and the jar is inverted in the trough of water B. Within ten minutes or less before the experiment, a few bubbles of chlorine gas must be permitted to enter the oxygen. Some phosphuretted hydrogen gas, contained in a test tube inverted over water, is then placed in the trough B, the mouth of the test tube being tightly closed by the thumb when removing the gas from one vessel of water to another, because phosphuretted hydrogen catches fire spontaneously when exposed to the air. The jar A is then grasped by the right hand, and a few bubbles of the phosphuretted hydrogen may be allowed carefully and cautiously to enter the oxygen. Each bubble then explodes with considerable violence, shaking the arm holding the jar up to the elbow, and producing an intensely brilliant flash of light.

FIG. 2.

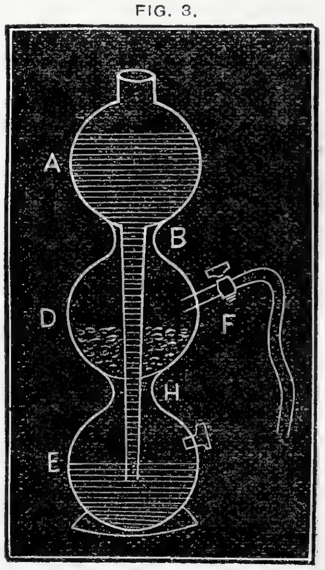


The chlorine is necessary in this experiment, because without it two or three bubbles of the combustible gas might enter the jar without immediate results, and then all go off at once with a dangerous explosion. The experiment has to be made very shortly after the addition of the chlorine, otherwise the chlorine will be all absorbed by the water. I see no reason why a very bright, cheap, and continuous light from a jet may not be contrived on this principle; but some method would have to be adopted to carry off the fumes produced, which are highly obnoxious and poisonous. The flashing light just described is very dazzling even in daylight.

APPARATUS FOR MAKING HYDROGEN.

Very convenient apparatus, used by chemists and at the Royal Institution, to make hydrogen for the lime light and other purposes is shown in *fig.* 3. The whole apparatus is made of glass, and the upper globe A has a long stem descending nearly to the bottom of the lower globe E, and fitting into the ground air-tight neck B. It passes loosely through H, but just above this neck the stem is fitted with an external leather washer. The bulb D is half filled with lumps of zinc. The sulphuric acid and water in A descend into E, but cannot rise far in E, because the air or gas in D and E has no vent. But let the glass tap F be turned on, the weak acid then rises to the zinc, and evolution of hydrogen is the result. When the tap is turned off again, the gas soon drives the liquid out of D into E, and up the long stem to A, and the evolution of hydrogen is stopped till more is wanted, being obtained by simply turning the tap. The stopper in E is to aid in cleaning out the globes and to pour away the waste liquid.

FIG. 3.



DISCOVERIES BY SPECTRUM ANALYSIS.

Mr. William Huggins, F.R.S., by means of measurements of the displacement of one of the hydrogen lines in the spectrum of the light of the star Sirius, has been enabled, to some extent, to compute the speed at which Sirius recedes from the earth in a direct line from the spectator. The transverse motions of stars may be measured with difficulty by astronomical appliances, but any method of measuring approach to, or recession from, the earth is entirely new, since under such conditions the star does not apparently change its place in the heavens.

Mr. Huggins encountered a difficulty at the outset, in the fact that the hydrogen lines vary in breadth under different conditions of pressure and temperature; but after many experiments he found that they expanded equally to the right and to the left, so that the central portion does not shift its position. If a star were rapidly approaching the earth more waves would enter the eye in the same space of time, so that red might look like violet; but as longer waves beyond the red would become visible; no part of the spectrum would be missing, and the colour of the star would not be changed. A star might recede so rapidly from the earth that the violet waves of its light might appear to us as red, but shorter waves than the violet would come into view, so that still we should see no change in the light from the star. The change can only be detected by the displacement of the fixed lines of some chemical substance.

On the foregoing principles, after measuring the displacement of the hydrogen line of Sirius from the line produced by terrestrial hydrogen, and after allowing for the motions of the earth and solar system, Mr. Huggins calculated that Sirius is receding from the earth at a speed of about 26½ miles per second. His spectroscope was so made that the light from Sirius and from terrestrial hydrogen passed through it at the same time, and he could see the two spectra at the same time, one above the other. He could thus compare the change in position of the lines with great accuracy; and the fact that the spectra were produced by the same instrument proves that the displacement is real, and not due to the spectroscope.

MAGNESIUM AND HYDROGEN.

Among other experiments performed by Dr. William Odling, F.R.S., he showed that magnesium will decompose water like potassium, but very slowly. The magnesium should be placed in a flask of water, and the water be kept at a boiling temperature as long as the evolution of hydrogen is desired. Sodium is now sold at a very cheap rate in London, but its action upon water is so violent that it cannot be conveniently used to make hydrogen; sodium amalgam, however, is also now an article of commerce, and this not only sinks in water, but decomposes it with less violence than the pure metal.

Dr. Odling showed that by dropping sodium amalgam into water great volumes of hydrogen gas may be made in less than a minute, and the mercury residue from the amalgam may be afterwards collected. His experiments to show that hydrogen is in all probability the vapour of a metal have already been largely published; in fact, one of my reports of his lecture on this point has already been quoted in these columns from a daily paper.

Dr. Odling exhibited one very curious method of making hydrogen by dropping a white-hot platinum ball heated nearly to its melting point in the flame of the oxyhydrogen blowpipe into hot water. Not only was steam produced, but the intense heat tore by main force some of the steam into its constituent gases, oxygen and hydrogen; and the mixed gases thus made were collected and exploded by the lecturer. The metal hydrogen unites with fluorine, chlorine, bromine, and iodine, in such a way that in its properties it is considered to be analogous to lithium, sodium, potassium, rubidium, cæsium, and silver, for these all belong to the same class in the eyes of the chemist. Liquid hydrochloric acid is, strictly speaking, chloride of hydrogen dissolved in water.

In one of his experiments Dr. Odling put some liquid hydrochloric acid into a bottle and applied heat to it, and the gas given off was passed over a lump of potassium contained in a glass bulb. The bulb was then heated by a spirit flame, the result being that the potassium united with the chlorine of the chloride of hydrogen, and the hydrogen was given off and burnt as a jet at the mouth of the exit tube.

WILLIAM H. HARRISON.

(To be concluded in our next.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 27th......	Liverpool Amateur............	Free Public Library and Museum.
„ 29th......	Oldham	Hare & Hounds Inn, Yorkshire-st.

EDINBURGH PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held in the Hall, 5, St. Andrew-square, on Wednesday, the 7th instant. Mr. George Slight, V.P., occupied the chair.

The minutes of the previous evening having been read and approved of, the Secretary read a letter from Mr. John Horsburgh, presenting the Society with a beautiful morocco folio and a set of a dozen 12 by 10 prints of *Abbotsford*, being copies from the negatives prepared by him for presentation to Her Majesty the Queen. Mr. Geo. Campbell also presented to the *carte* album of the Society a copy of the portrait of Capt. Talbot, of the "Star of Hope," and one of a local celebrity at St. Mary's Loch, "Tibbie Shiels;" and Mr. Yerbury also presented to the portrait gallery of the Society portraits of himself and of Mr. Stewart.

Mr. Alexander Banks was admitted a member of the Society.

The Secretary then proceeded to read a paper by Mr. Samuel Highley, *On Lantern Construction in Relation to Photography.* [For abstract of the paper see page 195.] In the course of the discussion which followed,

MR. NICOL stated that the compactness and neatness of the instrument exhibited, and also of the models, were worthy of considerable praise, as the entire apparatus was so arranged as to pack into very small bulk, and so save the lecturer and his assistant a considerable amount of trouble. He (Mr. Nicol) added that the condensed gas arrangement was to be put in action and shown later in the evening, and they would then be able to test it against their usual lantern and method. It had, however, the great advantage of portability, as they at present saw.

Mr. Bow, in speaking of the triple condenser, said that in his opinion it was a mistake to have the highly heated lime so near to it, as it ran great risk of splitting by the heat; especially to the back lens of the combination, with its peculiar curves, did this apply.

After a few further observations from various members, and a somewhat minute examination of the various pieces of apparatus, the two lanterns were adjusted to give separate halves of the same microscopic object of the same size on the screen, and the images were then carefully compared; the results will form a separate report of the committee.

The remainder of the evening was devoted to the exhibition of a number of views in Egypt, Nubia, Palestine, and the East, by both lanterns, and they were frequently applauded. After various experiments as to the best kind of screen, &c., the meeting adjourned, after passing a hearty vote of thanks to Mr. Highley for his paper, and the trouble he had taken to lay before the Society his whole apparatus for lantern exhibition.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 5th instant,—M. C. H. Teisseire in the chair.

The minutes of the previous meeting having been read and confirmed,

The Secretary read a letter from M. Davanne presenting his photographic annual; also a letter from the French Photographic Society intimating that any apparatus intended for the Paris Exhibition must not be addressed to the French Photographic Society.

The publications of the day, several of which were laid upon the table, were then discussed—amongst them the *Photographisches Archiv.* from Dr. Liesegang, and The British Journal Photographic Almanac for 1869, containing a very interesting account of the present state of the photographic art, with a portrait of M. Adam-Salomon, obtained by the process of phot-electric engraving of Mr. Dallas. M. Leon Vidal also presented to the Society his practical analysis of the different carbon printing processes.

The Chairman, in thanking the author of this publication, glanced rapidly over the different processes treated therein, so as to enable the members present to appreciate the object of the work, which was to disseminate amongst photographers generally a knowledge of all the new carbon processes and their improvements. He (the Chairman) said he was convinced that this method of printing was alone capable of furnishing stable proofs, and the only one from which amateurs could derive any advantage; for, as M. Vidal had justly stated, the process of heliographic engraving, however much improved, could never be anything but a commercial process, requiring both operators and apparatus specially adapted thereto. On the other hand, the carbon printing processes which were in the most advanced state could be turned to account without such intervention, and the results obtained were of a quality the stability of which was undoubted. The Chairman then alluded to the actinometer of M. Arthur Taylor, to the explanation of which M. Vidal had devoted a chapter in his work. He recognised the practical utility of the instrument, so ingenious and calculated to render such great practical services in printing by carbon processes.

M. Vidal said he considered it right to reply, by a brief explanation, to a question which had been addressed to him on the subject of the omission from his work of M. Poitevin's process, which was based on the employment of powdered pigments with a mixture of perchloride of iron and tartaric acid, which became hygrometric in the parts attacked by the light. His end being to make his treatise really practical, he did not think it necessary to mention processes requiring absolutely special applications, and which were not employed in the present printing practices. He made no doubt that, in the future of these processes, particularly in that of the bichromated gelatine, results much more regular would be obtained; but he wished to justify the word "practical" in connection with his treatise by not occupying himself at first with any process to which that term did not apply. He thought it right to add that, seeing the rapid improvement in those processes, it was his intention to continue the work he had commenced by a supplement, and thus maintain his practical treatise in support of the science of carbon printing. He took that opportunity of expressing the gratitude he should feel to those who might favour him with any special information, so as to enable him to render the work as complete and as useful as possible. There was, for instance, the method of operating adopted by M. Jeanrenaud in reference to the Marion process, and which merited the greatest attention; and M. Despaquis, on his part, communicated a new means of transfer and definitive fixing of the image with gelatine coagulated by alum.

M. Taylor mentioned that, according to the English journals, Mr. Blair claimed priority in regard to M. Jeanrenaud's process, which had been previously described by him (Mr. Blair) in England.

M. Vidal read a communication made to the French Photographic Society on this subject by M. Davanne. M. Davanne thought it was right to claim for M. Marion the priority of employing the albumenised paper, and to show that M. Jeanrenaud published the same experiments as Mr. Blair, whence he concluded that, without knowing it, the two experimentalists had adopted the same means and arrived at the same result. M. Davanne said he believed that it was not more just for Mr. Blair to make the reclamation against M. Jeanrenaud than for the latter gentleman to do so against Mr. Blair.

The Secretary read a proposition made to the French Photographic Society by M. Davanne, in the name of the committee of management, and which had been adopted, that a special silver medal should be given in the year 1870, for the best process (not patented) for transferring the negative on a film presenting the following conditions, if they are possible:—

"It should be sufficiently thin to give a clear impression on both sides, sufficiently resistant to be employed without difficulty and for a prolonged period, unalterable by the air and the continued heat of the sun and luminous action. As regards this point it must be remembered that the solutions of caoutchouc, generally proposed, became strongly coloured in the light. The surfaces should be like varnished negatives; should bear contact, without injury, with dry nitrate of silver, in short the process of transfer should be applicable to all kinds of negatives, wet or dry collodions, albumenised or tannin collodion, and varnished negatives. For this latter case, it would suffice to produce a good process for taking off the varnish."

The Chairman said he was happy that the French Photographic Society had taken the initiative of encouragement in that direction, and he was pleased to see thus sanctioned the many communications made by members of the Marseilles Society relative to the importance of pellicular negatives.

M. Vidal then proceeded to point out the several special advantages that would be attained by complete success in this method of transfer—its rapidity and simplicity; all that was required, in the majority of cases, for developing and fixing being the exposure to the light of the prepared pellicle, its immersion in hot water, and washing.

M. Pellissier presented some fine reproductions of engravings, amongst which sixty of the negatives had been obtained with the strontium collodion of Dr. Liesegang, which he eulogised, not only on account of its sensitiveness, but for the solidity and regularity of the collodion layer.

The Chairman also recognised in it these fine qualities.

After some private business, of interest only to members of the Society, the meeting separated.

Correspondence.

Foreign.

Paris, April 19, 1869.

There are few things so pleasant in the duties of a correspondent as reviewing a good, satisfactory book; and it perhaps may be said with equal truth that a good-humoured "cutting up" of a bad work is an operation that delights most readers. My task today is the annual pleasure of introducing M. Davanne's *Annuaire Photographique*, and of commenting very favourably upon the number just out. I would venture to suggest to the author the desirability of having it published earlier in the year, and he will excuse me for the suggestion, for the preface of the little work concludes with the following sentence:—"We earnestly beg everyone who has any errors to point out to us—or who may find omissions or suggest useful improvements—to address their remarks to us personally or to the editor, who will forward them to us." That this is written in good faith is shown by the corrections M. Davanne has made in this edition which your correspondent pointed out to him last year.

The first chapter is devoted to the reminiscences of those whom the hand of death has led from our ranks during the past year; for, says M. Davanne,—"To recal rapidly the services which these men have rendered is to add to the history of photography, and this is the title under which it has pleased us to cite their names at the head of our review." The following are the names, and their enumeration will show the loss we have sustained during the past year:—

The Duc d'Albert de Luynes.	M. Léon Foucault.
M. Claudet.	M. Benjamin Delessert.
Sir D. Brewster.	M. Hermagis.

Two philosophers, one patron, one artist, one optician, one amateur.

The second chapter is devoted to the theoretical researches into the science of photography for the past year, and here it is that the peculiar *specialité* of M. Davanne is seen—clever operator though he be also. In heliochromography nothing is reported to have been *accomplished.* An article from the *Philadelphia Photographer* of August, 1867, is alluded to, where is found a formula by M. Paage for the preparation of a paper for the reception of the colours of the spectrum. The *modus operandi* proposed is to float a sheet of good paper upon a bath composed of—

Nitrate of silver	45 grains.
Nitric acid	450 ,,
Water	10 drops.

When dry, the sheet is to be plunged into *concentrated* hydrochloric acid, and then is said to be ready for use. M. Davanne says that, not having made the experiment, he is unwilling to deny the practicability

of the process at once, but it appears to him, at first sight, that the mixture of nitric acid in the paper, and the hydrochloric acid in the bath, will produce *aqua regia* in the paper itself, and he wonders what will become of it under the circumstances. The fine work of M. E. Becquerel, which I have frequently laid under contribution for your pages, is found by M. Davanne to throw great light upon the theory of the chemical action of light; yet still there are many points of controversy which are not cleared up.

The researches of your able correspondent, Mr. M. Carey Lea, are also commented upon. For instance, Mr. Carey Lea announced that "no coloured ray, with the exception of the blue-violet and violet, had any action upon the bromo-iodides, which are considered the most sensitive that are employed in photography. The consequence of these affirmations would be, that all the differently-coloured bodies of nature, at least if they are *not* violet, have no action upon the sensitised plate, arising from their proper colour, but that they act only in consequence of the greater or less quantity of *white light* which they reflect—a light which we cannot perceive, on account of the greater intensity of the other colours." Again: this white light only produces chemical effects, "owing to the violet and extra-violet rays it contains." This is a quotation from M. Davanne. He adds, that the experiments made by M. Becquerel do not agree with these conclusions. I find this experiment cited by M. Becquerel, which does not seem to support the views of Mr. Lea. If an image of the spectrum be thrown on a film of collodion containing bromide of silver, the maximum of action is near the ray G, or in the blue-violet, but it extends on to the green. No doubt this apparent discrepancy will be explained. M. Davanne remarks that he thinks it useful to point out the fact that the action of the spectrum upon bichromate of potash is greatest in the blue ray F, and extends far on in the yellow. This salt being now much used in photographic operations, the difference between the action of the spectrum upon it and upon the salt of silver is interesting, and may prove practically useful.

There are three questions proposed for solution by M. Davanne, and under these may be grouped the controverted questions of the theory of the action of light upon substances. First:—"Which are the active rays in white light?" The reply to this is:—They are the violet and ultra-violet rays, and also the violet-blue, blue, and, with bromides, a portion of the green rays, according to M. Becquerel. Next:—"Upon what silver compounds employed in photography do these rays act the most?" The reply, after considering all things, is this:—"The silver compound most favourable for obtaining the negative image appears to be, when the general processes are employed, the mixture in very varying proportions of iodide and bromide of silver, proportions which vary from a quarter to half, and even beyond this; but the composition of the products and baths employed for preparing these substances may modify all the results." The third question, which comes up every year, is—"What is the change, chemical or physical, which is set up by the action of light in the compound of silver upon which it acts?" M. Davanne does not hesitate to repeat again that it is a *chemical* action—"a separation between the chlorine, bromine, and iodine on the one hand, and the silver on the other—a phenomenon of reduction, incomplete it is true, but the *chemical constitution* of the body acted upon by light is profoundly modified." M. Davanne does not repeat his old arguments, but calls M. Becquerel to his aid. I may, perhaps, recur to these arguments again, for in the short space of a letter there is not enough room to do them justice.

M. Davanne announces a theory for accounting for the phenomena of decomposition observed in bodies under the action of light, which he puts forward purely and simply as a theory, seeing he has not yet made any experiments to support it. It is well known, and has been written upon in your pages, that the decomposition of chemical substances by light is accompanied by the formation of a current of electricity. The electro-chemical actinometer of M. E. Becquerel is an example. M. Davanne thinks that this electric current is the result and not the cause of the decomposition of iodides and bromides of silver. These are his arguments:—The light acting upon the substance modifies its chemical composition in a manner more or less profound. The sensitive film is thus formed of two different substances, the iodide of silver *non-modified*, and the iodide modified, whatever be this modification. The contact of these two substances gives rise to the electric current. The electric current hastens the decomposition of the mixture employed for development, and determines the deposit of the molecules which form the image. Where the luminous impression has been weak, the proportion of *modified* iodide is equally small in comparison with that *non-modified*, and so the image lacks vigour. If the exposure has been right the proportions between the two conditions of iodide will be equal, and the hypothetical battery will have its *maximum* action. If the action of light has been too much, the *modified* iodide is in excess over the *non-modified*, and the battery does not exert its maximum action; its state resembles that to which it is brought by an under-exposure. "In this way," says M. Davanne, "the phenomenon of solarisation, unexplained up to now, is intelligible, and we can understand why an excess of light produces a reverse effect and gives images which are poor and weak." M. Davanne thinks that around this theory he announces all the different opinions on the subject can rally; but he would point out that it lacks the fundamental points of depart of all scientific discussion, namely, *experiment*. I trust that the hints thrown out will be the starting point of fresh work in the theory of photography.

Time does not allow me to write more today upon this little book. It is the most interesting number I have yet perused, and all interested in the theory of our art-science should possess a copy. I am glad to find that the articles of The British Journal of Photography are often quoted in it. R. J. Fowler.

Home.

SARONY'S ENLARGING APPARATUS.

To the Editors.

Gentlemen,—On looking at the apparatus recommended in the last issue of the Journal by Mr. Sarony, I thought the simplest trough camera —something similar to what has frequently been, I think, suggested in your Journal—would have several advantages over the one in question, viz.:—When artificial light is employed the plate is enclosed from any light. All parts being rigid and sliding in parallel grooves, there will be less attention required to be paid on that account, and it can be used as an ordinary enlarging camera without any special arrangement of the room in which it is to be used.

As some of your readers may not have any idea of the simple camera I think suitable, I will venture to attempt a description of the apparatus, which an ordinary carpenter will be able to construct at but little cost, and which will answer all the purposes required of an enlarging camera.

It consists of an oblong square box, large enough to admit a slide containing the largest size of plates to be used. The sides are grooved all the length about three inches apart. The end of the box at which the dark slide is inserted may have a permanent end fixed in to keep the sides of the box rigid. The lens is fixed upon a board that slides into any of the grooves in the sides of the box. The negative or transparency is fixed on a similar piece by suitable means.

At the end, hung at the bottom by a pair of butts, is a board that serves for laying or fixing a card on for a reflector, and also will serve the same purpose as a cap for the lens during the exposure.

The dark slide may be made of a rebated frame, something similar to those in general use, but it does not require so much time to construct. In place of the back of the slide being made to slide up, a board may be fixed into the frame. The front portion of the slide being a pair of folding-doors hung on each side and opening in the centre inside of the camera, no slide is required.

Upon the doors of the slide, as near as possible to the edges that they are hung to, are fixed two pieces of metal with a top similar to a door-key or a T, which, when turned round, open and close the doors of the dark slide, standing above the top of it about one and a-half inch. The top corners of the slide will require silver springs to keep the plate from falling forward.

The lid of the box or camera, if we may call it such, may consist of two pieces of loose board—one piece, about half the length of the box, dropping into a rebate on the top edge of the sides of the box; the other piece of board covering the end at which the dark slide is placed being long enough to exclude all light, having slips of wood fixed underneath, to come outside of the sides of the camera, and is laid on the top of the other so far as the other comes to. The end of the piece near the dark slide will require two holes cutting in, so as to permit the lid to come over the dark slide to keep out the light.

I am not aware if it is generally known or not, that excellent enlarged negatives may be obtained from transparencies, with the magic lantern, using the usual argand lamp with oil. I feel sure, from what I have seen, that, from thin negatives, transparencies as introduced by Mr. Sarony may be enlarged by the use of the lantern, with the oil argand lamp.—I am yours, &c., S. S. Crewdson.

April 20, 1869.

DENSE COLLODION.

To the Editors.

Gentlemen,—I wish very much that Mr. Blanchard, in introducing the discussion on density in collodion, at the South London Photographic Society, had given some information on a phase of this subject which several years ago, and about the time I left this country for Bombay, was attracting some notice. I allude to the addition of certain organic bodies to the collodion; or, to be more correct, to the addition of one body in particular, viz., glycyrrhizine. The addition of a small portion of an alcoholic solution of this substance was strongly recommended by Mr. Hardwich. One or two drops added to the collodion, according to his *dictum*, converted a weak and feeble collodion, fit only for glass positives, into one having such a degree of intensity that, if the addition were incautiously made, the collodion would be so hard as to be suited only for copying engravings or other subjects devoid of true half-tone. It was at the time when this recommendation was made that I was suddenly called upon to proceed to India, where other duties of an arduous and important nature prevented me from doing more in photography than take an occasional portrait or view.

Being now about to settle down in this my native country, I should like to know if the above-named addition to collodion has been "weighed in the balance and found wanting;" for only on this supposition can I understand the fact of its not having even been alluded to in any way on an occasion when its introduction seemed almost demanded.—I am, yours, &c., A Bengal Officer.

Tavistock Hotel, April 17, 1869.

[The organic addition to collodion referred to by our correspondent is one of those things that although strongly recommended at one time by Mr. Hardwich, its span of existence was exceedingly brief. It did not answer the purpose intended, and before there was a proper opportunity of its being generally tried, it was really "written down" again by Mr. Hardwich. Other organic substances have been recommended to be added, but no person now thinks of doing so.—Eds.]

AN IMPROVED LAMP.

To the Editors.

Gentlemen,—Under this heading you published last week the specification of a patent by Mr. James Allison Hogg, for a lamp which is palpably an imitation of others that have been long known, and which you in your Journal have on several occasions described.

That the patent is really not worth the paper on which it is written will be obvious to every person who knows anything about the history of wire gauze lamps; but I hold it to be matter for regret that persons can with such facility obtain patents for old, if not effete, inventions.

I do not charge Mr. Hogg or any other "second-hand" inventor with adopting the course indicated from motives which will not stand investigation. They may be really ignorant of the fact that others have laboured in the same direction, and that they are merely entering upon their labours; but really the numerous instances of patented re-inventions, recorded of late in your own and other journals, are becoming nauseating, and such as to demand for this country what already exists in America and some other countries, viz., a competent tribunal under whose cognisance each "invention" is first brought in order that its claims to novelty or utility may be ascertained before permitting any person whatever to secure a patent. Were this done, by the suppression of fungus inventors true invention would have room to grow and flourish.

I have for some years made a hobby of the collecting of specifications of patents connected with photography, and, as a curious instance of what I have alluded to, I find that no fewer than seven patents have, within much less than the same number of years, been obtained for precisely and identically the *same thing.* I shall not take upon me to say whether this is the result of honest ignorance or of unscrupulous imposture, but it behoves every man to whom real progress is dear to agitate for such legislative interference as will prevent the recurrence of such episodes in the field of English invention.

Lest it be thought that in this general and sweeping denunciation I hold an opinion that Mr. Sarony's patent should be classed among those I have denounced, let me say that if his invention be really as you stated it before one of the societies no more valid patent exists; for, in searching over the complete list of photographic patents, I do not find one which can at all be held as trenching on the same ground. I mention this case specially both because it is one of the latest novelties of any importance, and also because its claims to novelty have been attempted to be impugned. I might say the same about the new patent of Mr. Johnson, but, so far as I can see, nobody will think of questioning either its value or its novelty.—I am, yours, &c.,

April 20, 1869. A Provincial Patent Agent.

Miscellanea.

The Theft at Mr. Jabez Hughes's Establishment.—At the Middlesex sessions, on Wednesday last, Joseph Ricketts, 21, pleaded "guilty" to breaking and entering the house of Mr. Jabez Hughes, his master, and stealing therein a quantity of photographic paper and other articles, value £2 10s., his property; and Frederick Smith pleaded "not guilty" to receiving the same articles, knowing them to have been stolen. Mr. Ribton prosecuted, and Mr. Montagu Williams appeared for Smith. Ricketts was a porter in Mr. Hughes's employ. The house in Oxford-street was left empty at night, and articles being from time to time missed, Ricketts was watched and seen on the 30th of March to go earlier than his proper hour to the house, effect an entrance, and remove some of Mr. Hughes's goods. Smith is a photographer, and brother-in-law to the prisoner Ricketts. Some of Mr. Hughes's goods, bearing his mark, were found in Smith's shop; but, it appearing that Mr. Hughes's marks not being effaced on goods when sold, Mr. Ribton withdrew from the prosecution against Smith. Ricketts was sentenced to two years' imprisonment with hard labour.

Death of an Amateur.—The Dundee papers record the death, on Thursday, the 15th inst., of Councillor Kirkland, a gentleman well known in that town. He is described as excelling in photography, in which he was an amateur. He was not only dexterous in manipulation, and had a thorough knowledge of chemical appliances, but had a fine taste in the selection of scenery and objects. Not a few albums and drawing-rooms in Dundee are enriched by specimens of photography from his camera equalling those of the most distinguished professional photographers.

Soiree of the Liverpool Chemists' Association.—A few evenings ago this Society held a *soirée* which was numerously attended. There were many interesting displays in connection with science. Among others several of the rarer metals were shown in the spectroscope; the glass manufactures of Liverpool and the neighbourhood were illustrated by models, diagrams, and products; many microscopic subjects were shown, together with some of the more recent additions to the Free Public Museum. One of the chief features of the evening was an exhibition by Mr. Keith of Skaife's lucella for the production of instantaneous photographs by the magnesium light, an excellent photograph of the chairman being taken with it. Mr. Keith remarked that this instrument was likely to prove of great service in taking photographs of children, who, as they were all aware, were apt to be rather obstreperous while in the hands of the photographers. After a brief lecture by Dr. Carter on *The Electric Light*, Mr. E. Davies, F.C.S., delivered a lecture on *Hydrogenium*, with experiments, illustrating Professor Graham's recent discoveries, after which he showed the zirconia light. This brought the proceedings, which were of a highly interesting and scientific character, to a termination.

Photographic Exhibition at Clifton.—We observe, from the *Western Daily Press*, that one of the photographers to the Queen (for Clifton appears to boast of more than one), Mr. Bark, has opened a photographic exhibition for a week. It comprises the "latest novelties," including specimens of vitrotypes, carbon prints, photo-reliefs, phototypes, &c. We must really give the Cliftonians credit for being able to produce their enlargements in a much more scientific manner than that attributed to Mr. Bark by the writer of the article from which we derive our information. Here is the method:—"This is managed by a most ingenious plan. The photograph of the person is put in a magic lantern, and its shadow can thus be projected to any size on a screen. The artist traces in the outlines of this shadow with a light wash of colour, so that the exact features are impressed upon the screen, and a foundation is thus obtained for the artist to work upon. From this stage the process assimilates exactly to ordinary painting in oils, the developement of tone and colouring being a work of time." Again, we find Mr. Fruwirth given as the patentee of photolithography and zincography for the reproduction of line pictures, the process being the same as that employed for obtaining copies of the *Domesday Book*, an announcement which will cause Col. Sir Henry James to "scratch his head."

Sutton's Patent Albumenised Paper.—Some years ago (in 1862), Mr. Sutton, with the view of obtaining great brilliancy of surface in albumenised paper, took out a patent for a method of giving the paper a coating of India-rubber solution to retain the albumen subsequently to be applied on the surface. Mr. T. Lampray, Gaisford-street, who purchased the patent, now that it has expired has addressed us a letter on the subject, called for, he says, by the repeated demand that his friends and customers have made for an explanation of an advertisement which occasionally appears in our own and other journals to the effect that another dealer calls himself "sole agent" for the same paper, of which he, Mr. Lampray, held the proprietorship while the patent was in force. It appears that, for some time, Mr. Sutton continued to manufacture the paper for the purchaser of his patent, but, for reasons which need not here be mentioned, Mr. Lampray practically rescinded this business arrangement. Since the termination of the patent, any person is, of course, at liberty to manufacture the paper, only Mr. Lampray protests against any one now claiming an exclusive right to its manufacture, seeing that he, while the patent was in force, was its proprietor. This, denuded of a good deal of business details which would not interest our readers, is a digest of Mr. Lampray's communication to us.

Photo-Chromo Cards.—A writer in *Humphrey's Journal* says:—Every photographer of experience has been annoyed by the ignorance of the public as to the various degrees of actinism possessed by different colours, and the unlucky operator has often been charged with that to which the sun alone is chargeable—namely, photographing colours in very different shades to those presented by the original to the eye. A simple and inexpensive little arrangement which will obviate this difficulty has ocurred to us, and, with a view to lessening the burdens of our friends, we here give directions for its accomplishment. Take an ordinary *carte de visite* and draw a line from top to bottom down the centre, then divide the card into, say ten segments, by drawing horizontal lines across; there will then be five elongated rectangles or long squares on each side of the vertical line. Now colour each of the five squares on one side with one of the most deceptive colours, and make a negative "life-size" of the whole; then print a proof and paste over the blank squares on the card so that the actinic shade is shown opposite the respective colours. This will show at once, even to the most ignorant person, the shade likely to be produced by his or her dress, and in many cases it would pay the photographer to have this card lithographed, and so be able to give his customers with

each batch of pictures an unfailing guide to dress for future sittings, thus avoiding any just cause for complaints. It would also be well to make a large one, with a greater variety of colours, to hang in the reception room.

EXTRAORDINARY CASE OF TRESPASS AND ASSAULT.—A foreigner, named Christopher Dahl, a Norwegian, was charged, at the Liverpool Police Court, on Thursday, the 15th inst., by Charlotte Staples, of 14, Canning-place, Liverpool, with having, on the 7th instant, called at the complainant's residence, and searched through the house without the complainant's permission, and also with assaulting her by striking her in the side several times with his fist. The facts of the case are as follow:—On the 7th instant the defendant called at the complainant's residence to see if some *cartes de visite*, which he had ordered from complainant's husband, were ready. The complainant's husband was away at the time, but the complainant told him that they were not ready; however, if he would call the following day they would be ready. Defendant thereupon left the house, but returned again in about two minutes, apparently in a very excited state, and exclaimed, "Where is my umbrella?" to which the complainant replied, "You had none, sir, when you came in here." The defendant then used some very abusive language towards the complainant, and made a row, although the complainant had, as already stated, told the defendant that there was no umbrella there. He then commenced to search the house, and first entered the complainant's bedroom, where he turned down the bedclothes, and looked underneath the bed. Defendant then proceeded to the kitchen, searched it, and afterwards went to the dark room, where the complainant's husband stored the chemicals which he used in his business as a photographer. The complainant being afraid that the defendant would do some damage in this room, ran between him and the door, saying, "You must not go in there, sir." Defendant then seized hold of the complainant, pushed her violently and struck her twice, once on the shoulder and again in the side. The complainant again endeavoured to prevent him entering the dark room, and the defendant struck her again. The complainant's little boy corroborated his mother's statement. Prior to leaving the complainant's premises, the defendant bethought himself all at once that he had left his umbrella in a tobacconist's shop, next door to the complainant's, and went there to demand it, when it was handed to him. It appeared that the defendant had been in the tobacconist's shop before calling on the complainant, and had left his umbrella there. Mr. Cobb, who conducted the plaintiff's case, pressed for substantial damages, and the bench ordered defendant to pay 20s. and costs.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Wanted to exchange an excellent doublet lens (gives 12 × 10 pictures sharp to the edge) for a good 12 × 10 portrait lens. Also half-plate lens and folding mahogany camera, by "Cox," London (nearly new), for a Dallmeyer's triplet, a Squire's extra rapid card lens, or Solomon's enlarging apparatus. Difference adjusted.—Address, W., 33, Sidbury, Worcester.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

R. Pateson, Preston.—*Portrait of J. J. Myers, Esq.*

☞ *Correspondents should never write on both sides of the paper.*

A COUNTRY SUB.—The piece of paper marked No. 3 is much better adapted for papering your studio than any of the others.

J. O'C.—We have an article in type on the subject about which you inquire, and we trust to have room for it in our next number.

SAM. PEET, (Dublin).—Mr. Woodbury's process is now being worked by the Photo-Relief Company. The address is Hereford Lodge, Gloucester Road, Brompton.

B. J. F.—Many gums are affected by light, and to this cause you must attribute the pale colour of the lacquered work compared with the rich and brilliant colour it originally possessed.

GEORGE FRAZER.—Chloride of platinum was at one time recommended for toning prints, and it was employed for this purpose by a few persons; but there were such disadvantages attendant upon its use that it was given up, and, so far as we are aware, it is not at present used by any person.

AN EXPERIMENTER.—You may satisfy yourself as to the *possibility* of natural colours being obtained by exposing to light a piece of ordinary ammonio-nitrate of silver paper, previously covering it with pieces of coloured glass, or a strongly-painted magic lantern picture. When you examine it after an exposure of ten minutes in the sun, you will find the colours developed in a tolerably decided manner.

GEO. BROWN.—The condenser is by no means a necessary adjunct to the camera for producing enlarged transparencies. As we said last week, it is really only necessary that the negative be exposed against an uniformly-lighted sky. When the sun is shining brightly, its light may be utilised by being employed to illuminate a sheet of white paper, which will prove an admirable backing against which to point the negative to be enlarged.

G. FARMER, (Northampton).—1. The gentleman who took the pictures you admire has told us that he attributes much of his success to the lens by which they were taken.—2. The albumen process merely consists in iodising the albumen in a manner similar to collodion. The coating must be quite dry before it is immersed in the silver, which should contain a large proportion of acetic acid. After being excited, the plate must be thoroughly washed and dried.

ELEMI (Glasgow).—The only part of Mr. Urie's invention which we consider as at all applicable consists in his taking a transparency on glass, and then pouring over it a quantity of plaster of Paris sufficient to form a deposit, which, when hardened, is capable of being removed from the glass with the film attached. It is thus a positive picture—a transparency, if you like—on a slab of plaster. But *that* is not Sarony's process, and by no legal acuteness can it possibly be so twisted as to clash with it. Read our article on the subject, and let your own good sense, unaided by any prejudice, decide as to their similarity.

MISS S.—If a wash of ox-gall were applied to the surface of the picture, the colours would "take kindly" to it, which with an ordinary albumenised surface would not probably be the case. The most simple, if not the best, way of overcoming that greasiness of surface which is so repellant of water-colour is to apply the tongue and allow the surface to become dry. In this way the most greasy surface may at once be prepared for receiving colours. In the case of oil colours it is necessary that a coating of varnish should be applied to the picture. We cannot inform you what is the *best* varnish, but we have used with good effect both gelatine and gum, a little sugar being added to prevent cracking.

G. M. (Belfast).—We are glad to find a gentleman of ability (as we judge you are by your letter) about to take up the negative paper process with so much enthusiasm, and we shall willingly aid you to the best of our power. The process of iodising the paper as described by you is not good. Here are two other methods which you will find to be better—the first being by Mr. Law, the second by Mr. Hockin:—1. The paper having been waxed is carefully immersed in the following solution:—In twenty ounces (one pint) of water dissolve 225 grains of iodide of potassium and half that quantity of bromide of potassium; also, add a large teaspoonful of honey and sufficient iodine to give the solution a sherry tint. The paper is kept immersed, several sheets at a time, for a considerable period—say from fifteen to thirty minutes—and are then pinned up to dry. The sheets are now of an uniform brown or purple colour, and will keep for any length of time. Excite by immersing each sheet in a thirty-grain bath of nitrate of silver, containing also thirty minims of glacial acetic acid to each ounce of solution. Wash in two changes of water, and expose within twenty-four hours after exciting.—2. The other method is intended rather for plain than for waxed paper. Precipitate iodide of silver from the nitrate solution by adding iodide of potassium; wash the precipitate and dissolve it in cyanide of potassium. Float the paper on this and allow it to dry, after which again float on a bath composed of one part of hydrochloric acid in twenty parts of water. Wash, and excite as before.

LONDON GAZETTE, *April* 20.

PARTNERSHIP DISSOLVED.

DEMEZY AND HEMERY, Regent-street, photographers.

METEOROLOGICAL REPORT,

For the Week ending April 21*st*, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

April 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
15	29·81	64	55	54	58	SSW	0·05	Dull
16	29·34	58	44	48	51	WSW	0·23	Dull
17	29·30	53	43	45	46	NW	0·17	Dull
19	30·17	59	37	42	48	W	—	Fine
20	29·93	61	45	48	50	S	0·02	Dull
21	30·01	—	44	50	54	WSW	—	Fine

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 469. Vol. XVI.—APRIL 30, 1869.

THE SENSITIVENESS OF CHLORINE, BROMINE, AND IODINE COMPOUNDS.

In his interesting *resumé* of the sessional work done at the Royal Institution, Mr. Harrison this week calls attention to some experiments performed by Dr. Odling, which prove that chlorine is capable of easily liberating both iodine and bromine from certain of their combinations. As the subject is one which nearly concerns some of the operations our readers are everyday in the habit of performing, we may add a few remarks supplementary to the very interesting observations of Mr. Harrison on Dr. Odling's lecture.

It is worth remembering that the general law has been established that chlorine is capable of displacing both iodine and bromine from their hydrogen compounds, while iodine and bromine are each able to liberate chlorine from its oxygen salts. This remarkable variation appears to us to possess an important and, as yet, but little appreciated influence on some photographic reactions.

The experiments of Dr. Odling, recorded by Mr. Harrison, admirably illustrate the power of chlorine to displace bromine from its hydrogen compound, and then of this bromine to liberate iodine from hydriodic acid—the displacing body in each instance, of course, stepping into the position in the compound of the substance set free. Since hydrogen in all its chemical relations resembles a metal, it is easy to understand that chlorine would as easily displace bromine from bromide of potassium as from bromide of hydrogen or hydrobromic acid; and again, that bromine would, in the same way, liberate iodine from iodide of potassium with nearly the same ease that it does the iodine from iodide of hydrogen or hydriodic acid.

On putting the matter to the test of experiment, it is found that most of the bromides and iodides of the metals are decomposed in a precisely similar manner to the bromide and iodide of hydrogen.

We find, then, by experiment, that chlorine combines with metals with most energy, then in order comes bromine, and iodine possesses least attraction. But this order is found to be the reverse of the order of sensitiveness of certain metallic iodides, bromides, and chlorides to light; hence the more loosely-combined iodide of silver is most easily affected by light, and the more stable chloride is least acted upon, the bromide of silver occupying an intermediate position.

Admitting what has been just stated to be true, it is now very interesting to inquire what we would expect to be the degree of sensitiveness of mixtures of two or three of the above silver salts. The natural inference would be, that a mixture of the iodide and bromide of silver would be *less* sensitive than iodide of silver alone, and that a mixture of the iodide, bromide, and chloride of silver would be still less easily impressed by light. Experience shows that this is certainly not true of a bromo-iodide film, and we are strongly inclined to think that the presence of a little chloride in a bromo-iodised collodion still further increases the sensitiveness. It certainly does not diminish sensibility unless added in undue proportion; in fact, formulæ for collodion have been published in which iodides, bromides, and chlorides were combined

Remembering that, theoretically, we should expect the bromo-iodide film to be less sensitive than that of plain iodide of silver, and the "iodo-bromo-chloride" film to be still less easily impressed by light—but that, practically, we find this not to be true—let us see whether we may not easily find an analogous case in another branch of science.

The analogy between heat and chemical action is so close that we may easily consider bodies which are sensitive to heat as, to a certain extent, representing those which are sensitive to light, or, rather, to the chemical force resident in solar light. Now, two metals which we are all familiar with, viz., silver and lead, require considerable heat to melt them. Silver only fuses at a very high temperature, which has been estimated at 2233° Fah., whereas lead melts at about 612° Fah. If we mix these two metals we should expect the mixture to have a fusing point intermediate between that of either metal. In reality, however, we find that the mixture or alloy of silver and lead is much *more* fusible than lead alone; therefore *the mixture is more sensitive to heat than is either metal,* per se.

In this case we have *two* metals the mixture of which fuses more easily than either of the constituents alone; but we can take an instance of the mixture of *three* metals which possesses a greatly lower fusing point than any of the constituents. If eight parts of the metal bismuth (fusing point 518°), five of lead (fusing point 612°), and three of tin (fusing point 442°) be melted together, an alloy or a mixture is obtained which easily melts in *boiling water*, or at a degree of heat less than half that required to melt tin, the most fusible of the constituents of the alloy.

From what we have already mentioned as to the sensitiveness of the chloride, bromide, and iodide of silver separately and mixed, when exposed to the chemical action of light, and of the sensibility to the influence of heat of several metals and their mixtures, it will easily be seen that the variations from theory in each set of cases precisely correspond. It would seem, then, that if we take a certain modification of force as the agent by which we wish to bring about a change in certain bodies susceptible of its operation, a mixture of these bodies will prove to be more easily effected than any of the constituents alone; and that this is true to a great extent in photography we have abundant evidence to show.

We turn now to the second point touched upon at the outset, viz., that chlorine, though capable of displacing bromine and iodine from their hydrogen or metallic combinations, is in turn displaced by bromine and iodine from its oxygen compounds. When the well-known salt, chlorate of potash—from which we so easily prepare oxygen gas—is treated with bromine, chlorine is evolved. and bromate of potash produced; and when this bromate of potash is treated with iodine, the latter turns out the bromine and produces iodate of potash. Therefore, while chlorine forms the most powerful direct compounds with hydrogen or metals, it produces much less stable compounds with oxygen than either bromine or iodine; and this just leads us up to the point which we wish to make before concluding these remarks. If, at any time, any chlorate, bromate, or iodate be found to be sensitive to light, analogy leads us to expect that the maximum sensibility would be found in the chlor*ate*, and that the iod*ate* would be *least* sensitive—that is to say, the sensibility would be exactly the reverse of that which we find to obtain in the case of the corresponding chlor*ide* and of the iod*ide*.

OVER-DEVELOPED NEGATIVES.

Almost the very last thing that a photographer learns is the exact point at which to stop development. It is easy to give a criterion to fix the point—the difficulty lies in acting up to it. To get the most perfect combination of brilliancy and softness one should develope just as long as transparency remains in those denser portions of the image which are to constitute the high lights, so that the very central spot, as it were, even of the highest light shall print white. But, then, this must be a mere point, smaller than a pin's head. Just so soon as this point widens out a little we get that repulsive chalkiness that leads the careful photographer to consider the negative as worthless.

The difficulty in hitting the right point lies not merely in the needful experience of what the negative should be, but in judging of it under difficulties. The light in the operating room is often insufficient; but, even if abundant, its colour is unfavourable, and the negative itself is, to some extent, blocked up by the undissolved iodide and bromide. Besides, the fixing bath varies in strength and acts differently upon different films, so that at times more, and at others less, reduction of strength occurs in the fixing.

Experience and close observation remove these difficulties to a large extent, but not altogether; so that, after a succession of good results, there will be, from time to time, a negative taken in which too much attempt at brilliancy has been made, and which, when viewed after fixing by ordinary light, gives evidence of something like blockiness in the high lights. In work done at home it will generally be best to try again; but, even then, the discovery may come too late, while in views exposed at a distance we have not the remedy, and in either case must see what can be done with the negative.

I take it that a careful photographer, when such mistakes do occur, will find them out before he varnishes the negative—not, perhaps, in trying new methods or in working new sorts of dry plates, in which the actinic transparency and opacity are often very deceptive; but in any regular work, habitually pursued, the exercised eye will always detect this defect before varnishing. If not, the very troublesome operation of darkening parts of the back may need to be tried. Varnish, coloured yellow with alcoholic solution of annatto, of dragon's blood, or of gamboge, may be tried, perhaps with advantage, though the writer has never had much satisfaction out of this sort of operation.

But in the much more common case, where the trouble and its extent are perfectly perceived and measured as soon as the negative is carefully examined by ordinary light, much may be done to help it. I shall glance rapidly at some of the methods that have been used before speaking of that which has seemed to me to work best.

Cyanide of potassium has been long used for this purpose. It is certainly not a bad agent, except for its poisonous properties, which alone should cause its rejection. But it eats away the half-tone too much, and, whilst the negative is benefited in some respects, it is seriously injured in others.

Acid pernitrate of mercury will actually dissolve the image, and has been used for reducing negatives. It acts powerfully, and should be applied very carefully. All mercurial solutions are objectionable in this—they seem to render the film tender.

Iodising the film has been used by some. When a negative is placed in a weak solution of iodine in water, or in dilute "Liegol's solution" (iodine dissolved in iodide of potassium), it darkens a good deal and then lightens again. In this condition it is much more transparent than before. The reduction can be increased by dipping into weak cyanide or hyposulphite; but, even without this last, the reduction in strength is apt to be too great, and the brilliancy of the print is gone.

Perchloride of iron, recommended first, I believe, by Mr. Hughes, is, to my mind, the most satisfactory agent for this purpose. I do not mean to speak too positively, for I have not often had to use these means, but the experience which I have had has been altogether favourable. The advantage has seemed to be that a transparency was put into the densest portions before the half-tone was seriously injured, so that by stopping in good time the negative was got into a really useful condition.

This substance can be had from any druggist under the name of "muriated tincture of iron," in the form of a buff-coloured solution, which, before using, should be largely diluted with water—perhaps tenfold. The nicest way to apply it is as a bath. The negative should be well wetted and then plunged into the bath. Frequent examination is necessary, in order to enable the operator to stop at the exact point and without overdoing his work. When this point is reached the film must be well washed off, dried, and varnished, and the solution (filtered, if necessary) will answer again and again.

The method is a really serviceable one; and I think that anyone who tries it carefully once will be disposed to resort to it again should occasion occur. As a matter of precaution the first trial is best made with a negative of no very great value. M. Carey Lea.

DRY PLATES IN THE FIELD.

There is a question which has often arisen in the minds of landscape photographers, and which arises quite irrespective of the skill and experience they may have attained either in the artistic or the manipulative departments of the art—What are the best means to employ for carrying sensitive dry plates to and from the field, and for exposing them in the camera?

This question is one which is at all times pertinent, but more especially so at the commencement of the landscape photographer's "season," for at the present moment there are few taking rank under this category who are not beginning to shake off the lethargy of the winter, if indeed they have not already done so.

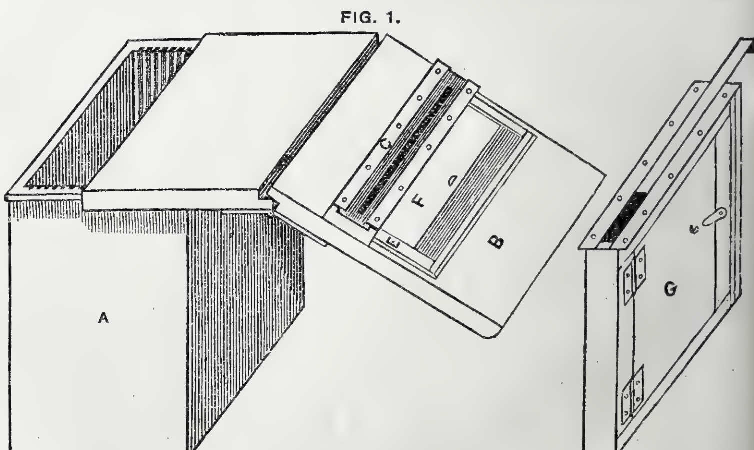
A few days since, when out with a few friends in search of pictorial "bits" for the camera, we had a better opportunity than usual for observing the great diversity of opinion that exists on this subject, for the methods for effecting the transport of the sensitive plates differed from each other in every case except in two, the photographers in that instance having with them the usual well-known double dark slide.

Now, when the number of views desired is strictly limited—we mean by this a number not exceeding say half-a-dozen—there is no method of carrying plates so convenient as the double dark slide. There they are charged and numbered, and ready for being dropped into the camera, three of them constituting an aggregate bulk not exceeding that of the camera, which is assumed to be of a portable description. But when a large number of plates have thus to be carried, the bulk of the packages and the expense of the slides (for a really good double dark slide must of necessity be costly) are such as to prove matters for serious consideration.

On the occasion to which we have referred one gentleman had a transfer box in which he had eighteen plates of the size 8 × 5. Transfer boxes of this kind are very convenient, and, when proper precautions have been taken to ensure the accurate fitting of the plates so that they shall pass smoothly and easily from the dark frame into the plate-box, there is scarcely any possibility of a hitch in its working ever occurring. Transfer boxes were at one time much more commonly used than they appear to be at the present time, and we think that now, when dry plates are such an agreeable accompanist to the tourist, they might be re-introduced with advantage. It is such a number of years since the changing box has been described that in the interest of our readers of less than ten years' standing we append a brief account of it.

So far as we can ascertain, it was invented fourteen years ago by the late Mr. G. R. Berry, of Liverpool, a man whom we knew as one very fertile in dodges and expedients, both chemical and mechanical. The annexed diagram explains its construction.

FIG. 1.

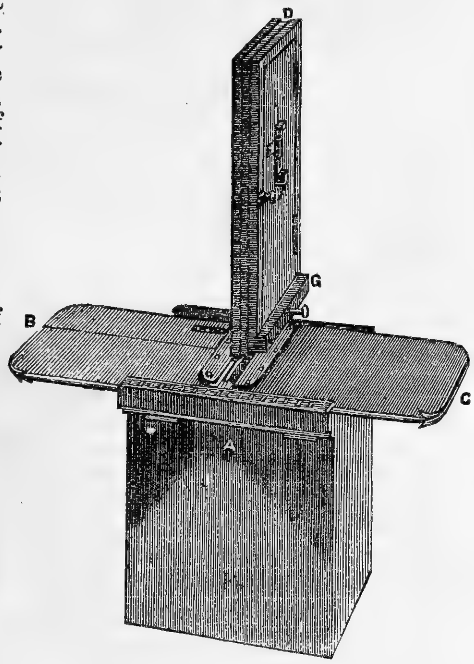


In the above engraving A is the plate box, with grooves to hold any requisite number of plates. A hinged sliding table or cover B, with a long slit at C, provide the means of affording ingress or egress to any plate, the adjustment in each case being effected by the sliding piece F, which travels in the groove E. To transfer a plate from the box to the dark slide G, the latter is slided on the groove in the lid, and, the long brass slips or sliders which serve to close out the light being withdrawn, the plate opposite to the slit passes through

when the box is turned up. Before the dark slide is removed from the box care must be taken that the brass slips are pushed in again, otherwise there would be an admission of light. The cover of the box is hinged to favour its portability.

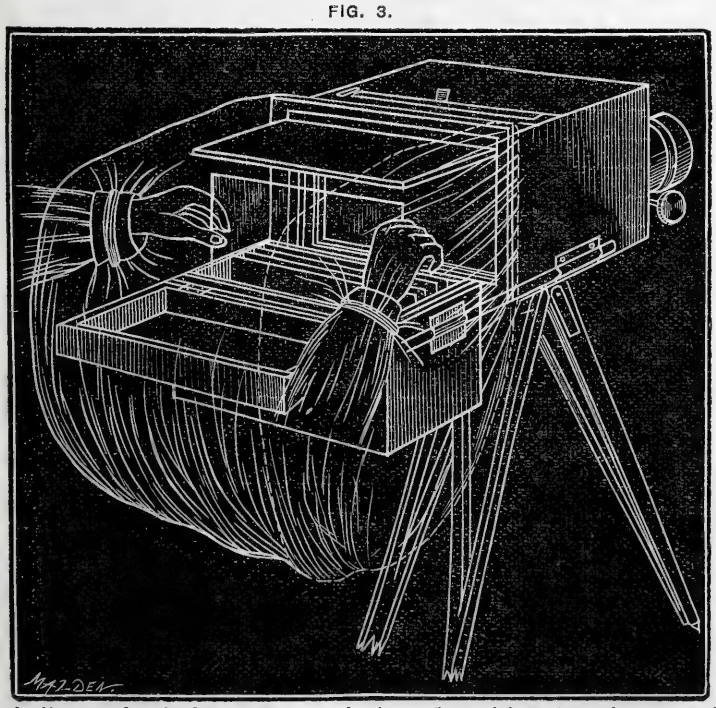
The transfer box which we use ourselves differs from that of Mr. Berry just described, but only in details, not in principle. In our slide, the little shutter which prevents the ingress of light is formed of a shutter of brass, not pulled out at the end, as in Mr. Berry's, but revolved by means of a small wire handle on the outside. A careful inspection of the diagram will show that it differs from Mr. Berry's box in at least one important respect, viz., that the supplementary sliding apparatus is done away with, and that the whole of the hinged sliding top is moved from space to space of the grooved box, an index outside serving to indicate the proper degree of removal. We have frequently used this transfer box, and always with increased pleasure. *Fig.* 2 shows the box with the covering piece opened out and the dark slide of the camera in the act of being slided on to its place. As will be observed, A is the box, which holds eighteen plates, and D is the dark slide. After the plate has been transferred, and the dark slide removed, the sliding cover of the box, by means of hinges, folds neatly over, and is retained in its place by a spring catch.

FIG 2.



We now arrive at quite another method of transferring plates from the box to the camera, and one of these we saw for the first time on the occasion referred to. Let it be supposed that the camera is placed on the stand, in the usual position, and that the dark slide is in its place. Now let it further be supposed that, by hooks, rods, or any similar mechanical contrivance, the box of sensitive plates is attached to the back of the camera; if, now, the back of the camera slide be opened (a catch being employed for keeping it raised), and if the lid of the plate-box be similarly opened, the transference of a plate from the box to the slide will be one of the easiest matters imaginable.

FIG. 3.



But how about keeping out the light? This is accomplished by springing over the end of the camera a piece of calico, or rather a calico bag, sufficiently large to include the plate-box, and containing arm-holes for inserting the hands. The diagram shows the method of operating without any further explanation. We may premise that a piece of non-actinic muslin inserted as a window in the calico covering enables the operations to be conducted with great facility, for its transparency admits of the transfer of the plate being watched and directed with ease.

With one other method of effecting the transfer of the plate from the box to the slide we shall have exhausted the subject. A changing bag has been occasionally employed by some photographers, and, in one case in which we were acquainted with the operator, with a degree of success and facility we could scarcely at the first glance have supposed possible. It was really a bag composed of black velvet, but it passed muster as a focussing cloth, for which it did duty in a most effective manner. The dark slide and plate-box were placed in the interior by means of a slit in the bottom, and on the top were two holes to admit the hands, each of these being bound round by an India-rubber band. A piece of oiled yellow silk in the top permitted the operations to be watched from the outside; and in this way a dozen 9×7 plates were transferred to and from the dark slide without one of them having been subjected to accident either from the scratching of the surface or exposure to light.

We have thus given in detail the various expedients to which our best landscape artists have had recourse for effecting the transfer of sensitive dry plates from the box in which they are stored to the camera in which they are impressed. We entertain a profound respect for the ingenuity of photographers, and we shall be very much delighted if some of our correspondents cause us to realise the fact that there are other and better expedients available than the best of those above described.

ON PRINTING PHOTOGRAPHS ON PREPARED PAINTERS CANVAS AND SIMILAR SURFACES.*

Much has been written about photographic printing on paper in its various phases, but comparatively little has yet been either written or said on the application of silver printing to other surfaces than paper.

Patents, it is true, have been applied for, and in some instances they have been actually completed, claiming the exclusive right to print with certain substances on certain textures; and by virtue of our wonderful patent laws they (the patentees) have even been able to induce people to spend their good, hard-earned money in the attempt to restrict further invention to the particular groove of the patentee. This attempt to restrict the range of experiment is as insane as attempting to restrict the limits of thought. Be this as it may, the subject I have been desired to bring before you has been made by many previous experimenters more or less a subject of mystification; and the wonder to me has been that some adventurous fellow with more money than brains has not long ago patented it, whether he knew how to do it or not.

Judging from the general run of the specifications I have seen, any possible process of printing on painters' prepared canvas or allied surfaces will be certain to be claimed, as soon as published, for the proprietors of half-a-dozen of useless patents, and the subject, so far as they are concerned, placed, to all persons like you, gentlemen, and myself, beyond the possibility of either improvement, experiment, or investigation. But fortunately for us who are professional photographers there has not been, apparently (so far as I know), any appropriating inventor who has yet cared to include *direct silver printing* on the impure oil-painty surface known as "painters' prepared canvas" in his specifications—provisional or otherwise.

An apparent exception to this is to be found in the patent of that indefatigable but most incommunicable mortal, Mr. John Pouncy, of Dorchester, who some years ago proposed to use the substance I speak of to *transfer* his printed bitumen pictures to. These were said to be, and probably they were, carbon pictures in oil; but I must say that, as a young man not well read in photographic literature, I have had doubts as to what the bitumen pictures of the only patentee who claims oil printing as part of his claims to protection were—that he should be allowed to have government protection for what no one knows anything of, and which, if they are anything, must be modifications of the earliest known process of Niepce.†

What I propose to bring before you tonight does not depend on any of the occult or more difficult-to-be-determined questions of science;

* Read at a meeting of the Edinburgh Photographic Society, April 21, 1869.

† Three months hence Mr. Pouncy's new specification will be published.—Eds.

but simply relates to a few details of ordinary manipulations, and to the application of the same powers that are so well known to the photographic printer on paper.

Cleanliness and carefulness are, it is well known, indispensable in all photographic work, and it is by these qualities alone that success in canvas printing is attainable.

But it is not on canvas alone that the process of which specimens are before the Society this evening can be printed; it is applicable to printing on all impervious or semi-impervious surfaces, of whatever material they may be composed.

When a porous surface, such as wood or any similar substance, has to be operated on, the only requirement is that the porosity be destroyed by varnish, paint, or some such material, and this then may either be salted before being applied, or the salting may be added after it has become dry; in fact, there seems no limit to the application of nitrate of silver to any substance of the character I have described, provided it be not allowed to penetrate deeper than the outer surface of the material operated on, and provided the kind of salting used be suitable to the substance operated upon.

This is a matter in which there is considerable room for latitude, almost any of the ordinary chlorides—ammonium, barium, sodium, potassium, calcium, lithium, or magnesium—being available. But I find that those salts with a tendency to deliquescence are not only the most suitable but also the most sensitive.

I have confined my observations this evening to a single salting formula; but this is by no means the limits of the process, as, by varying the chemicals as we do in ordinary printing, a great variety of effects can be produced, both as to colour, rapidity, and cleanliness of impression. However, I leave this in the hands of ardent experimentalists, confident that in the one perfect process which I will formulate there will be no trouble to practical men; at the same time there is a wide field open to those who desire to pursue this path of experiment.

The oily surface which painters' canvas presents is the first difficulty which must be got rid of, and it is done in this way:—Get your canvas ready, lay it flat on a board, sponge it over with spirits of wine (or you may use carbonate of soda or any other alkali) till the surface is free from all greasiness. Be careful not to rub the surface overmuch. Then make the canvas into a sort of dish by bending up the edges, and pour over the surface a solution of citric acid dissolved in spirits of wine. Drip it well, and, when nearly dry, pour a solution of spirits of wine and chloride of calcium over the canvas for about five minutes; pour off, and allow the canvas to dry. When dry, float on it a solution of nitrate of silver of the ordinary printing strength for four or five minutes.

I have printed canvas prints when the silver was only forty grains, and found very little difference in the prints. Print in the usual way; do not print very deep; then fix with hyposulphite of soda. I have found that old or weak soda answers best. Toning with gold is quite unnecessary.

FORMULÆ.

1. For washing the canvas:—Equal parts of methylated spirits of wine and water, or a solution of carbonate of soda in water, after which wash freely.

2. After washing, coat with—

Spirits of wine	1 ounce.
Citric acid	from 15 to 20 grains.

3. Salting solution:—

Spirits of wine	1 ounce.
Chloride of calcium	10 grains.

4. Sensitising solution:—

Nitrate of silver	50 grains.
Distilled water	1 ounce.

Considerable latitude is allowable with these quantities.

Another way by which many modifications of colour can be got is to prepare the canvas surface as above. When washed and dried the surface is to be chlorided by the application of a solution of the salt chosen, keeping the equivalent of chloride equal to about five grains of chloride of sodium to one ounce of water, and spirits of wine in equal quantities; add to this from one to two grains of either gelatine, starch, albumen, or similar organic substance, and add about ten grains of citric acid. Float this on the surface as directed; then, when dry, apply the nitrate of silver, and print.

The printing is much more rapid than in the case of ordinary paper printing, only about one-third of the time being needed for the canvas that is required for an ordinary quick printing paper.

I prefer, where possible, to use a large printing-frame to ensure perfect contact with the negative and canvas surfaces, otherwise the usual want of sharpness and decision will be visible.

This method of printing is applicable to direct as well as to enlarged negatives; and the prints before you this evening include several of both kinds.

Much washing is not required, as the hyposulphite does not penetrate into the impervious surface of the paint; indeed, in this respect, it is much like printing a transparent positive on glass.

I think I have now said all that is required to enable you to produce prints of this kind; but, if not, I shall be glad to give any further explanation you may think necessary. PETER LOTHIAN.

THE COLLODIO-BROMIDE PROCESS.

ON THE PREPARATION OF THE PLATE.*

THE one great advantage of the collodio-bromide process consists in no silver bath being required in the preparation of the plates, so that, after the plates have received a suitable substratum and the collodio-bromide has been prepared, the further steps are mostly mechanical and simple.

Believing, however, as I do, that the merits of our favourite process are still unknown to many photographers, I wish to bear my part in its advocacy—the remarks I shall submit being intended chiefly for those of us to whom the preparation of dry plates, at least without a bath, is a novelty.

The collodion, after receiving its share of silver, should be carefully decanted, or, better still, filtered through cotton wool. For this purpose a funnel may be used, the flat top of which is covered with a piece of glass and wet blotting-paper, and, by not pouring in the sediment, the rest passes through readily.

While this is being done, fill one or two flat dishes and a larger vessel with common water. Then take up plate No. 1, and, after dusting the surface, coat with collodio-bromide in the usual way. After draining, set aside while plate No. 2 is being coated in like manner. Then plunge No. 1 into the first dish of water; after No. 3 is coated immerse No. 2, and so on. By this means no time is lost.

The collodio-bromide does not flow so readily over the plate as plain collodion, especially when a substratum is employed; it also sets less rapidly than plain collodion, but a minute is quite sufficient, and no portion of the film must be allowed to dry, or an insensitive patch will result. It will thus be seen that large-sized plates must be coated and immersed individually.

After coating each plate the lip of the bottle must be cleaned; and, should any sediment be present, it is advisable to use two bottles alternately. Should the film after a time commence to tear away in the operation of coating, the collodion must be thinned with a mixture of ether and alcohol, which should be at hand. Some operators pour *from* one bottle and off the plate *into* another, filtering and thinning the latter before using it for coating again, and this ensures greater uniformity.

Before putting the plates into the third vessel, and again upon removal after soaking, it is my practice to give each a quart of water on the surface. When all are immersed, pour away what remains of the collodion, filter the tannin bath into clean flat dishes, and have the drying box and rack at hand.

The tannin bath I use consists of—

Tannin	15 grains,
Gallic acid	5 ,,
Grape sugar	5 ,,
Alcohol	1 drachm,

to the ounce of water.

The tannin should be filtered separately before adding the alcohol, otherwise the resinous part would be dissolved. The gallic acid may be dissolved in alcohol or boiling water.

Many modifications of the above may be used—some with advantage, as I shall describe hereafter.

The plates, after immersion in the tannin bath, should drain, preferably on a rack, and then be placed in the drying box, there to remain undisturbed till dry. I am inclined to consider a good drying box one of the elements of success in a "dry" process, the object in view being that the plates should dry quickly, without sudden variation of temperature, and out of the reach of dust and light; and, further, that some provision be made for carrying off the vapour.

When the plates are dry, the backs should be coated with some pigment of a non-actinic colour. This effectually prevents blurring under any circumstances. A convenient medium is annatto laid on with a brush. The addition of a little glycerine or sugar prevents

* Read at a meeting of the Liverpool Amateur Photographic Association, April 27, 1869.

the annatto getting too hard when not in use, and likewise renders its subsequent removal from the plate with a wet cloth easy. The use of collodion containing colouring matter as a backing is to be avoided, on account of the difficulty of subsequent removal and of the danger of a portion getting round to the front of the plate.

I may mention, in passing, that the backing furnishes a ready means of recording thereon with a pencil or style any circumstances connected with the preparation or exposure of the plate, as a guide in development.

The plates, being prepared and stowed away, will remain unimpaired for years, if the ordinary precautions be adopted in keeping them.

One difficulty which is sometimes encountered in preparing collodio-bromide plates consists of a mottled appearance of the film. This appearance operates the more detrimentally from the fact of the film being equally sensitive throughout its entire thickness. The fault is not inherent in this process, and various causes have been assigned for it. Its removal may, I think, be effected by one or more of the following remedies:—

1. When thinning, do not use too much ether with the alcohol.
2. Pour on from one bottle and off into another.
3. Pour plenty of collodion on the plate, do not go twice over the same part, and do not keep it on the plate longer than necessary.
4. A collodion containing an excess of the cadmium salts becomes gelatinous and may produce the evil. It has been suggested by Mr. Bolton and others to use magnesium or to employ ammonium exclusively, but with what success I cannot state.
5. The evil may, doubtless, be corrected, to some extent, in the development, by bringing out the details of the image quickly and fixing while yet faint and on the surface, and then intensifying with silver.

I have alluded to modifications in the composition of the tannin bath. Within certain limits an increase of tannin gives a resulting picture possessing more contrast, while gallic acid confers softness and greater sensitiveness. The grape sugar prevents any tendency which these crystallisable bodies may have to become brittle, and likewise assists in promoting a speedy development; and they all act mechanically in keeping the pores of the film open, without which the dry film is impervious to the developer, and insensitiveness results.

With this latter fact in view, I have been led to try the action of gum on the film, with such favourable results that I strongly recommend its adoption; and, since then, I learn that its good effects have been appreciated by other workers in this process.

Four solutions were prepared:—

No. 1.—Forty grains	gum arabic......		to the ounce of water, adding one drachm of alcohol.
„ 2.—Fifteen „	gallic acid		
„ 3.—Twenty „	grape sugar ...		
„ 4.— „ „	tannin............		

Ten plates, having been coated and washed, were treated as follows:—

No. 1.—Original tannin bath, before described.
„ 2.—Twenty-grain tannin solution.
„ 3.—Old tannin bath, *washed*, and then gum solution.
„ 4.— „ *unwashed*, „ „
„ 5.—Gum solution alone.
„ 6.—Gallic acid, and washed.
„ 7.—Old tannin bath, washed, and then grape sugar.
„ 8.— „ *unwashed*, „ „ and gum.
„ 9.— „ „ then gallic acid, and washed.
„ 10.— „ „ „ „ „ and finally grape sugar.

They were exposed consecutively under a pair of stereo. lenses, and developed as nearly as possible under the same conditions.

No. 1 developed steadily and well.
„ 2 came out slowly and short of detail in shadows.
„ 3 quickly and well—not so intense as No. 1.
„ 4 quickly and intense.
„ 5 developed rapidly and intensified readily.

The gum plates, upon moistening, assumed an opaque, porous, and creamy appearance—developed almost like wet plates, and the deposit was of a peculiar non-actinic colour. The remaining plates developed as I expected—the gallic acid lacking intensity, possibly from over-exposure, the grape sugar coming out in half the time, and readily acquiring density.

I have made a new tannin bath on my old formula, adding thereto twenty grains of gum to the ounce, and hope to report further on another occasion. Meanwhile, I would say to those who have not yet adopted our process—Give it a trial; and to those who have—Try gum. JOHN HENDERSON.

EXTEMPORE WINDOW BLINDS FOR TRAVELLING PHOTOGRAPHERS.

EIGHT or ten years ago, before dry collodion processes had gained the footing they have since secured, and when the photographic process employed by the tourist was the waxed paper or the calotype, the chambermaid of a well-appointed hotel dreaded the advent of an amateur photographer as if he brought with him a species of plague, which to her he indeed did.

In those days the waxed paper had to be excited each morning before starting on the tour for the day, and the views were developed each evening after returning. The multiplicity of Betty's duties being thus increased tenfold by the messes caused by the photographer, her aversion to the members of the craft was of a deep-rooted and sometimes malignant type; while the more serious evils of indelible stains in carpets, and on tables and chairs—discovered only after the departure of the lodger, and too late for compensation through the bill—rendered even landlords dubious about the propriety of receiving such visitors into their hostelries.

A friend of ours was once present when the landlord of a hotel, not a hundred miles from Hampton Court, on seeing a gentleman alighting from a vehicle, with a lad carrying in the camera stand and other luggage, immediately passed the word to the attendants that every room was "engaged," and the unfortunate photographer was compelled to secure quarters elsewhere. In explanation, the landlord informed our friend that his carpets and tables had previously been so much destroyed by photographic artists, that he would rather that half his bedrooms should remain empty than that they should be occupied by such people. They were well enough in other respects, he said, and paid their way like gentlemen, but he could never forget the deplorable messes they made.

Times have changed since then, and landlords now court the visits of nomadic photographers. There are still occasions, however, when it is desirable to "do" a little photography in the country, and when the blinds of the bedroom, or, indeed, of any other room in the hotel, are quite worthless for shutting out the light. Before starting on a tour in the morning, for example, it is frequently desirable that the plates should be examined or transferred from the stock box to the slides; it is also frequently desirable to develope a negative now and then, in order to see if the exposures which are given are correct—not that a photographer of much experience can go far wrong in exposing a plate, but the actinic power of the light is sometimes much greater or less than would be deduced from its luminous power.

When for any of these reasons it is necessary to darken a room, in two out of three cases it will be found to be attended with so much difficulty as to render it practically impossible, or at any rate highly inexpedient, to do so effectually. A gentleman to whom we have been indebted for several practical hints in the mechanical branches of our art-science, has informed us of a very handy and simple method of effectually shutting out the light from any room, whether in a hotel or in one's own house, although of course it has special reference to the photographic tourist. There is a thin, tough, brown paper to be met with at all paper dealers' which is absolutely opaque to actinic and almost so to luminous radiations. The photographer must always carry with him a few sheets of this brown paper, selecting such as are quite free from pinholes or similar defects. In one of these sheets a hole of any reasonable dimensions—say a foot square—is made, and a cover of "non-actinic muslin" made for it. Now by means of pins and wafers a window may by this paper be so effectually blinded up in the course of three or four minutes that not a single ray of light can find admission into the room. The sheet in which is fixed the muslin pane may be placed at either the top, the bottom, or the middle tier, according to the necessities or taste of the operator.

Since commencing to write this article we have had a window blinded in accordance with these general directions, and are indeed much pleased with the result. A few pence invested in non-actinic muslin and brown paper will secure a valuable boon to the travelling landscape photographer.

FROM WHAT HEIGHT SHOULD THE SITTER BE PHOTOGRAPHED?

AT a meeting of the Manchester Photographic Society, held on the 10th of December last, the writer of the present article introduced for discussion amongst the members sundry questions relating to photo-artistic portraiture, amongst which were the position of the horizon line in a scenic background, and the height from which a sitter should be photographed. Though the ideas expressed by the

writer on these subjects met with considerable opposition, no more powerful argument was brought against them than that furnished by the *custom* of artists to raise the figure considerably above the level of the eye, and to lower the horizon line very considerably beneath the head of the figure.

The admission that science progresses, that discoveries are made, that new inventions are produced, and that improvements are possible—an admission, surely, which every man in his senses must make—is in itself a recognition of the fact that, despite their knowledge, however extensive and however deserving of respect, our ancestors were not omniscient and were not infallible; on the contrary, in multitudes of things they laboured under misapprehension and indulged in error. Hence the antiquity of any custom, no matter how extensively practised—though it may warn us not to abandon that custom without very strong evidence that it is a mistaken one—is not in itself any sound and just argument for the protracted continuance of the usage referred to. Until almost within the last quarter of a century portraits were not "taken" or landscapes represented by means of photography, because, in spite of "the wisdom of the ancients," the photographic art was not known until the nineteenth century had made a very appreciable advance. Few men, however, would suppose the use of photography as a means of delineation to be other than legitimate because a knowledge of it was not possessed by our ancestors.

One of the earliest attempts at pictorial delineation, it is said, was the outline drawing by a lady of antiquity upon her lover's shadow. This style of art, it needs hardly be said, was not of long duration, nor was that immediately succeeding it. Step after step in advance has been made from the earliest ages up to the present time, with products varying between a rude and ill-traced outline and an elaborate and commanding academy painting. Still it does not follow that any rule by which modern painters have learned to abide with more or less tenacity is thereby infallible; indeed, where there is any sound evidence that such a rule is founded upon misconception, it certainly ought to be abandoned in spite of the argument of usage, and in spite of the prestige of antiquity.

In an article published in The British Journal of Photography on the 8th January last, the writer endeavoured to show that the custom of representing a figure as seen from a point decidedly below the level of the head was, *as a rule*, a custom much "more honoured in the breach than the observance." In the article alluded to it was stated that friends when enjoying each other's society do, in most instances, see each other's heads upon about a level with their own. It was also stated that "very tall men habitually (*i.e.*, by habit) look down upon their shorter brethren," and that "men of the opposite characteristic, on the other hand, are given to looking above them." In reference to this point Mr. Wake, in a letter published on the 15th January, asks how I "would satisfy both the short and tall friends of the sitter, as they see him from different heights." This question, which the "Gossiping Photographer" of a contemporary thought particularly good, is, it will be perceived, wide of the mark, inasmuch as the object in view is rather to avoid displeasing the majority of persons, than to give satisfaction to the small minority, especially when that minority offers no greater claim to our consideration than its excessive or diminutive stature.

If, as I contend, it is a mistake in portraiture to delineate a person as seen from a point considerably below the level of his own head, a decided step in advance is made by abandoning the *artistic* custom of placing the figure upon a raised dais; and the question for consideration is whether the sitter ought or ought not, *as a rule*, to be photographed from a point on a level with his own head, and not whether there are exceptions which are destitute of the advantages derived or enjoyed, *as a rule*, by such a procedure. If the artist's custom of raising the figure were invariably adhered to, very tall men would be raised indeed, and give an extensive, if not a pleasing, view of the nostrils. Such a view may possibly, as asserted, confer "dignity" upon the head, and it may be that the writer only reveals his own obtuseness in failing to perceive it. Mr. Wake does not deny that, *as a rule*, men see the heads of their friends on or about a level with their own. He merely asks how the short and tall friends would be accommodated, a question which I have already shown to be wide of the mark.

The "Gossiping Photographer" alluded to, who is frequently very careless about his statements, even where their accuracy is easily determined, is strictly to the point in flatly denying that there is any average height amongst men. He expresses himself as being at a loss to guess upon what "authority" I have made this statement. I am certainly surprised that any one should be found to ask such a question. To be tall or short in stature is to be exceptional; to be very tall or very short is to be very exceptional. Obviously the average, the rule, the fact bearing out in the *majority* of instances, lies between these points. When facts so self-evident as this are called into question, I shall, for the future, pass over without notice arguments based upon such ridiculous disputes.

Our "gossiper," however, if not more to the point, is at all events more rational, where he says of a number of friends that, "while some stand, others lean backward or forward to this side or to that." I am well aware that in some society, the members of which are more characterised by freedom than decorum, some not only stand, but stand on tables or chairs whilst expressing their sentiments to their hearers who, in their turn, stand in every variety of posture or sit in every conceivable style either on or under some neighbouring table, according to the state of cheerfulness or inebriation in which at that particular time they may happen to find themselves. I have frequently myself witnessed "friendly meetings" of this description in the "lager beer saloons" of the United States. To contend, however, that any gentleman who happens to officiate on the "stump" (as a table is frequently called when used as an extempore platform) should be represented as seen by the most humbly-stationed of his hearers in order to secure the most satisfactory likeness, would be absurd, inasmuch as that gentleman, in his "turn," as a rule, sinks, during the temporary excitation of some other individual, into undertable insignificance.

Where two persons only meet together, it certainly is not the rule for one to stand upon one table and the other to sit beneath another. They generally preserve more equality of position, and, where of similar heights—which, *as a rule*, I reiterate men are—they view each other from a point on or about a level with the head of the person seen. In such society as indulges in the violent extremes of temporary elevation and depression there is, nevertheless, an average relative position which is neither above nor beneath the general level.

If frequent repetition of inspection adds to our knowledge of a man's appearance, as I should think every one will admit it does, we shall certainly most easily recognise him in a picture taken from a point to which he presented that aspect which we have seen the greatest number of times—which may be front face, or side face, or profile, for anything I care to advance at present, but must be, *as a rule*, in the majority of instances on or about a level with the spectator's head.

In my article on the *Artistic License*, which appeared in this Journal on the 26th of February last, I pointed out the folly of attempting to answer too many arguments at once, and showed, as well as I was able, the desirability of maintaining order in the discussion of any question. The "Gossiping Photographer" alluded to, in noticing that article, avoids saying anything in connection with the immediate subject upon which it treats, viz., the respective spheres of legitimate art and the artistic license. He repeats for the second time an argument on the position of the horizon line in reference to the proportions of the picture, to which I shall have pleasure in giving attention in its proper place. Meanwhile I may state that I do not, as he fears, "fail to understand" him; and even if I did so it would not be, as he uncourteously supposes, from determination. I trust the comparison with a deaf old servant of his, who is more than usually deaf when he (the "gossiper") is proving him to be wrong, is a comparison which I do not wholly merit—firstly, because if the truth can be believed I would much rather be proved wrong than right; and, secondly, because any proof of my being wrong is hardly to be hoped for in such carelessly-expressed statements as some of those indulged in in reference to me by the "gossiper." Those gentlemen who are really desirous of advancing the sound interests of the art of portraiture would, I think, do good service by discussing in the pages of this Journal, in an earnest and temperate manner, such questions as—"What is the sphere of legitimate art?" and "From what point of elevation in reference to the sitter should a portrait be taken?" D. Winstanley.

THE ROYAL INSTITUTION SESSION.*

Eyes.

Dr. H. Power has lectured at the Royal Institution upon eyes of every shape and hue. He said that few animals are without eyes. The *Polypi*, which throw out arms to catch and poison the animals they eat for food, seem to have no eyes. *Amœboid* animals, the little jelly-like organisms seen under the microscope, which travel like lumps of putty, elongating in one direction and contracting in the other—these have no eyes. *Protozoa* and most worms have no eyes. The tape-worm has none, perhaps because it lives in darkness and has plenty of food rubbing against its nose. The jelly-fishes *(Discophora)* have red and black spots near margins of star-like points on their

* Concluded from page 198.

bodies, which spots may be eyes, but it is doubtful. Star-fishes have very complex eyes, looking like red dots. It is doubtful if any of the *Echinoid* class have eyes, and in none of the *Radiata* are there any but doubtful organs of vision, though most of them have a very excellent lens or undeveloped eye. The oyster and scallop can see very fairly, having plenty of eyes round their outer fringe, near the edge of the shell, and their eyes are of a rather highly developed order. The *Gasteropoda* have, for the most part, very good eyes, especially snails and barnacles. The eyes of the *Gasteropoda* are highly developed, and sometimes situated in the brain itself.

In the snail tribe the eyes are sometimes at the root of the tentacles (horns), sometimes on the sides thereof, and sometimes at the top. In these animals the power of moving the eye is for the first time given, and if any obstacle be placed in the way of a common garden snail, it will be seen moving its eyes about at the top of its horns, to get a good look at the impediment. Its eye is furnished with a cornea, and in many respects it is like the human eye. The *Cephalopoda* have good eyes, sometimes of very large size, and the *Nautilus Pompilius* is remarkable, in that its eye seems to have no lens, but only a "pinhole" to form the image. The *Annelida*, including leeches, seem to have no organs of vision.

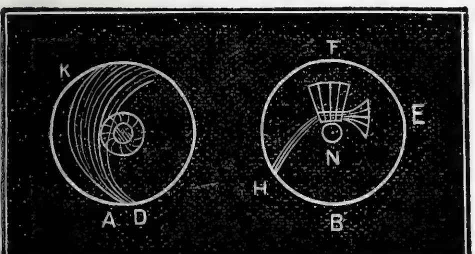
Some of the animals found in the sea have eyes in their brains, some have them under their bellies, others have them along their sides, and others again in the tips of their tails. The eye of the dragon fly has 28,000 facets, each of which is supposed to cast a distinct image or a distinct colour. The *Vertebrata* are distinguished by the uniform possession of two eyes, with the single exception of a very rare fish found in the Mediterranean, with about 1,000 undeveloped eyes under its belly.

The eyes of birds are distinguished by their keenness of perception; it is a well-authenticated fact that in many tropical countries, when a horse or other animal is slain, little black spots will be seen above the distant horizon, and before long the sky will be dark with the vultures wheeling overhead. Most *Vertebrata* can move their eyes freely, but the skate and shark have their eyes held in a peculiar way by a support below.

The Eyes of Owls.

That thoughtful bird, the owl, has very fine eyes, but is without movable eyelids. If its eyes be watched, a white film or curtain will be seen to come down over them now and then, and be as quickly withdrawn. This white curtain shuts up in wrinkles at the top corner of the eye K, *fig.* 4. In this diagram A is the front of the eye of the owl, and B the back. When the film is pulled from D it comes down over the front of the eye. The pull is given by the muscle E, and is communicated to the film *via* H and D. When giving the pull, if it pressed upon the optic nerve N, the owl would see colour, and have its vision otherwise disturbed, so a second muscle is placed at F, to give an upward pull at the same time that E pulls horizontally. The owl can enlarge and contract the pupil of its eye at will, but the human being cannot do so.

FIG. 4.



The Coloured Light of Flames.

Dr. Odling showed experiments with coloured flames. He exhibited the combustion of lithium, which is not only an excessively rare metal, but is lighter in weight than any solid or liquid body whatever at present known to chemists. It burns with a steel-white flame and plenty of white smoke, something like magnesium; but when the oxide produced by combustion is re-ignited in the flame of a Bunsen's burner, the flame emits a very beautiful crimson light. To show the delicacy of the spectrum analysis test for sodium, Dr. Odling took a slip of chemically-clean platinum, which, on being placed in the flame of a Bunsen's burner, gave no colour to the light. He removed it from the flame, and when it was cool drew it twice between his fingers to take up a minute quantity of soda from the perspiration. When it was once more inserted in the flame, an intense yellow light was the result, strikingly visible to the whole audience.

The peculiar pale violet-colour given to the flame by potassium was next shown; but when there is much sodium in the flame the intense yellow colour masks that given by other substances. Dr. Odling surrounded a yellow sodium flame with a double glass cylinder filled with a blue solution of indigo, which cut off all the yellow rays. Then, when lithium and potassium salts were ignited in the yellow flame, the characteristic colours of these salts were seen by the audience, the yellow rays being cut off by the fluid medium.

The red and violet colours from the two aforementioned salts could not be seen when the blue liquid screen was removed. The yellow flame with which gun-cotton and pyroxyline burns is caused by the trace of soda the substance contains, which soda it is impossible to remove by any amount of washing.

Iodine, Chlorine, and Bromine.

A chloride of silver wet collodion plate requires a much longer exposure to get a picture in the camera than a bromide of silver plate, and an iodide of silver plate is the quickest of the three. Now, supposing the invisible image to be primarily caused by waves of light setting up a motion of separation between the atoms of silver and the iodine or other substance with which it is combined, iodine should have the weakest affinity for silver, bromine a stronger one, and chlorine the greatest of all, to agree with the theory. Gmelin's *Chemistry* gives a little evidence that such is the relative value of the affinities of chlorine, iodine, and bromine for most bases, but nearly all other text books give no information at all on the subject.

Some experiments by Dr. Odling threw a little light upon this matter. To show that bromine will turn out iodine, the lecturer added some bromine to iodide of hydrogen or hydriodic acid, and the iodine was set free. Some bisulphide of carbon was then shaken up with the liquid, when it dissolved the free iodine, and sank with it to the bottom of the vessel as a rich purple solution. He then took some bromide of hydrogen or hydrobromic acid, and added chlorine, the result being that the bromine was set free. Ether was added to the liquid; it dissolved the free bromine, and rose with it to the top of the solution. Chlorine and bromine have a pretty rapid bleaching action, but that of iodine is slow and feeble. He added some iodine to a weak solution of indigo; no action was apparent till the liquid was warmed, and then its colour was slowly discharged. Bromine has the power of taking up hydrogen from sulphuretted hydrogen and depositing the sulphur.

Dr. Odling also exhibited the experiment described recently by Mr. Fowler, of the combustion set up when bichromate of potash is ignited in a test-tube. The sparkling is caused by the burning of the hydrogen of the ammonia in the oxygen of the chromic acid.

At present Professor Tyndall is lecturing at the Royal Institution upon "Light." The lectures as yet delivered have been very elementary. William H. Harrison.

P.S.—In the part of this summary published last week, after describing gas apparatus, I gave a short suggestion about a new washing bottle. By an error this suggestion was removed from its original place and printed near the beginning of the article, among subjects which had nothing to do with it. As the plan itself is not in use at the Royal Institution, the accidental transposition made the paragraph look very peculiar and out of place, thereby calling for this explanation.—W. H. H.

ON THE ATOMIC WEIGHT OF ALBUMEN, AND THE COMPOUNDS FORMED BY SENSITISING A CHLORIDED AND NON-CHLORIDED ALBUMENISED PAPER UPON A SOLUTION OF NITRATE OF SILVER.

IN TWO CHAPTERS.—CHAPTER I. *(concluded).*

I give, now, these various formulæ in the following table, commencing with the lowest atomic weight:—

Table of the Formula and Atomic Weight of Albumen, as Given by those whose Names Appear in the Left Hand Column.

	Carbon.	Hydrogen.	Nitrogen.	Oxygen.	Phosphorus.	Sulphur.	Atomic Weight.
Lieberkuhn	144	112	18	44	0	2	1612
Mulder	180	139	22	60	0	2	2039
Fownes	400	310	50	120	1	2	4434
Liebig	432	338	54	136	0	6	4860
Berzelius, as given by Mr. Martin	400	620	100	120	1	2	5444
Dr. Lowig	720	558	89	240	1	8	8204
G. Price	720	560	89	240	1	8	8206

Before we show how these atomic weights—differing so largely in amount—have been deduced from the but slightly-differing percentage constitution given by various analysers, and, therefore, from but slightly-differing empirical formulæ, we shall point out some of the extraordinary and inexplicable discrepancies in the proportions which the various elements bear to each other in some of the above formulæ.

Berzelius, in his formula, as given by Mr. Martin, assigns the same number of atoms to carbon, oxygen, phosphorus, and sulphur as Fownes does, but he doubles the amount of hydrogen and oxygen, one of the consequences of which is, he gives the atoms of nitrogen as being a fourth of those of carbon, whereas Lieberkuhn, Fownes, and Liebig give them as an eighth, and Mulder, Dr. Lowig, and G. Price a trifle less than an eighth. Again: notwithstanding the greatly differing numbers assigned to carbon, hydrogen, nitrogen, and oxygen in the formulæ of Lieberkuhn, Mulder, Fownes, and Berzelius, they agree exactly in the number they assign to sulphur. Fownes, Berzelius, Dr. Lowig, and G. Price give 1 of phosphorus, but Lieberkuhn, Mulder, and Liebig do not give any.

If a compound's given percentage constitution be considered as accurately representing the result of its analysis, the empirical formula deduced therefrom cannot be called in question, as an empirical

formula is but the expression of an analysis in the number of atoms of the elements representing the percentage constitution; therefore it merely gives the relative proportions of the constituents of the compound. When the percentage constitution of a compound has been ascertained, we see how easy it is to calculate an empirical formula from it; it is not so, however, when we come to deduce a rational formula, for this must represent the actual composition of the compound. Various matters have, therefore, to be considered before we can determine what it is to be; for instance, we must know in what manner it enters into the composition of salts, that is, what is its combining molecule. Thus it is often necessary to take some multiple of the empirical formula.

I have shown that for the formula I calculated myself, I multiplied my empirical formula by 80, as that is the lowest number which will give even but one atom of phosphorus, if the elements are to retain the same relative proportions as they do in the percentage constitution. I was afterwards led to adopt this formula in constructing the tables I have alluded to before, in consequence of the extraordinary circumstance that it coincided in every particular with that given by Dr. Lowig, with the sole exception of its containing two more atoms of hydrogen. Dr. Lowig's formula must, therefore, also be a multiple of the empirical formula by 80, but why it has two atoms of hydrogen less than my own I cannot ascertain.

We see, from the foregoing table, that Mulder gives no phosphorus in his formula. This is rather singular, for he gives it as 0·4 in his percentage analysis. Without phosphorus, then, the sulphur becomes the element in my empirical formula of the lowest amount. As it is there represented by a tenth of its atomic weight, the multiplication of this formula by 10 is the lowest that can be employed to give even but one atom of sulphur. Proceeding, therefore, upon the same plan that I adopted in deducing my own formula, viz., by taking the next whole number when the fraction is greater than a half, this multiplication by 10 produces the following formula:—C_{90}, H_{70}, N_{11}, O_{30}, S, giving an atomic weight of 1,020.

We must bear in mind that this is the lowest atomic weight that can be assigned to albumen, upon the supposition that its percentage constitution is correctly given, and that phosphorus is not one of its constituents—that is, if the same relative proportions of its elements are retained. If we double the formula produced by this multiplication by 10 of my empirical formula, we have Mulder's formula, but the hydrogen will be 140 instead of 139. Mulder, therefore, multiplies my empirical formula by 20, but he takes the hydrogen in the percentage constitution, as it is sometimes given, viz., as 6·95 instead of 7, and multiplies the decimal as it is. By so doing we have Mulder's formula exactly as given in the preceding table.

If we refer to the formula given by Dr. Lowig, as I quoted it when I first mentioned it, viz., 20 (C_{36}, H_{25}, N_4, O_{10} + 2 HO) + 8 (NH_2 S) + NH_2 P, we see that the latter part of the equation is + NH_2 P. Now, without this addition, which contains the phosphorus, the formula would be equal to—carbon 720, hydrogen 556, nitrogen 88, oxygen 240, sulphur 8; if this be divided by 4, we again have Mulder's formula exactly. In Watts's *Dictionary of Chemistry* we are told:—"Mulder regards albumen as a compound of (hypothetical) protein with (hypothetical) sulphamide, viz.:—

$$\text{“}5\,\underbrace{(C_{36},\ H_{27},\ N_4,\ O_{12})}_{\text{Protein.}} + \underbrace{N_2,\ H_4,\ S.}_{\text{Sulphamide.”}}$$

This gives for 5 of protein C_{180}, H_{135}, N_{20}, O_{60}—giving an atomic weight of 1975; and sulphamide N_2, H_4, S, gives an atomic weight of 64. These, being added together, give us, of course, Mulder's atomic weight again, viz., 2039.

Dr. Lowig says:—"From the elementary analysis of protein we calculate the following formula—N_{50}, C_{400}, H_{310}, O_{120}, with which one and two atoms of sulphur and phosphorus are believed to occur." Now this is Fownes's formula exactly, and is an empirical formula multiplied by 44.

Liebig multiplies an empirical formula by 48; my own, however, thus multiplied, will produce a deficiency of two atoms of hydrogen and an excess of oxygen. But, by taking hydrogen in the percentage constitution as 7·05 (as sometimes given) instead of 7, we obtain the requisite number; and taking oxygen as 22·83 instead of 22—which divided by the atomic weight, gives 2·85—and multiplying the decimal as it stands, we also obtain the required number. We are told in Watts's *Dictionary of Chemistry*:—"Liebig's formula is intended merely to express, in a simple form, certain relations between albumen and other animal substances. Lieberkuhn, on the other hand, regards his formula as actually expressing the composition of the molecule of albumen as it exists in the metallic albumenates."

Lieberkuhn multiplies my empirical formula by 16, and proceeds upon the same principle that I did in deducing my own formula, viz., when the multiplication produces a fraction greater than a half, he takes the next whole number. Thus: nitrogen produces 17$\frac{5}{7}$, which he considers as 18, and sulphur 1$\frac{3}{5}$, as 2. In my empirical formula, the oxygen is 2$\frac{3}{4}$, which I considered as 3, in consequence of the fraction being greater than a half; Lieberkuhn, however, multiplies it as it is.

We see from the foregoing that the formulæ of Lieberkuhn, Mulder, Fownes, Liebig, Dr. Lowig, and G. Price are but differing multiples of the same empirical formula, or of one that differs but very slightly from it, in consequence of a different percentage analysis having been taken as the basis; therefore, the elements bear the same relative proportions in all of them, within the limit assignable to the slight variations of the percentage constitution from which they may have been deduced.

However, when we come to examine the formula of Berzelius, as given by Mr. Martin, we find the carbon, oxygen, phosphorus, and sulphur are the same in amount as given in Fownes's formula; these elements must, therefore, have been produced by the same multiple (namely, 44) of the same empirical formula; but the hydrogen and nitrogen are exactly double the amount given by Fownes, and, therefore, to produce this increase we must either double the multiplier of the empirical formula and make it 88 for those two elements, or we must double their amount in the percentage constitution—neither of which is allowable.

Now, it is scarcely necessary to say that, to form a rational formula, the same multiple of the empirical formula must be used to every element in the compound; and that, if this multiplier be doubled for some of the elements and not for the others, or, what amounts to the same thing, if their amount in the percentage constitution be doubled, the formula will be based upon a false representation of the analysis. Methinks, therefore, it cannot be denied that this formula of Berzelius, as given by Mr. Martin, is (as I have said before) utterly worthless as representing the constitution of albumen, and, therefore, must be discarded. The only supposition upon which we can accept it is the inadmissible one that every analyst has been in error in not doubling the amount of the hydrogen and nitrogen; or, the equally inadmissible one, that in deducing a rational formula from a percentage analysis, the proportions of some of the elements of the compound may be doubled, whilst the others retain their relative percentage proportions.

Taking the formula, which I have shown is deduced from Mulder's analysis of the percentage constitution of albumen, to give but one atom of sulphur when the phosphorus is omitted (which formula I shall designate "lowest") and discarding that of Berzelius, as given by Mr. Martin, for the reasons already given, we have the following atomic weights assigned to albumen:—

The "lowest"	1020	being the empirical formula multiplied by	10
Lieberkuhn ...	1612	,, ,, ,, ,, ,,	16
Mulder	2039	,, ,, ,, ,, ,,	20
Fownes	4434	,, ,, ,, ,, ,,	44
Liebig	4860	,, ,, ,, ,, ,,	48
Dr. Lowig......	8204	,, ,, ,, ,, ,,	80
G. Price.........	8206	,, ,, ,, ,, ,,	80

All these various numbers agree very nearly with the results of the analysis of albumen, and, therefore, may be considered as pretty accurately representing its constitution. But which of them is to be taken as really representing its combining molecule?—that is, the atomic weight with which it enters into the composition of the compounds termed "albumenates?" With this puzzling question, I leave the subject till the next chapter. GEORGE PRICE.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 5th	North London	Myddelton Hall, Islington.
,, 5th	Edinburgh.....................	Hall, 5, St. Andrew-square.
,, 6th	Glasgow	Andersonian University.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held in the Rooms, 5, St. Andrew-square, on the evening of Wednesday, the 21st inst.,—Mr. Geo. Slight in the chair. There was a large attendance of members.

The minutes of the previous meeting having been read and approved of,

Mr. Peter Lothian read a paper *On Printing Photographs on Prepared Painters' Canvas and Similar Surfaces*. [See page 205.] When the reading of the paper was concluded,

Mr. MACBETH said Mr. Lothian had not described the method of using the lantern. Did he use the enlarging lantern?

Mr. LOTHIAN replied that the pictures before them were enlarged negatives printed in the usual way.

Mr. MACBETH could not say anything about the process, but he thought it was admirable. So far as the requirements of art were concerned, he thought it was even more than was necessary; but the advantage gained was in the likeness being absolutely perfect. The only thing he should be anxious about would be the fear that any of the chemicals should affect the colour or the canvas. He did not know how far it might penetrate into the canvas. A great deal depended upon how the combination was made, because there was a good deal of clay in many of the canvases, and in those cases the canvas was hard and very apt to chip off. He did not know how far the action of the chemicals in the preparation might act upon that. He prepared his

wn canvas with pure white lead and plenty of raw linseed oil, in order be secured against the possibility of its giving way. He also used e canvas very tightly stretched, so that the threads were all open and e paint more or less rivetted on the back of it. At the same time, owever, they must use sufficient oil so as to prevent cracking. He had great objection to the canvas generally manufactured, because of the nount of clay it contained. He did not know whether the chemicals sed—such as acetic acid—might penetrate into it. A great deal epended on the quantity of the size put upon the canvas. If the size ere too thick it was almost certain to chip off in the course of time, pecially if the medium were of a hard, dry quality; but, so far as the quirements of painting were concerned, nothing could be better than e examples Mr. Lothian had brought to illustrate his process.

The CHAIRMAN inquired if Mr. Macbeth had painted upon photographs ich as these were.

Mr. MACBETH replied in the negative.

Mr. ANDERSON asked if the peculiar tone and colour of the photo-aphs would not always be seen, even through the painting.

Mr. MACBETH said that were he ordering any photographer to do that nd of work, he would regulate this according to the subject. Sup-osing the person were red-haired, the hair would naturally come out ark; and he questioned whether he would allow it in that case to be deeply printed, because some portion of the brilliancy would be lost laying the paint upon it. It depended entirely upon the complexion. or a fair complexion he should recommend that the picture be not too eeply printed, because there were about the eyes certain qualities which eflected the light and which were apt to cause blackness. The colour raw umber was about the best for this.

Mr. W. H. DAVIES observed that it seemed to him that the pecu-ar method of salting adopted, as well as the peculiar admixture of rganic matter that was added with the salting, or before it, might very aterially influence the colour, and it seemed to him very possible, dging by the specimens before them, that it was so, inasmuch as one the pictures was very much like a gold-toned picture. That must ave been in consequence of the organic matter used in the preparation the picture. Another had quite a red tone, and some that he had seen nd done himself had been quite red, very much like an untoned albume-ised print. If albumen were used, they might make the colour of the educed silver as nearly as possible the colour of raw umber, so that he ould recommend that albumen should be used instead of gelatine or rrowroot.

Mr. ROSS said he thought it was nearly twenty-five years since he rinted pictures on canvas and had them then painted in oil, and he ad no reason to believe that they had changed, so far as the chemicals ere concerned. Of course, there was not so much known of photo-raphy in those days as now, and the pictures were then printed with nd printed in the sun; but he was not sure that he did not prefer aper to canvas. He thought that it would last much longer than ither canvas or millboard. He had seen all those give way, but he had ever seen an oil-painting on paper give way. He was rather inclined o stand by the paper; still that was merely his own opinion.

The CHAIRMAN asked Mr. Ross if he had found the chemicals to act pon the canvas.

Mr. ROSS said not upon canvas but upon *papier maché*.

The CHAIRMAN further inquired if he (Mr. Ross) had found the hemicals to destroy the canvas.

Mr. ROSS replied that he had not.

Mr. DAVIES remarked that there must be something essentially lifferent between the materials used then and those adopted now, inas-nuch as Mr. Lothian's process was very much more rapid than ordinary paper printing, while Mr. Ross spoke of long exposures to light.

Mr. ROSS said that the system he referred to was much slower.

In answer to a question,

Mr. LOTHIAN observed that one of these pictures was printed in four ninutes, and the rest took some more and some less time—perhaps ten ninutes on an average in a poor light.

The CHAIRMAN asked if the same process applied to paper for accele-rating paper printing.

Mr. LOTHIAN replied that he had never compared the two.

Mr. DAVIES said he had seen many *formulæ* given in the photographic journals for the production of prints on canvas, but he had never seen one picture on canvas produced by acting according to the directions, and by some of those formulæ there was not the slightest chance of pro-ducing a picture. He had tried two or three of them, but never could produce a picture. The process before them, however, seemed to be per-fect so far as the work was concerned. He (Mr. Davies) asked Mr. Lothian if he had found all kinds of canvas to do the work equally well.

Mr. LOTHIAN said he had found half-prepared canvas to be the best to work upon. In reply to a further inquiry, he said that if supplied with a negative he could easily furnish a copy at a day's notice.

Mr. DAVIES recommended Mr. Lothian to try the development of a print upon the canvas.

Mr. ROSS said it would give more half-tone, but not so much brilliancy.

Mr. DAVIES was doubtful whether the surface of the canvas would be sufficiently clean to allow the development to go on, that being so very delicate a process.

A vote of thanks was then given to Mr. Lothian for his paper.

Mr. Macbeth exhibited two fine photographs, by Mr. H. P. Robinson, which had been forwarded to him, and he also presented to the portrait album of the Society a portrait of himself, by Mr. Lawrence, of Glasgow, one of the members of the Society. Mr. Alexander Nicol also presented his portrait, taken by himself, to the gallery. Both were accompanied with autographs. Mr. G. L. Bensa's photographer's com-panion and angle tape was placed upon the table for inspection.

The meeting was then adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Association was held on Tuesday last, the 27th inst., at the Free Public Library, William Brown-street,—the President, Mr. O. R. Green, in the chair.

In accordance with a resolution of the previous meeting, a number of visitors had been invited, and the lecture theatre of the museum was brought into use, in addition to the usual room of meeting.

The minutes of the former meeting were read and confirmed. The presentation prints for 1868 were on the table for distribution to mem-bers. The photograph that had been selected was *The Gleaners*, printed by Messrs. Robinson and Cherrill, of Tunbridge Wells.

The paper of the evening, being the third of the series on the collodio-bromide process, was then read by Mr. John Henderson, the subject being *The Preparation of the Plates*. [See page 206.]

The CHAIRMAN said that Mr. Henderson's experiments confirmed the opinion of many photographers, that it was necessary to use a preserva-tive of a nature that, when dry, would keep the film from contracting.

Mr. WILSON stated that in coating large plates it was advisable, in order to avoid mottling, to use an excess of alcohol in the collodion.

A vote of thanks was passed to Mr. Henderson.

Mr. Charles Brown was elected a member of the Association.

The CHAIRMAN said Messrs. Robinson and Cherrill had kindly pro-mised to take, during the summer, an instantaneous photograph of a *Sunset at Sea*, of the large size of 22×15 inches, with the special object of presenting a print to the Liverpool Amateur Photographic Associa-tion, to be awarded, in November next, as a prize for the best instan-taneous photograph of a size not less than forty square inches, taken by a member of the Association.

A vote of thanks was given to Messrs. Robinson and Cherrill for their kind offer.

It was agreed to have a photographic excursion to Gresford on Wednes-day, the 12th May.

This being the whole of the business, the members and visitors ad-journed to the Lecture Hall, where a large collection of photographs and other objects of interest was ready for inspection. There were upwards of three hundred prints exhibited, ranging from 24×18 to microscopic size. Many of these were very excellent specimens of the art, and some pictures of distant places and objects were particularly interesting. The following were the principal exhibitors:—

Mr. O. R. Green showed a large number of photographs, his own work; and some of Braun's fine carbon reproductions from the old masters, together with a selection from a variety of sources.——Mr. John Henderson also exhibited a large number of excellent photographs, chiefly of architecture and scenes taken by himself.——Mr. Atkins con-tributed Canadian hunting scenes and a revolving stereoscope.——Mr. Murray sent seven sheets of leaf and fern photographs, taken from paper negatives, produced directly from the leaves and plants them-selves. In the centre of some of the leaves portraits were printed.—— Mr. Hubback had a number of views, taken in the Yo Semité Valley, California.——There were also shown a selection by Mr. Guyton; two of bunches of grapes grown by Mr. Meredith, of Garston, photographed by command of the Queen, shown by Mr. Watling; and specimens of photo-crayons shown by Messrs. Robinson and Thompson.——Mr. Lewis Hughes showed a number of excellent photographs, and next exhibited a number of lantern transparencies by the aid of the oxy-hydrogen light. The most notable of these were some beautiful photo-graphs of diatoms by Dr. Maddox and others, one of the celebrated southern telescope constructed by Mr. Grubb, of Dublin, a picture of the moon taken originally by its aid, and another of the moon by Mr. Warren De la Rue.

The proceedings closed with a vote of thanks to Mr. Hughes.

BRISTOL PHOTOGRAPHIC SOCIETY.

A MEETING of photographers was held at the Philosophical Institution, Park-street, on Thursday evening, the 22nd inst., under the presidency of Mr. Dunmore, of Chepstow, when officers were appointed for the above Society.

The Lord Bishop of Gloucester and Bristol, who, having been applied to to accept the presidency of the Society, had returned an encouraging reply, was unanimously chosen President, subject to his lordship's acceptance of the post. Dr. Brittan, Dr. Budd, Mr. Ennel, and Mr. J. Beattie were elected Vice-Presidents; Mr. W. H. Barton, Secretary; and Dr. Willet, and Messrs. Phillips, Miles, Clarke, Willcox, Bark, Midwinter, and Dunmore, a Committee for the ensuing year.

A code of rules was adopted in accordance with those which govern the proceedings of the North London Photographic Association.

The Society, which starts with between thirty and forty members, will hold its meetings on the fourth Thursday in every month. On the fourth Thursday in May Mr. Dunmore will exhibit, by means of the lime light, a series of transparent photographic views. Several members have already promised to read papers on subsequent monthly meeting nights.

Correspondence.

Foreign.

Paris, April 26, 1869.

I CANNOT leave the *Annuaire Photographique* of M. Davanne without further remarks upon some of its more interesting contents. My last letter will have afforded a little idea of the portion of this work devoted to the theory of photography. In this communication I propose to review some of the more practical indications of the author.

There is a section devoted to the consideration of the possibility of utilising phosphorescent compounds in photography, and an article from THE BRITISH JOURNAL OF PHOTOGRAPHY is quoted as an authority on the subject. M. Davanne suggests the use of M. Poitevin's process with tartaric acid and perchloride of iron, as a means of employing phosphorescent powders for producing luminous photographs. It is well known that when a mixture of these two solutions is spread upon a well-dried sheet of glass, and exposed under a transparent positive, the parts acted upon by light become hygrometric, and the picture may be developed by dusting a powder over the surface. By employing a phosphorescent powder the developed picture will be luminous after exposure to light, and will remain so for a long time. If it be desired to produce a picture from a negative, a mixture of bichromate of potash and gum, with sugar and honey, may be used. The duration of these luminous images depends upon the length of time required for the decomposition of the sulphurets of which the phosphorescent bodies are composed, and although these pictures will not be so lasting as ordinary photographs, they will last long enough for the purposes for which they are required—curiosity and amusement. I think that if some enterprising person were to take up the matter of luminous photographs he would reap a good harvest. These pictures can be shown in all their beauty in the evenings by exposing them to the light of burning magnesium, and then taking them into a darkened place. The little "fluoroscope" had a certain amount of success last season, and the "traps to catch sunbeams" still more, but I think phosphorographs, or luminous photographs, would take even better. Should your readers wish for information on the preparation of phosphorescent powders, it will give me great pleasure to bring the complete practical researches of M. Ed. Becquerel before their notice.

The late discussion upon the relative values of English and French photographic lenses is referred to by M. Davanne, and he says that three English periodicals have edified the French by showing them how certain English houses make their best "first choice" English photographic lenses. This method, he says, "consists in obtaining unmounted lenses from France, at rather a low price; these are compared with a standard lens of a good house, and all which bear the comparison are put in an English mounting, with the name of the English maker, and are sold at double, or more, their real value." He asks—"Why do not our (French) makers make the choice themselves? Why are they not a little more strict before putting their names upon the apparatus which leaves their workshops—a little more careful of their workmanship in general? Why do they not try to produce those new combinations which could better solve the questions of rapidity, amplitude, and delicacy which are required by the more and more perfected photographic processes? And so, instead of bringing very costly apparatus from England or Germany, let us find in France excellent instruments on more advantageous terms." Thus the reputation of the French makers would affirm itself, "and it would not be judged necessary any longer to change the nationality of those lenses which we export."

As the warm weather is coming on, the repetition of M. Davanne's recommendation as to the ventilation of dark rooms will not be out of place, and its adoption will be found practically useful and sanitary. The dark room should be ventilated by two openings—one high up, the other low down—and arranged so that the air can circulate freely without letting in the light. M. Davanne uses this plan in a very little dark room, and he can work there without being sensible of any inconvenience. "If I reiterate my opinions upon this subject," says the author, "it is because there is reason to believe that the prolonged inhalation of the vapours of ether has an influence upon the brain, and leads, in consequence, to grave disorders of the health." Let photographers look to this point. Many of them are not in good health, and scarcely know why. The proper ventilation of their operating rooms might restore vigour to themselves; it would at any rate be worth the trial, and would do no harm.

A few words on photographic "quack" preparations, which stand in the same relation to photographers as "quack" or proprietary medicines do to the general public. "It would be very desirable," remarks M. Davanne, "for the photographer to accustom himself to distinguish that which is called a genuine *chemical product* from those complex mixtures, almost always amorphous, which can offer neither guarantee nor control, and on which the maker most frequently lavishes the terms of 'salt of' or 'new chemical product.' We do not mean to say that it is never advantageous to use certain mixtures, but we do affirm that the photographer himself should prepare them; and all secret compounds appear to us to be made much less for the advantage of the operator than for that of the vendor, who generally gives his own name to his merchandise, and thus announces to those interested that his mixture has nothing to do with chemical nomenclature." With reference to the "so-called economical mixtures" to substitute for nitrate of silver, M. Davanne believes there is only an illusive benefit in their use, and very often nothing but deceptions. M. Davanne, therefore, refuses to notice all substances of this sort which have come under the observation of photographers since the last *Annuaire*. The dangerous products used in photography are brought before our notice, but I do not find much which would be new to your readers.

If ammonia be added to a solution of chloride of gold, a precipitate of fulminating gold will be formed, which often explodes by simple friction. Detonating silver *may* be formed in precipitating an *ammoniacal* solution of nitrate of silver by caustic potash in order to obtain the silver in the state of oxide; or there is a chance of making it by dissolving oxide of silver directly in ammonia. The immense power of this detonating compound is shown by the fact that a piece the size of a grain of millet seed has been sufficient to break the foot of the test glass containing it. If to a solution of free iodine a quantity of ammonia be added, the terrible iodide of nitrogen is formed, which explodes with the touch of a feather. Every year M. Davanne enters his protest against the use of cyanide of potassium in photography, which can be replaced to advantage in every way by other substances. To clean the hands stained by pyrogallic or gallic acid developments it is useless, for it has no decolorising power over the bistre tint resulting from the colouring matter produced by the action of oxygen upon these acids on the skin, whereas free iodine acts upon this vegetable colouring matter, bleaching it like chlorine, and the iodide of potassium, in which the iodine should be dissolved to make a skin-cleaning solution, will remove the stains produced by the reduced silver.

Upon the question of soluble cotton, which is engaging attention at present, M. Davanne refers to some researches of M. Schunck, of Manchester, who has shown that cotton only contains ninety-five per cent of pure cellulose, the other five per cent. being matter soluble in carbonate of soda, and of which one-third may be precipitated from the alkaline solution by means of sulphuric acid. In this precipitate M. Schunck has found a substance analogous to vegetable wax, fusible at a temperature of 184°, a fatty acid similar to margaric acid, and fusible at 128°, colouring matters, pectic acid, and albumen. According to M. Schunck it is to these waxy and fatty matters that cotton owes its property of not being immediately moistened by water when immersed in it, and these substances may be one of the causes which render it difficult to prepare a pyroxyline always the same, and having all its fibres of the same degree of solubility. M. Davanne suggests for the preparation of a more regularly soluble cotton the use of old white linen, pure paper, or even an alkaline washing of the carded cotton, which in this case must be well rinsed in pure water before being subjected to the action of the acids. In the advertisements I notice that chloride of platinum is offered to photographers for producing rich tones with economy of time and money. It is recommended to be mixed with two parts of chloride of gold, and employed in the same way as this salt. The lowest price at which nitrate of silver is advertised is between 3s. 6d. and 3s. 7d. per ounce avoirdupois, and its purity is guaranteed. There are three kinds of chloride of gold offered—the pure brown chloride, the yellow, and the double salt; and the prices are for fifteen and a-half grains (one gramme), 1s. 9d., 1s. 8½d., and 1s. 8d., bottles being extra.

I must conclude this letter by referring to a communication I have just received from MM. Schaeffner and Mohr, relative to their carbonate of silver paper. They now recommend that the paper itself shall be fumigated in the ammonia box, and that the bibulous paper impregnated with these vapours be done away with. The advantage is found in the rapidity of printing being doubled; and the only extra precaution to be taken is to place a sheet of parchment, waxed, or some impervious paper at the back of the fumigated sheet, in order to "keep in" the ammoniacal vapours.

MM. Rohaut and Hutinet, the successors of M. Ch. Dauvois, wish me to call attention to their new "*cartes* satin." I have some in my possession, and they are very beautiful, the backs of the cards having the appearance of rich moire antique of various tints. One would have supposed that no novelty was needed so soon after the "*carte plinthéole;*" but whenever I call upon these enterprising manufacturers they always have something new to show me, or have something "better than ever" in preparation. Their English trade stimulates them to exertion, and so let English photographers always seek after new things.

R. J. FOWLER.

Home.

TONING AND FIXING.

To the Editors.

Gentlemen,—From your article in last number I was induced to procure some of Obernetter's sensitive paper, and find that, after being in my possession for at least four days, it still retains its purity. I presume the sensitive surface or film is an emulsion of chloride of silver and collodion; but whatever the nature of the surface may be, I have an observation to make on its toning, which, from all that I have read, appears to be somewhat unsatisfactory, if it be not difficult.

About three years ago I had a supply of the various requisites for practising printing by the Wothlytype process, and, if you remember, the toning and fixing were effected by one solution—gold and hyposulphite of soda, I suppose. Now we cannot overlook the fact that the toning of Wothlytypes by such a solution is, at least, partly due to sulphur; but from the fact that they are produced on collodion instead of albumen is presumably due the fact that they are unchanged. At any rate, whether the Wothlytype pictures are *on* the collodion, *in* it, or under it, some prints I produced by the process named, and washed only for ten minutes, are in a *far better state of preservation* than four or five which were taken by a London photographer whose name is known almost wherever the art has penetrated.

To be brief: I toned some Obernetter prints in my three-year-old Wothlytype toning bath, and a richer and warmer tone I do not desire to have. I believe it consists merely of gold and hypo., and it may be theoretically as bad as that employed by Obernetter himself; but I shall be much mistaken if it do not produce as good and permanent prints as those obtained on albumenised paper with ordinary gold toning.

If prints toned in this way should fade, as is said to be the case, how comes it about that some plain paper prints which I took in 1856, and toned with gold and hypo. (one bath for both toning and fixing), have not yet shown symptoms of fading?—I am, yours, &c.,

April 26, 1869. Geo. Markham, M.D.

[After receiving the foregoing communication we lost no time in looking up our old stores, among which we fortunately found one of the bottles of fixing and toning solution for Wothlytypes, sold ready for use by the late United Association of Photography. It certainly tones the prints very nicely, the tone being a rich and warm brown. By adding a few drops of a solution of chloride of gold and tin, as described in our Almanac by Mr. Henderson, the prints took a deep purple tone. Desirous of knowing the composition of the solution, we applied to Lieut.-Colonel Stuart Wortley, the chairman of the company alluded to, and he has kindly favoured us with the following:—

"*Rosslyn House, Grove End Road, April* 27, 1869.

"Dear Sir,—The composition of Wothlytype toning and fixing bath is—1. Dissolve one drachm of chloride of gold in sixty-four ounces of water. 2. Dissolve one pound of hyposulphite of soda in forty-eight ounces of water. Pour 1 into 2, shaking 2 all the time.—Faithfully yours, "H. Stuart Wortley."

—Eds.]

To the Editors.

Gentlemen,—I think you will be pleased to hear that the admirable paper of Obernetter tones very well with the chloride of calcium bath, as recommended by Heisch. You must, however, print rather deeper and tone rather more than when employing the sulphocyanide of ammonium, as recommended by Herr Obernetter.—I am, yours, &c.,

April 28, 1869. Clericus.

A PAPER QUERY.

To the Editors.

Gentlemen,—I wish to find a rougher surface than ordinary albumenised paper on which to print studies of large heads, &c. In all books I have consulted I can find no simple formula for preparing such that a beginner can easily understand and carry out. The information I want is—What is the *best* description of paper for the purpose? adding a simple form of preparing it for sensitising, and any additional information as to dealing with it which is different from what is required with ordinary albumenised paper. If you can supply me with this in your next number you will greatly oblige,—Yours, &c., H. H.

April 27, 1869.

[Why not try plain salted paper?—Eds.]

SOLAR CONDENSERS.

To the Editors.

Gentlemen,—I should feel greatly obliged if you could inform me where I can get a condenser such as was mentioned and figured in No. 467, under the article on printing enlarged transparencies; also, about what the price ought to be, supposing it to be nine or ten inches in diameter.

I do not want it so much for enlargements as for illuminating *whole*-plate negatives by the lime light, so as to make reduced transparencies for the lantern. I have not time during the day, so am obliged to use artificial light.

I may say that I have made transparencies from quarter-plate negatives, using a common reading-glass as condenser; for lens I employed a portrait combination, and I found it would work *quite sharp* without any stop. Now, if I have to copy the same negative, using magnesium ribbon with a piece of ground glass interposed, though the result is pretty good, there is not near the sharpness at the margin, unless a very small stop be used. If you can give me an explanation of the above, it will much oblige,—Yours, &c., Phantasmagoria.

Hendon Hill, Sunderland, April 27, 1869.

[We publish your letter in the hope that some of our readers will be able to supply the desired information about the large condenser. Respecting the experience in enlarging with or without a condenser, as described in the latter part of the above letter—although at first sight it would appear to be almost inexplicable, yet it is, in reality, easily accounted for, the optical conditions being different. To explain it lucidly, we should require to have a diagram engraved, for which there is now no time. This we shall do on a future occasion.—Eds.]

VARIOUS QUERIES.

To the Editors.

Gentlemen,—I would deem it a very great favour if you would kindly answer the following in your next, and oblige,—Yours, &c.,

Plymouth, April 26, 1869. Amateur.

1. I have enlarged several transparencies, trying to imitate the Sarony pictures, but have failed on this point:—When I come to place the transparency on the tinted paper all appears dark—at least, no picture can be seen. To look at the transparency in the usual way, all looks well. Where do I fail?

Answer.—You doubtless allow the picture to be so much fogged that there is no part of it free from silver.

2. Can I enlarge on opal glass, also on talc, in the same way as I would for a transparency?

Answer.—Yes.

3. Is a triplet lens by Vogel a good one for views, such as *streets, sea pieces*, &c.? If not, what sort of one would you recommend?

Answer.—We are not acquainted with the lenses of this maker. We prefer the lenses of our home makers to those of foreign manufacture.

4. In making an enlarged negative from a transparency, should the transparency be enlarged to the size that the negative is to be?

Answer.—You may make an enlarged negative of any size from a small transparency. In this case you must use either a copying camera or a magic lantern.

ENLARGED TRANSPARENCIES.

To the Editors.

Gentlemen,—I was much interested in your article on the production of Sarony's pictures. I suppose an ordinary camera, with a proper piece of wood with springs to hold the negative, would answer well, the lime light being used from a lantern with a three and a-half inches condenser to concentrate the light.

As an amateur I have no proper studio for portrait work, so I am almost without *portrait* lenses. The only proper portrait combinations I have are Dallmeyer's 3D ten inches focus and a three and a-half inches double stereo. combination. Would either of these lenses be suitable for producing enlarged transparencies? I have many doublets, triplets, &c. Is a *light blue* cloth background the best for vignettes, where the print is required to show nothing but the portrait—I mean without sign of a background?—I am, yours, &c., Oxoniensis.

[An ordinary camera will answer quite well for producing enlarged transparencies; but in employing the lime light with the condensers, as suggested, it is imperative that the condensers be close to the negative. Either of the portrait lenses mentioned will answer, but we should prefer the one with the shorter focus as being more convenient. The light blue background will answer quite well for the purpose described.—Eds.]

Canadian Indians.—We have to thank Mr. Stark for *carte* photographs of some as wild-looking and, we may add, as "wide-awake" looking Indians as ever presented themselves to the gaze of the camera. They are from the vicinity of Slantford, Ontario, and the photographs are by Messrs. Willis & Bryant, of Woodstock. One young squaw is really a pretty girl; but, if there is any truth in physiognomy, she "has got a sweet temper of her own."

EXCHANGE COLUMN.

A Ross's orthographic lens, for views and groups up to 12 × 10 inches; a whole-plate lens, by Lerebours and Secretan, with superior Spanish mahogany camera with sliding-back for two cabinet pictures on 9 × 7 plate; large baths and printing frames up to 17 × 14; will be exchanged for a 2B Dallmeyer's No. 3 triplet, or other good apparatus for portraits, or groups.—Address, R. M. Small, 45, Stanhope-street, London, N.W.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photograph Registered During the Past Week.—

W. H. Oxley, Batley, Yorkshire.—*View of Liversedge Church, Yorkshire, from a Drawing by Miss E. Lawford.*

☞ *Correspondents should never write on both sides of the paper.*

J. N. M.—Add some dried and powdered carbonate of potash, and shake well up. The water present in the spirit dissolves a portion of the salt, which will be seen floating at the bottom as a denser fluid.

Amateur Mechanic.—Sealing-wax such as that which you enclosed would answer quite well for cementing together two pieces of glass. Your failure has arisen from your not having heated the glass sufficiently previous to applying the wax.

"April 21st."—The cause of the cloudiness was the precipitation of some oxide of cadmium by the caustic potash Even in the absence of cadmium you will get a "cloudiness." Filtration through a plug of cotton will remove much of the turbidity.

An Aspirant. B. J. C.—Your prints have been so very imperfectly washed that we can taste the hyposulphite of soda still remaining. The fixing solution has also been too weak. The toning is good, but both the fixing and the washing have been done very imperfectly.

J. Valliard.—We should have had much pleasure in inserting your communication but for two reasons:—First, it is evidently intended to puff the goods of a manufacturer whose name is almost unknown in this country; and, secondly, it does not otherwise convey a single scrap of information calculated to be useful to our readers.

Stereo.—Instead of coating only the margin of the plate with a substratum, it would be better to coat the whole surface. There is no danger whatever of the film slipping, or getting damaged, if even so weak a substratum as one part of albumen to twenty parts of water be employed. From your point of view 12 × 14 is a large size; but after a little practice you will come to manipulate them quite as easily as you now do your stereoscopic sizes.

Charles Brown.—We could not, without much more minute inquiry than we have time to bestow upon the subject, inform you of the exact date when the acetate of soda toning bath was first introduced; but, if it will in any way aid you and your friend in settling your wager, we may inform you that in our commonplace book of jottings we find the following memorandum:—"Acetate toning—Abbe Laborde.—1860." A search through the photographic journals of that year would, therefore, probably enable you to decide the question.

A Constant Reader.—The subject would form material for a patent, which would be quite valid; but to some extent it would prove a waste of money to patent it, for under no circumstances could you ever realise sufficient pecuniary remuneration to defray the expenses of the patent. If your object in proposing to adopt such a step be to secure your position as the first inventor, that may be readily and more cheaply accomplished by publishing the invention in our pages, or making it the subject of a communication to one of the photographic societies.

C. V. S.—We have seen a three-wheeled velocipede, the price of which was three pounds. It was constructed of iron, and appeared to be well adapted for photographic purposes. There was no difficulty at all experienced in driving it; for, having obtained permission to try it, after a preliminary experience of about a minute we were enabled to start off, on a level road, at a more rapid pace than we should like to have to accomplish on foot during the present sultry weather. Although the velocipede tried was quite effective, we should, all things considered, prefer paying a higher price for one that was better finished.

A Hull Correspondent suggests that it would confer additional value on our pages if we were to try carefully and report upon all the processes, suggestions, and formulæ which are contributed to our columns. Of all the suggestions that we have ever yet received this is the most perfect example we have yet seen of writing without reflection. Would our correspondent like to be one of a committee of twenty to whom was delegated such a task? In one communication alone there sometimes occur suggestive matters sufficient to keep one experimenting for a week before being in a position to "report" upon it.

Young Astro.—Without doubt you can obtain photographs of the fixed stars, but they would be of no use to you otherwise than to indicate their relative positions. You cannot seriously imagine that by some kind of photo-telescopic legerdemain a fixed star could be expanded until it showed a disc like our moon, or even like one of the planets of our system. If this be not your meaning, what is implied in your query respecting the utmost limit to which a collodion picture will stand enlarging? Photography may be very useful in recording the positions of the stars, but not in any other way at present. Secure a collodion and bath which are absolutely free from pinholes, otherwise you may find your negative deficient in some of the subjects which probably you might expect to be present.

J. H. S. (Houston, Texas).—Communication received. Thanks. We are glad to hear that in your far-off home you still desire to "become acquainted with the progress which is almost daily being developed in connection with artistic and scientific photography." We trust that, by means of this Journal, you may long hold "converse by silent sympathy of thought" with the earnest workers in our photographic field.

Medicus.—There is not much in your letter which calls for special comment except your concluding statement, in which you "suppose that the position of the stop is not a matter of any great importance." Take your landscape lens, and, with the stop in the position in which it was placed by the maker, take a picture. Now, removing entirely the front containing the stop, place close up against the lens a stop made either of cardboard or metal, but precisely the same size as that previously employed. Now take another picture and compare the two. Both will be equally sharp in the centre, but in the one last taken the sharpness will be restricted to a small area in the centre, while the other will be sharp all over. This experiment will also enable you to answer your own question:—"Seeing that a small aperture is always employed with a landscape lens, why not at once use a small lens without a stop? Would it not come to the same thing?" If you do not care to try the experiment, you may deduce the answer from what we have said above.

Novel Action.—A citizen of New York has, it is said, entered an action against a "spiritual" photographer, of the same city, who took or supplied portraits of the gentleman's wife and daughter, both deceased, the action being for obtaining money under false pretences.

New Collodion.—Messrs. Samuel Fry & Co. have sent us sample bottles of their collodion and varnish, with a request that we should give them a fair trial. We have tried the collodion both in the wet and dry processes; in the latter case the processes employed being the Ryley collodio-albumen and the coffee, both of them being practised in the manner described in our Almanac. From these trials we find that the collodion is well adapted for both wet and dry processes. We can also speak in highly favourable terms of the varnish, which dries very hard and brilliant.

"Pensive Thoughts."—At the last Photographic Exhibition in Conduit-street, there were no pictures more generally admired than those contributed by Mr. Hubbard, of Oxford-street. Of these, a portrait of a girl sitting at a window was, in our estimation, the most attractive for all those qualities which go to form a picture of high merit. We have to thank Mr. Hubbard for sending us a copy of this picture (entitled *Pensive Thoughts*), and, from having thus an opportunity of examining it more perfectly than we could while it hung on the walls of the Exhibition, we find that, in matters of technical detail as well as in general effect, it bears the closest inspection. It is only of a small size (half-plate) but it is a veritable gem. It is, we understand, printed from three negatives.

Sun Spots.—A correspondent of a contemporary writes:—"There are at present two clusters of large spots passing towards the western limb of the sun. The largest consists of three spots. The diameter of this group, inclusive of the deep dark penumbra, which makes the whole appear almost as if it were one large spot, is at least three times the diameter of our globe. The two large spots are jagged round the edges, and of no regular form. They appeared this morning (April 16th) just as if some tremendous convulsion in the body of the sun at that part had thrown the incandescent envelope aside in all directions. The other group, about some 24,000 miles distant from the former, consists of four smaller well-defined spots. These two groups will in a few days become smaller in appearance as they pass off on the western side. Another spot has within these two days come in sight on the eastern limb, and if it continues will, of course, appear larger as it approaches the centre of the luminary."

METEOROLOGICAL REPORT,

For the Week ending April 28th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

April 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
22	30·12	65	43	50	55	SW	—	Fine
23	30 12	60	50	53	57	WNW	0·52	Dull
24	30·08	—	49	50	53	NNE	—	Dull
26	30·33	62	45	50	56	NE	—	Fine
27	30 19	69	46	53	58	NE	—	Fine
28	30 23	—	48	55	62	ENE	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 470. Vol. XVI.—MAY 7, 1869.

READY SENSITISED PHOTOGRAPHIC PAPER.

Three varieties of silvered printing paper are now before the photographic public—two of them being ready sensitised, and the third capable of being rendered sensitive by a very simple treatment. One of the two first is the Obernetter paper, which we referred to more particularly a few weeks ago. This paper, as we have already stated, is not only very sensitive to the action of light, but it is also capable of reproducing the most minute details of the negative, probably in consequence of the fact that the sensitive layer of chloride of silver is retained as much as possible on the surface in a fine film of collodion. This paper possesses an additional advantage over the ordinary sensitised albumenised paper, inasmuch as it can receive an image which may be easily developed, thus greatly shortening the time required for printing even in very dull weather. This is an advantage, however, which is less likely to be appreciated during the bright spring and summer time than it would be in the dark, short days of winter.

The next claimant for public favour is the Carrier paper, which certainly yields excellent results, as we can testify from our own experience. Moreover, it keeps without discolouration for a very considerable time, as we have had some of it in our possession for nearly four months without its having exhibited any material tendency to change; and that its sensibility has not varied is proved by the fact that we, a few days ago, printed upon the paper with the same facility that we did when the sample first came into our possession.

Again: we have the carbonate of silver paper of MM. Schaeffner and Mohr, which, since the beginning of the present year, has attracted so much attention. This paper has the disadvantage of requiring a certain amount of preparation before it is sufficiently sensitive to the action of light to be used in printing. Formerly it was necessary to saturate with ammonia the pads placed behind the paper in the pressure-frames; but now Mr. Fowler informs us that the paper is simply fumed by the inventors with ammonia in an ordinary fuming box prior to employing the paper for printing purposes. In either case, however, the necessity for special treatment prior to exposure necessarily places this paper somewhat at a disadvantage, when it is compared with its two rivals already referred to; although its high sensitiveness when fumed, its good keeping qualities, and convenience of preparation place it greatly in advance of ordinary albumenised paper. Apart from the practical advantages which this paper enables us to obtain, we have the fact that the principle of its action is wholly new to photographic science, and this is a recommendation which we cannot easily overlook in the existing condition of photography. Let us hope, then, that the carbonate of silver paper may not be left in unmerited obscurity, but that it may receive a fair share of attention from the numerous able experimentalists throughout this country who purpose devoting much time during the ensuing summer to the practice of the "black art."

While upon this subject we cannot forbear offering a suggestion here, which, we have some reason to think, may turn out to be of value in connection with the interesting process of MM. Schaeffner and Mohr. We have often heard it objected that the carbonate of silver paper is never likely to be much used by the professional photographer, owing to the pungent fumes of ammonia with which the atmosphere of the operating room would quickly become charged. This, certainly, is a reasonable objection, since the frequent inhalation of ammoniacal gas would be very likely to, at least, predispose the operator to unpleasant catarrhal and bronchial affections. It would, therefore, be a point of great importance to discover a material which, though itself inodorous, would readily afford the requisite ammonia to the carbonate of silver during exposure.

This problem does not seem to be so very difficult as would, at first sight, appear. A substance called *urea* is excreted by the kidneys to the extent of about one ounce and a-quarter per diem by each adult person. This urea, when in the presence of water, possesses the singular property of affording, by decomposition, *carbonate of ammonia*. This change is expressed in symbols in the following way:—

$$\underbrace{C_2\ O_2\ H_4\ N_2}_{\textit{Urea.}} + 4\ HO = \underbrace{2\ (N\ H_4\ O,\ C\ O_2)}_{\textit{Carbonate of ammonia.}}$$

Here, then, we have a substance which can be very easily and economically prepared, and which is inodorous, very soluble, and easily affords the substance we require to render our carbonate of silver sensitive to light.

AN ACCIDENT TO A BATH.

A friend of ours met with a singular difficulty, a few days ago, in the treatment of a very acid nitrate of silver bath, and, since the cause of his trouble and its effects are seldom met with, we will state the matter now, as it may interest such of our readers as like to make notes of variations in photographic chemicals.

A sample of bichromate of soda was purchased, and some of this dissolved in water and the solution added to the bath cautiously. The acid was soon neutralised, but a white turbidity was noticed; and as this was supposed to be carbonate of silver, the bath was very feebly acidified and then filtered. After a short time fine crystals were observed floating about in the solution and in part deposited on the side of the bottle. The bath also exhibited a tendency to deposit silver, owing to some reducing action having taken place in the liquid. It is scarcely necessary to say that these pinhole and stain-producing substances were removed by filtration, but the cause of their production was a mystery.

An analysis of the bicarbonate of soda used was now made, and it was found that the salt which was supposed pure in reality contained some *Rochelle salt*—the double tartrate of soda and potash. The crystals produced in the bath were, therefore, tartrate of silver, and the tendency to reduction was the consequence of the presence of tartaric acid in the silver solution. It is quite obvious that the Rochelle salt was an accidental contamination, and it is quite easy to understand how it may get mixed up with bicarbonate of soda in an ordinary druggist's establishment.

When the Rochelle salt is powdered, it very closely resembles bicarbonate of soda in appearance; and, as the two salts are largely employed conjointly, in the preparation of the well-known "Seidlitz powders," sold in every druggist's shop—as the mixture of the

powdered Rochelle salt and the bicarbonate for these powders is usually made by a junior assistant—it is very easy to understand how the bicarbonate may become contaminated with the tartrate, if we recollect that assistants are not likely to be very particular as to the cleanliness of the scoop used to remove the requisite quantities of either substance from its drawer or box.

Perhaps the solution of the mystery attending the appearance of pinholes, arising from the presence of minute crystals in the bath in this instance, may also throw light on other obscure cases of this annoying photographic disease.

MR. JOHNSON'S CARBON PROCESS.

I HAVE been looking with interest for the promised new carbon process of Mr. Johnson; therefore when it reached me in the last number of this Journal, I was somewhat surprised to find it a modification of one of my own. In fact, all the essential part is taken from mine—all the portion that is claimed as novel; and his method differs from mine only by adding to it a feature that is also not new, but derived from Mr. Swan's, viz., the exposing of the tissue before attaching it to the support.

Mr. Johnson especially claims as new the discovery of the fact that the "tissue," when moderately wet, may be easily made to attach itself to glass, and that, without the use of presses, &c., it will adhere sufficiently to the glass to admit of development. If your readers will turn to page 181 of your volume for 1868, April 17, a full year since, they will find that I attached my tissue to the glass in precisely the same way, and used it as a support for development. What is more is the following:—A difficulty presents itself in getting the wet tissue into contact with the glass without the introduction of air-bubbles. I found a mode of accomplishing this by slipping the glass under the tissue whilst the latter was still in the liquid, and this method Mr. Johnson also adopts.

The solitary difference, then, is that Mr. Johnson exposes the tissue before, instead of after, attaching it to the glass. This feature, however, belongs to a great many other carbon processes, and cannot, in any sense of the word, be considered as novel.

I think I have reason to complain of this adoption of my ideas without acknowledgment; and I cannot think that a patent based upon them will stand. In fact, at the commencement of my remarks, I said that I had known this method then for nearly a year, and desired to make it public *before some one else patented the ideas.* I suppose that a new combination of known methods for a new end may be patentable, but hardly a combination of ideas all originating with others, and for an idea not new, but very familiar.

It will be observed that I am here speaking as to the essential steps in the process, and not as to incidental ones, such as modifications of the mode of transferring. These are very secondary in importance. M. CAREY LEA.

TRANSLUCENT PAPER, AND SOME OF ITS USES.

TRANSPARENT films may be made very useful to the photographer. The subject was brought before a certain portion of the photographic public a few years ago by Mr. Blair, of Perth, who, finding that he had got hold of a good idea, with a friendly persistency (for he had nothing pecuniarily to gain by it) tried earnestly to press it on a somewhat limited constituency.

When we observed, three years ago, the articles of Mr. Blair in the now extinct *Photographic Notes*, we believed that the rendering of paper translucent (if not transparent) was an idea which might be most profitably utilised; and, in order to ascertain how far this was the case, we set about preparing some of the paper in question. Let us here request the reader to accompany us in the following practical observations on the preparation of this paper, after which we shall, as the old divines used to say, "proceed to apply the subject."

If a very thin and homogeneous paper be obtained, and be wetted on both sides with benzole, it becomes highly transparent, the transparence, however, being very evanescent. The transparence, while it lasts, is such as to enable any picture, engraving, writing, or similar matter placed in near contact, to be plainly visible through the translucent body. The object, then, was to obtain a highly-translucent paper which should be *permanently* so. Here Mr. Blair steps in with his experiments.

After repeated trials of various substances—especially with oil of almonds—Mr. Blair finally adopted copal varnish as the best substance for impregnating the paper. Copal varnish, then, is diluted with turpentine. To apply this to the proper kind of paper—the very thin wove letter paper commonly sold for foreign correspondence—it ought to be stretched upon a frame, and a plate of iron or other metal having been made so warm that it can only be touched with much discomfort, the paper is brought into contact with it, and a broad brush charged with the diluted varnish is carried evenly over it with an uniform sweep. As soon as one side has been varnished the second side is similarly treated before placing the paper aside to cool and dry.

In Mr. Blair's experiments he says nothing about the sizing of the paper and the influence it exercises in the securing of a good body of varnish in the paper. In several of our own experiments we took the precaution to remove the size before applying the diluted copal varnish. This we did by immersing the paper for a few seconds in a bath of hydrochloric acid, which at once converts a well-sized paper into a bibulous sample. Of course it was thoroughly washed in plain water before being dried and charged with the varnish.

In applying the varnish see that the paper be thoroughly dry before laying it on. From the rapidity with which the varnish sets some care and skill are requisite in applying it. Mr. Blair at first thought that a week would be sufficient for it to acquire the requisite degree of dryness for subsequent successful operations; but, as we ourselves also have ascertained, he has since found that it ought not to be used when new, and that it becomes improved by age.

In a letter received from Mr. Blair during the present week, he says:—"I think, however, that for any photographic operation—except, perhaps, mere transfer—it is better to be old and bone dry. I find that it takes the varnish a long time to dry thoroughly. I think that some of my original experiments failed from the paper being too new. By the way, I have lately ascertained that copal is sometimes dissolved in spirits, and is an article of commerce in that state, but I have never seen it. I have got a little copal gum, which I am to try and dissolve in this way. Spirit should be more harmless in the paper than turpentine for photographic chemicals, and if it produce the same amount of transparency should be preferable in other respects."

Respecting the use of this substance Mr. Blair, as one of the "fathers" of carbon printing, naturally inclines to this application of it. We, however, have been hitherto looking at it as a substitute for glass in the collodion process, whether wet or dry, but more especially the latter. Collodion takes kindly to such a pellicle, and there is really no difficulty in making it form a good substitute for glass when thus used, all that is necessary being the careful immersion of it in the nitrate of silver bath and its subsequent washing and preserving. We have only made one trial of it in connection with the collodio-bromide process, and the result is such as to warrant us in predicting this as a highly excellent process to use with it.

When a negative has been taken and developed on a glass plate, the film can be readily transferred to the translucent paper by a variety of means. We have present, close at hand, a negative which was transferred from the glass to the paper by means at once simple and effective. The paper (a sample obtained from Mr. Blair) was first moistened with ox-gall, and then coated with a varnish of gelatine which contained a minute quantity of sugar. After it had become quite dry, it was immersed in water for about a minute and carefully plastered down upon the negative, which was also previously dried, and again wetted with water. After a sufficient time had been allowed for drying, the collodion film, which was now attached to the paper, was removed from the glass. At one place it seemed reluctant to leave the glass, but a few drops of water having been allowed to fall and spread between the glass and the partially removed collodion film, no further difficulty was experienced.

Mr. Blair's directions for effecting the removal of the film are somewhat different and more detailed, although the same in principle. He says:—"We cannot have a finer or cleaner medium on which to *take* a negative than glass; but we may have various reasons for wishing it transferred to transparent paper. In that case the collodion, when the negative is finished, should be allowed to dry, but should not be varnished. A bit of the transparent paper, cut to a size rather smaller than the glass, should be steeped in water for about half-an-hour, as it will be found to swell and extend a little under the influence of moisture. It should then be pressed between blotting-paper, so as to absorb the surface moisture; but before it has time to dry and again contract, pour a quantity of warm gelatine on the collodion, spread it gently but quickly with a slip of blotting-paper, and, while still fluid, lay on the paper, beginning at one end and gradually lowering it towards the other (it is not difficult to avoid air bubbles, at least with small plates); then keep the paper in its place by the thumb at one corner, and pour

back the surplus gelatine at the opposite corner into the bottle. Should the gelatine thicken before the process is finished, hold it near the fire and it will flow. Blotting-paper also may be laid above, and a slight pressure used to expel any extra gelatine by the sides, so that the drying may be more rapid and regular. It is then set aside to dry; and it is better not to use artificial heat, as the imprisoned vapour might blister the paper. The drying may take twenty-four hours or so. When dry, risp the collodion at the edges of the glass, and steep in *cold* water. The water will soon find its way between the collodion and the glass, and the negative can then be lifted from the glass with the paper. The gelatine again drying will make it hold firmly to the paper; but it may be varnished outside, if thought necessary, by any pliable varnish. A negative so transferred, or taken directly on this paper, can be printed from either side."

At this stage we leave the translucent paper for this week, promising to return to the subject very shortly.

ON ALKALINE BICHROMATES:

Their Solubility, Density of their Solutions, and Means of Distinguishing Them.

Density.—In consequence of the importance of alkaline bichromate processes, and in order sometimes to facilitate the use of these reacting agents, I have thought it desirable to do with them as has already been done with regard to the principal products used in photography.

I have prepared tables showing the density of the bichromates of potash and of ammonia usually sold in the trade, at a mean temperature of fifteen degrees (Cent.), so that whatever solution be given, by means of the hydrometer or Baumé's areometer, the value of the solution may be immediately ascertained.

The table of density, for the one or the other bichromate, is formed into three columns. The first column indicates the quantity of bichromate dissolved in 100 parts of water at fifteen degrees. I have not gone beyond ten per cent., these solutions never being employed in a more concentrated proportion.

The second column indicates the degree marked by these solutions in the hydrometer. This degree is expressed in figures which give the weight of the cubic centimetre of the liquid in millegrammes. When the density of the liquid is shown on the tube of the instrument it is only necessary to read the same and see upon the table at what point this figure corresponds with the first column, which will show the value of the solution.

The third column is intended for persons who may not have, or cannot procure, a hydrometer, but who have an areometer of Baumé's. It indicates the points of correspondence between the two instruments. I should mention that the areometer is often too short in the stem for the number of degrees inscribed, and then it lacks the sensibility and precision necessary for the special case we have in view.

Table of Densities for the Solutions of Bichromate of Potash and Bichromate of Ammonia.

Bichromate of Potash.			Bichromate of Ammonia.		
To 100 Water.	Density.	Degrees Baumé.	To 100 Water.	Density.	Degrees Baumé.
1	1008	1·2	1	1006	0·9
1·5	1012	1·8	1·5	1008	1·2
1	1016	2·4	2	1010·5	1·6
2·5	1019·5	2·9	2·5	1013	1·9
3	1022·5	3·3	3	1015	2·2
3·5	1025·5	3·7	3·5	1017·5	2·5
4	1028	4	4	1020	3
4·5	1030	4·3	4·5	1023	3·3
5	1032·5	4·6	5	1026	3·7
6	1038·5	5·5	6	1030	4·4
7	1045	6·4	7	1035	5
8	1051	7·2	8	1040	5·8
9	1057	8	9	1045	6·4
10	1063	8·8	10	1050	7·1

Solubility.—The solubility of the bichromate of potash is that of ten parts to a hundred of water, at the temperature of 19° C. and ninety parts to one hundred of water at boiling heat. That of the bichromate of ammonia is as thirty-one parts to one hundred of water at the temperature of 15°, taking as the base of the experiment a hot supersaturated solution and cooled for twenty-four hours At boiling heat the solubility is much more considerable; and, at the first glance, it would be supposed that the bichromate of ammonia, like the nitrate of silver, became dissolved in any proportion. It happens, however, that beyond a certain stage the crystals do not dissolve even in boiling water; the point of saturation is then from 135 to 140 parts of bichromate of ammonia to 100 parts of water.

There remained another indication to be given. Although the bichromate of potash and bichromate of ammonia are sensibly different the one from the other as to colour and general appearance—the former being of a more decidedly clear orange tint than the latter, the colour of which approaches rather the brown—it might nevertheless be possible that the one should be mistaken for the other. In order to distinguish them, it is only necessary to expose them to the action of heat. The bichromate of potash *fuses* at a temperature before the sombre red colour is attained, and does not decompose except at an intense heat, whilst the bichromate of ammonia presents the peculiar phenomenon of taking fire and continuing to burn with deflagration, leaving a residue of green dust (sesquioxide of chromium), which presents the appearance of green tea. This residue treated with water will not give it any colouring if the bichromate of ammonia be chemically pure; but it generally gives a slightly yellow liquid, which becomes a bright yellow immediately that any appreciable quantity of bichromate of potash is added to it.

M. A. Davanne.

SPECIFIC GRAVITY BOTTLE.

To make a cheap and easily-found one-thousand-grain gravity bottle for amateurs, telling very near the mark:—

Collect together a few so-called two-ounce phials, the longer and narrower the neck the better. Take your graduated measuring glass and examine for one of the phials that will hold, at somewhere between the top and bottom of the neck, two and a-quarter ounces and sixteen drops, fluid measure of water. A third of about a dozen phials that I tried of three different makes were of this capacity.

Having found the bottle that you think will fit, put it into your weighing scale, and make a counterpoise weight of lead, brass, iron, or anything else. I prefer, for convenience, a pill box, containing some small bird shot or old tacks. Add to this counterpoise weight one thousand grains, fill up your bottle with water of about sixty degrees Fah., till it exactly balances the counterpoise weight and the one thousand grains. If the surface of the water stand at a convenient part of the neck of the bottle, mark the spot very exactly with the corner of a small file, and your instrument is complete.

If you mark well with your eye the relative positions of the top of your thousand grains of water and your file mark, you need never be more than two grains wrong in taking the specific gravity of any fluid from sulphuric ether to sulphuric acid.

To those who prefer a five-hundred-grain bottle to one of the double capacity, of course a one-ounce phial will be equally easy to manipulate.

Harry.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The anticipated advent of a sultry summer reminds me that I should mention one or two items for professional photographers which are suggestive of coolness and, therefore, comfort. One very hot summer's day, some time ago, I was in the studio of a photographer who showed me a cooling "dodge" to which he had resorted. His studio had a ridge roof, and right on the top of the ridge ran a piece of leaden tube about the thickness of a person's thumb, having two rows of holes which, when the water was turned on, allowed tiny streams of water to trickle over the roof, making the place seem, as it in reality felt, very cool and delightful. The tube, which was of that kind known in the gas-fitting trade as *composition* (a mixture of lead and tin), cost only sixpence per yard, and the holes were pierced in the sides by the photographer himself, by means of a darning needle fixed in a wooden handle. The whole thing, he said, had been completed by himself and his assistant one morning before breakfast time. It has other advantages besides that of preserving a cool temperature in sultry weather, one of which is that when the glass in the roof becomes dirty, instead of having to send a man up to clean it, he has merely to turn on the water in full force, by means of a stopcock, when the stream effectually washes away any dust and dirt which may obscure the glass.

In other photographic studios similar means of giving a cool and refreshing appearance are adopted. The London Stereoscopic Company's studio, in Regent-street, affords an example of the excel-

lent effects obtained by utilising ferns and miniature fountains. Mr. Samuel Fry, too, has erected a neat fountain in his studio, or rather at the entrance to it, the jet pipe of which was originally intended to answer as an argand gas burner, but which so well fulfils its new mission that, in my estimation, nothing could possibly answer better. Here is a hint worth adopting:—A few feet of composition gas pipe, a few ferns or other plants tastefully arranged, and a gas argand burner, and you have a delicious summer fountain, costing little, but worth much. I anticipate an objection which may be urged against the argand burner, in that the holes being pierced in an iron cap rust will ensue. They are now capped with a species of fine fireclay instead of metal, and, so far as water is concerned, they may be considered everlasting.

How far is it expedient or desirable that a velocipede should form part of the outfit of a peripatetic photographer? and which is the better kind of velocipede—the bycycle or the tricycle? For rapidity and grace in motion the former, or two-wheeler, evidently claims the first place, and if the traveller had no traps to carry there would be no question as to their respective advantages. A bycycle cannot stand independently, a three-wheeler can; a bycycle can turn a sharp corner, a tricycle cannot. Which of the two is the better adapted to the requirements of the photographer will be ascertained in due course. Mr. Swan, who may be considered an authority in this matter, put forward in your last ALMANAC a strong claim on behalf of the French or two-wheeled description. I should like to know if he has had reason to modify his opinions, and, if so, what he would now advise—if he has ever made a photographic excursion upon a velocipede, and with what result. In short, I want to have an answer to the question: Which is the better machine for the photographer—the bycycle or the tricycle?

The subject of patenting as *new* that which is really old has been so well treated by your correspondent, "A Provincial Patent Agent," that I have very little to add to what has been said. It really reflects discredit upon our patent system that any person whatever, no matter how old or effete the subject of his invention may be, can secure protection for it on the easy terms of a payment of a few pounds. There are many speculators who, when an invention is offered to them, never once think of inquiring whether the patent is valid or the invention really novel, but look at it solely as a means for successful speculation. A reform in our patent system that would prevent this would be a real reform.

The societies appear to be getting dull. At the London Photographic Society a subject was discussed which has no more relation to photography than gunpowder has. Surely some better subject than the explosive nature of gun-cotton could be got as the *pièce de résistance* at the last meeting of the Society named. The meeting of the North London Photographic Association was a little better, its proceedings comprising an exhibition of photographs by means of the lantern. Messrs. Pumphrey and Mr. Stuart deserve much commendation for the successful efforts they have made to cause this department of our art to stand out as one essentially English. At the meeting of the South London Photographic Society a discussion on density and sensitiveness in the collodion process took place. Mr. Blanchard, in opening the discussion, confined himself to the conditions of collodion and bath requisite for obtaining the greatest rapidity; and the members who spoke on the subject followed suit.

It is pleasing to observe the formation of a new Society in Bristol, seeing there are several men of note who reside in that quarter of the kingdom, including Mr. Mungo Ponton, whose name will "endure for aye" among photographers. "Depend upon it, sir," said an old friend to me upwards of eight years ago, "the action of bichromate of potash upon organic matter, induced by the action of light, will yet play a far more important part in photography than you, I, or any other person can now anticipate." So it has proved. All honour, then, to Mr. Mungo Ponton for his great discovery, which acts as a substratum for so many others. I do not happen to know whom the Bristol and Clifton photographers have made president, but it is *customary* in such cases to select a man of high social position, who can be "lugged" into a connection with art or science, in the hope that an illustrious name and a dignified position in life will be considered as more than an equivalent for his ignorance of the special requirements of the situation. Verily there is a dreadful amount of "lickspittleism" in our composition, and a lord, because he is a lord, is considered a better man to preside over a scientific body than a real man of science. For example: the trial of Talbot *versus* Laroche before the Lord Chief Baron resulted in the election of the latter learned gentleman to fill the chair of the London Photographic Society, although, if my memory serve me right, he it was who put to one of the witnesses on that occasion the innocent question—"Is hyposulphite of soda an acid?" He has now retired from his post, and another and more practical man fills his place; but in another of the metropolitan societies—the North London—a gentleman of scientific, although not of photographic, attainments has filled the chair for many years, and for many years he has not condescended to be present at a single meeting, and, indeed, it is questionable if one of the present members of that society have ever so much as seen the gentleman to whom I have referred. So long as human nature *is* human nature toadyism, in one form or another, will be rampant. But there are good men about Bristol; let me hope that the Bristol Photographic Society will not strike upon the rock on which so many other societies have been shattered.

What between Johnson's carbon process, Carrier's sensitised paper, the carbonate of silver paper of another firm, and the Obernetter sensitive paper, one really does not well know to which side to turn. I suppose and try to believe that they are all good; but which of them is to take the place of ordinary albumenised paper? Have the albumenisers yet begun to reduce the number of hands employed by them? I trow not. "The proof of a pudding is the preeing o't," says a Scotch proverb; and the proof of the success of a process of printing will in like manner be the universality of its adoption by the profession. Photographers are generally quite alive to their pecuniary interests, and are not sufficiently conservative to adhere to any course of action when what they believe to be a better one is presented for their acceptance. I should therefore like to know how the profession generally feel towards the last innovation—Johnson's patented carbon process. It can, however, scarcely be said to have been put into competition as yet. I, at least, have seen no advertisement in which the suffrages of the photographic public are invited on its behalf. On the general question of carbon *versus* silver the former would undoubtedly claim the vantage ground, were it not for some special something or other. What is that something? and can it be pushed aside so as to permit the contest to be decided upon the real merits of the respective claimants? When the durability of photographs and, closely connected with this, the respectability of the photographic professor are the issues raised surely no amount of trouble, even were the result to be revolutionary, would be too much to bestow upon the question involved.

The patented specification of M. Argamakoff, published in your number for April 2nd, made me laugh. Not content with giving us a number of general photographic platitudes, this inventor wound up, in the last paragraph of his specification as published by you, by patenting the now well-known Woodbury process of photo.-relief printing.

A perusal of your article on small portable, if not pocket, cameras suggests this question—What is the limit to the magnifying of a negative, provided that it has been very sharply taken? You speak about four or five diameters, as if that were all that is worth striving after? Why not twenty, thirty, or more diameters? I have seen a flea enlarged very creditably to three inches then why cannot a negative of an inch in size stand enlarging to fifteen or twenty inches? The stock objection is, that the deposit of silver forming the picture will not permit such a degree of magnifying. But why not? There are processes by which negatives may be taken on glass in which the deposit of silver is so very fine that it appears, under a tolerably high power, to act as a stain on the film in which it is inbedded. I do not think that collodion will do this—at least I have not seen any instance of the kind—but albumen will. It is well known among some of the more wide-awake in the trade that to ascertain whether a transparency be obtained in collodion, collodio-albumen, or albumen alone, it is only necessary to apply a compound microscope to the deposit and the secret is at once revealed. An albumen surface is stained, a collodion one is full of minute atoms of silver, the very size of which can be approximatively determined; therefore, if an albumen instead of a collodion film be employed, and a lens which yields microscopic definition, why cannot a negative be produced which is capable of, comparatively, an indefinite degree of enlargement?

In saying that "there is nothing so sweet as forbidden fruit," Mr. Blair shows that he posesses some knowledge of human nature. And really if he had only secured by patent his method of making paper translucent, there is no saying how many thousands would have tried their hands at it. I certainly mean to publish my experiments with the very useful article (translucent paper)

which called for the reply from Mr. Blair, and I should have done so on the present occasion did I not stand in wholesome fear of the editorial instructions received by me, which amount to this—"cut it short; dont be prosy." I fear I shall have to make it the subject of a special article, which it well deserves to be.

The new photo-engraving process of Mr. J. V. Robinson, of Dublin, consists, if I understand it aright, of a layer of silver on the glass plate instead of a denser material; it is, in short, the same, with a difference, as that which was advocated by a Scotch artist, Mr. Norman Macbeth, some time ago, the difference being the opaque film laid on the glass. Far be it from me to say which process I think most of, but I suppose that thinness and amorphousness (excuse the word) of film are the essential requisites for preparing a surface which (pardon me for saying it) not one person in twenty thousand will employ for the purpose alluded to. I have seen a very thin film, formed of wax and lampblack, which made a surface on which the finest conceivable lines could be drawn. Why, therefore, not adopt an easily-made surface rather than one which necessitates a troublesome chemical operation. Rub the warm glass over with bees' wax, smoke it over a lamp emitting much soot, and the surface is ready, when cold, for receiving through the instrumentality of the etching needle the ideas of the etching artist.

The paper which was read before the Edinburgh Photographic Society, *On Printing Photographs on Prepared Painters' Canvas*, will have been read with interest by more than myself. A great deal of nonsense has been talked about the subject, and much mystery has been attempted to be thrown around it; it seems, however, to be here comprised in a nutshell by Mr. Lothian. But the statement of Mr. Ross, who is surely, of all men, an authority, that paper is as good a medium as canvas for supporting an oil painting, is one which excites my grateful respect and attention; and I am sure that some hundreds of photographers, who have been in the habit of pasting paper enlargements upon canvas and allowing their patrons to believe that no such pellicle intervened, will be delighted to learn that by their doing so they have unwittingly adopted a better means for preserving the picture than if they had photographed it direct upon the canvas.

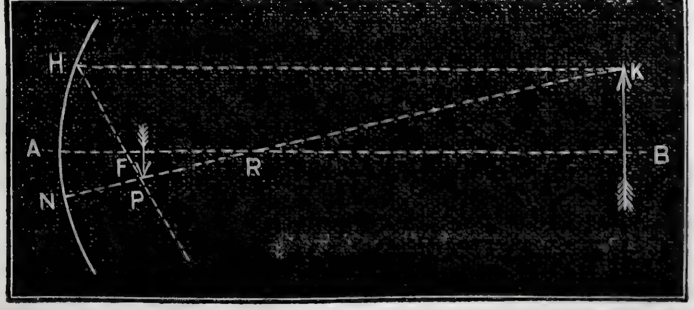
PROFESSOR TYNDALL ON "LIGHT."

Professor Tyndall, LL.D., is now delivering a course of lectures at the Royal Institution upon "Light," and the first two or three were of an elementary character.

In the opening lecture, delivered on the 8th ult., he said that there is no such thing as perfect opacity or transparency; thin sheets of the most opaque metals transmit some light, and the purest ice, water, air, or crystals absorb some rays. He then explained how the velocity of light has been measured by observations of Jupiter's moons, and demonstrated by experiment that light diminishes as the square of the distance from the source. He said that, in looking at a long row of gas-lights in the street, they seem so equal in brilliancy that it is difficult to realise the foregoing law; but the fact is that the more distant lamps throw a smaller image upon the retina, so that, although the light is less, it is condensed upon a smaller surface. In this lecture he showed the lens-like action of pinholes, and demonstrated that the angle of refraction is equal to the angle of reflexion. He took a large flat brass ring, tied a sheet of tinfoil over one end of it and a sheet of tissue paper over the other, then pricked a hole in the tinfoil with a pin. This, he said, was the simplest camera or model of the human eye which it is possible to construct.

In his second lecture, delivered on the 15th ult., he explained the laws which govern the reflexion of light from concave and convex mirrors. In the course of his remarks on concave mirrors, he gave the following simple rules for ascertaining the size and position of the image which a concave mirror will throw of a distant object:—

FIG. 1.



Let A B, *fig.* 1, be the axis of the mirror, F its focus for parallel rays, and R be the radius of the circle from which the mirror was cut. It follows that the ray K H, from the point of the arrow, must be reflected through the principal focus F of the mirror. Also, that as the ray K N passes through the point R, it must fall vertically at N, and be reflected back in the same direction. Hence the image of the point of the arrow will fall at P, and the position and size of the optical image is ascertained.

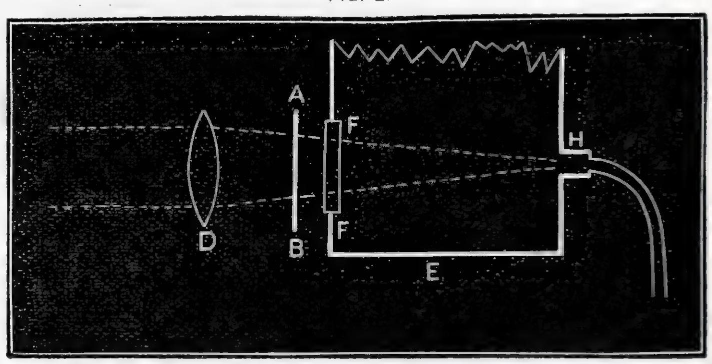
In this lecture he showed that the centre and the circumference of a spherical concave mirror do not bring rays to exactly the same focus, and that a stop in front of the mirror improves definition, but causes a loss of light, as is the case with lenses. He also showed the method by which the index of refraction of any transparent substance is measure. When speaking of total reflexion, he showed the property possessed by a prism of inverting magic lantern images. He said that the foam of the sea is white, because among the multitude of transparent particles there is so much total reflection that all the incident light is broken up and lost in "echoes" between the surfaces. Hence the water no longer looks transparent. Writing paper and wool are white for the same reason, and but for the "echoes" would be transparent.

In his third lecture, delivered on the 22nd ult., he exhibited the refracting properties of lenses, and working models of dioptric apparatus from Trinity House. These lighthouse lanterns consist of a bent cylindrical lens placed like a belt round the lamp, so that all the rays falling upon the lens are sent out horizontally into space. Above and below the lens are bent prisms, so that the light falling upon one of their surfaces at the angle of total reflexion shall also be sent out horizontally over the sea. Long experience has proved that no other method of economising all the light from a luminous source is equal to this light.

He also entered very deeply into the optics of the human eye; but most of these phenomena were collected and published by me in this Journal last year. Every human eye has small dots and snake-like threads moving in its humours, which things are brought into view more distinctly by looking at the bright sky through a pinhole in a card.

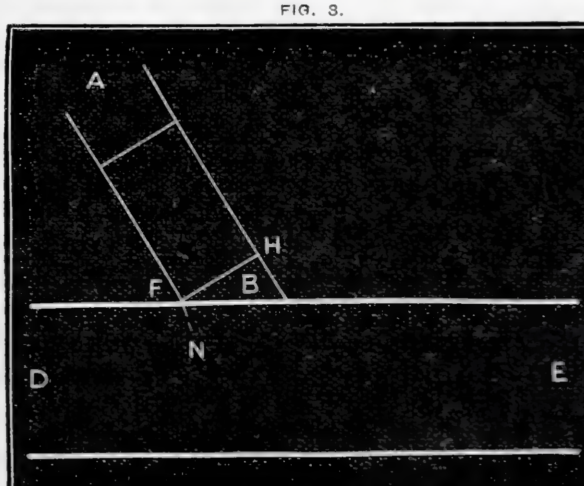
Professor Tyndall closed this lecture by showing Duboscq's electrical fountain—a very beautiful experiment, wherein an intense beam of light is unable to escape from a curved column of water, because of the laws of internal reflexion. This experiment may be explained by the aid of *fig.* 2, wherein D is a large lens receiving parallel rays from the electric

FIG. 2.



lamp, and bringing them to a focus at H. The bottom of a great tall vessel of zinc, filled with water, is shown at A, E, H, and a flat plate of white glass is cemented in this vessel at F F. By this arrangement, when the cork is removed from H, the water pours out in a dark room like a dazzling rope of light. Colour may be imparted to the luminous cylinder of water by placing sheets of coloured glass at A B.

FIG. 3.

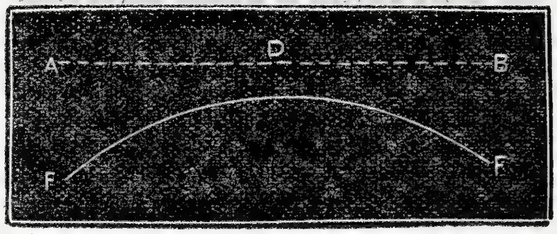


The lecturer exhibited the spherical aberration of a large lens by placing a stop in front of it, and bringing the charcoal points to a focus upon a screen. Next, he fixed an opaque circle on the centre of the

lens, so as to use the outside portions of the lens only to form the image. The screen had then to be moved much nearer to the lens to get a sharp image of the carbon points, thereby proving that the centres and edges of such lenses do not bring rays to the same focus, and tend to throw confused images.

Professor Tyndall, in his fourth lecture, delivered on the 29th ult., explained how the emission theory of light had to be abolished and the wave theory adopted. He then gave the reasons why waves of light are bent out of their course by transparent substances such as glass. Suppose waves of light flowing from the sun in great circles like those caused by throwing a stone into water. A small section of one of these waves will be straight, and suppose such a section, A B, *fig.* 3, to fall obliquely upon the upper surface of a sheet of glass, D E. One end of the wave F will enter the glass before the other end H, so that the F end of the wave is made to travel more slowly than the H end. This causes the whole wave to swing round, and take a different direction F N. On the same principle, let A B, *fig.* 4, be a wave of

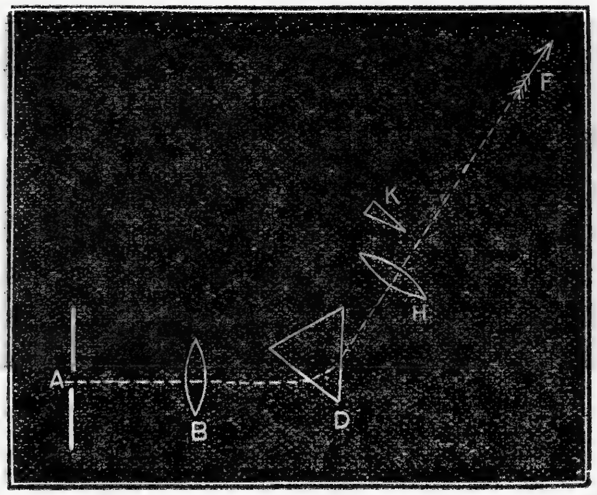
FIG. 4.



light approaching a lens F F. The centre D will be retarded before the velocity of the two ends of the wave is altered, and thus the ends will swing round, and the light be brought to a focus. Supposing A B were a line of soldiers approaching the curved edge of a ploughed field F F, the same retardation would take place in the centre of the line.

The lecturer exhibited the following very beautiful experiment, to show that white light consists of many colours. He threw the image of a small round hole in the electric lamp A, *fig.* 5, upon a screen, by

FIG. 5.



means of the lens B, and then interposed a prism D, so that a small imperfect spectrum was thrown upon the screen in the direction F. A second lens was then interposed at H, when all colour upon the screen disappeared, and a perfect image of the luminous carbon points was seen. He then refracted a portion of the beam of light H F, by inserting the edge of the thin prism K, and a double image of the points was seen, in one of which green colours predominated, and in the other red was the chief tint. When the the prism K was removed, only one image was seen as before, of brilliant whiteness.

As regards the physical constitution of the interstellar ether, Professor Tyndall said that it is of very little density, and of almost infinite elasticity. In the case of sound, the greater the elasticity the greater is the velocity, and the less the density the greater the velocity. So it is with ether, but the motion of the ether particles is across the direction of the propagation of light, whereas the motion of air particles is in the direction of the transmission of sound. This ether fills all space, and surrounds the atoms of all bodies. The vibrations of luminous solid particles are taken up by the ether, and the waves thus produced pass through the lens of the eye, and, impinging on the retina, give the sensation of light.

The intensity of the light depends upon the amplitude of the transversal vibrations of the ether particles, the intensity being also proportional to the square of the amplitude. The amplitude of the vibrations diminishes as the distance from the source of light increases. The reflection of ether waves obeys the law established in the case of light, the angle of incidence being demonstrably equal to the angle of reflection. How the waves are refracted has already been stated; and it will be noticed that, in the case of a sheet of glass with parallel surfaces, the wave on leaving must be twisted round in an opposite direction to that which it took on entering, so that in passing through a flat sheet of glass light is not permanently refracted.

Professor Tyndall said:—"The density of ether is greater in liquids and in solids than in gases, and greater in gases than in vacuo. A compressing force seems to be exerted on the ether by the molecules of these bodies. Now, if the elasticity of the ether increased in the same proportion as its density, the one would neutralise the other, and we should have no retardation in the velocity of light. The diminished velocity in highly refracting bodies is accounted for by assuming that in such bodies the elasticity *in relation to the density* is less than in vacuo. The observed phenomena immediately flow from this assumption. The case is precisely similar to that of sound in a gas or vapour which does not obey the law of Mariotte. The elasticity of such a gas or vapour, when compressed, increases less rapidly than the density—hence the diminished velocity of the sound."

Colour is entirely a phenomenon of wave-length, and the colour of light depends upon the number of waves which strike the eye in a second. A wave of red light is about $\frac{1}{39000}$ of an inch long, and a wave of violet light $\frac{1}{57500}$ of an inch. The velocity of light being 192,000 miles per second, when this is multiplied by 39,000 the result is the number of red waves in 192,000 miles. The product is 474,439,600,000,000, and all these waves enter the eye in a second. In the same interval 699,000,000,000,000 waves of violet light enter the eye. The following is the number of waves per inch of different undulations of light:—Red, 39,180; orange, 41,610; yellow, 44,000; green, 47,460; blue, 51,110; indigo, 54,070; violet, 57,490. WILLIAM H. HARRISON.

PHOTOGRAPHY IN COURT.

PHOTOGRAPHIC PIRACIES.

AT the Central Criminal Court, on Tuesday, the 4th instant, before the Right Hon. the Recorder, John Coleman, John Lawrence, and William Hooper were indicted for a conspiracy to infringe and defeat the copyright in certain valuable works of art, the property of Henry Graves, of Pall-mall East.

The prisoner Coleman pleaded guilty, and no evidence was offered against Hooper.

Mr. Giffard, Q.C., and Mr. Montagu Williams conducted the prosecution; Mr. Underdown and Mr. Metcalfe the defence.

The circumstances were recently reported in some detail when the prisoners were under examination before the Lord Mayor. The engravings alleged to have been pirated were, among others, *The Railway Station*, *My First Sermon*, *Ordered on Foreign Service*, *The Lost Piece of Money*, *The Last Kiss*, *The Anxious Mother*, and *A Piper and a Pair of Nutcrackers*. The piracy was effected through the agency of photography, and all three prisoners were proved to have been concerned in it—Lawrence as a principal, Coleman as having hawked the pirated copies about the streets, and Hooper as having been employed in mounting them. It was stated incidentally on the trial that the prosecuter, Mr. Graves, in the 42 years he had been in business, had expended nearly half a million of money on the production of works of art, and that on *The Railway Station* alone, by Mr. Frith, R.A., he had spent 24,200*l.* Photographic copies of the various engravings mentioned in the indictment were produced in court in proof of the alleged piracy, and the prosecutor identified the originals, which he said were his property. The cheapest of his engravings of *The Railway Station* were sold by him at five guineas each, and the best copies at fifteen guineas. The pirated photographs of the same engraving were sold at from ten shillings to fifteen shillings each, according to the risk run in their production, and the cost price might be sixpence or one shilling each. It was proved that the documentary evidence of the proprietorship of Mr. Graves in some of the subjects in question was destroyed in the fire at Her Majesty's Theatre, one of his galleries having been burnt to ashes. In some cases the original pictures themselves had been destroyed. He gave a circumstantial account of the way in which he had become possessed of the several paintings, and of the pains he had taken to protect his interests in them. The evidence went to show that the prisoner Coleman had frequently been seen hawking photographs of the engravings in question about the streets, and that at the lodgings of the prisoner Lawrence, with whom he was in regular communication, about 850 of them were found.

Mr. Millais, R.A., who had been subpœnaed for the defence, was called as a witness. Replying to questions by Mr. Underdown, he said he finished painting *My First Sermon* in January, 1863, and sold it by word of mouth to Mr. Gambart. *My Second Sermon*, which he painted in the following year, he sold to Mr. Agnew, with the copyright. That was the understanding. With respect to *The Lost Piece of Money*, Baron Marochetti had made a bust of witness's wife, and witness, having promised to paint something in return, gave the Baron that picture after it came from the Exhibition, but, before doing so, he had sold the copyright to Mr. Graves. That was in December, 1862. In answer to Mr. Giffard, in cross-examination, witness explained he meant by having sold *My First Sermon* to Mr. Gambart that he agreed to sell it to him. A short time afterwards Mr. Agnew came to his studio and saw the picture, which he said he had bought of Mr. Gambart. Understanding

the copyright was witness's, Mr. Agnew wished to have the copyright as well as the picture, and then and there, on the 27th of January, 1863, gave witness a check for the copyright. Next day Mr. Gambart called and paid witness for the picture.

Mr. Frith, R.A., was called, and said the picture called *The Railway Station*, which he painted, was begun in 1860 and finished in 1862. He painted two pictures with that title, the original being on commission from Mr. Flatow, and from one of these the engraving was made.

Mr. Collinson proved that he painted *Ordered on Foreign Service* in 1861 and 1862, and afterwards sold it to Mr. Graves, with a certain reservation. Mr. George O'Neill deposed to painting, in 1865, *The Anxious Mother*, and selling it to Mr. Flatow. Evidence was also given that Sir Edwin Landseer, who painted *A Piper and a Pair of Nut-crackers*, sold it to Mr. Flatow in 1864.

An elaborate argument ensued as to questions of copyright raised on the evidence, Mr. Underdown, for the defence, contending that before anybody could be entitled to the privileges of the Copyright Act, not only must the copyright when acquired, but every subsequent assignment of it, be registered, and declaring his belief that if that test were applied to the pictures or engravings now alleged to have been pirated, no copyright would be found to exist in any one of them.

The Recorder told the jury the question for them was whether the prisoner Lawrence, well knowing he had no right to publish and sell those impressions, combined, notwithstanding, with the prisoner Coleman to do so. Not many years ago there was no copyright in works of art, but the legislature, thinking it right that the persons to whose skill and genius the world was indebted from time to time for such productions, had done something to remedy that state of things. He thought there was *primâ facie* evidence that the property in the different prints in question was vested in Mr. Graves.

The jury found a verdict of *Guilty* as against the prisoner Lawrence, and evidence was then given that he was convicted of a similar offence about a year ago.

In the result, Hooper was discharged, and Coleman, who had pleaded "Guilty," and Lawrence, entered into recognizances to appear and receive judgment when called upon.

Contemporary Press.

AN ENLARGEMENT MANUFACTORY IN FRANCE.

[BULLETIN.]

ONE people possesses at home iron and coal mines, another, far removed from the first by climate as well as by distance, has an abundance of corn, sheep, and cattle, which are wanting in the other. It is only natural that a reciprocal exchange in their products should take place between the two peoples, bringing to each other that which it requires, and that which could never be naturally found in its own territory. This is one of the origins of commerce legitimately established.

I have frequently asked myself why the excess of natural resources in one country should not be turned to account so as to profit by it from others. For example: the idea has already been conceived of utilising the Falls of Niagara by furnishing motive power to countries at a sufficient distance therefrom; the heat of the volcanoes for distributing heat at a distance, as water and gas are distributed in our towns; and even accumulating the heat of the sun in certain southern countries to some commercial profit. Why is not the light of the sun turned to the advantage of photography? This is what I asked myself before I saw the practical realisation of the idea, and after having very often anathematised the fogs of my own sweet country. It is not necessary to travel very far to the north in order to find countries almost deprived of the sun, and in which the purchase of apparatus for enlargements would be an expense almost ridiculous to think of. In the south, on the contrary, there is an exuberance of light, and both its intensity and its chemical qualities there permit you to attain results otherwise unhoped for.

A man of genius I met with at Marseilles, M. Marias Melchior, had entertained the idea of establishing a kind of magazine for enlargements, and installing therein a number of powerful solar apparatus. No establishment could be more useful to photographers, and, mounted on a large scale as it is, it constitutes a speciality perfectly remarkable, where I have seen enlargements executed from forty-eight centimetres to six feet high and more. Many artists, retouchers, and painters of talent are attached to the house, whose particular duty it is to retouch negatives in their defective places.

When I visited the studios there arrived a box of negatives from Russia. I assisted at the unpacking, and, if you will allow me, I will give your readers an idea of the very ingenious manner, as it appeared to me, in which the negatives were packed for that long distance. They were contained in small wooden boxes, and at the four angles of the collodionised face there were small balls of virgin wax; placed upon them was a plate equal in size to the negative. The two plates thus in juxtaposition were bound with small bands gummed and encircled with several thicknesses of silk paper, and placed with wadding in the box.

The negatives to be enlarged need not be larger than seven centimetres square. As a matter of course, their transparency and cleanness are the conditions necessary to success. CH. DE SEH.

TROUBLE IN THE DARK ROOM.

[PHOTOGRAPHIC MOSAICS.]

THE greater proportion of a voluminous editorial correspondence received is to tell tales of woe and tribulation, and to answer them is our daily duty and pleasure. Beautiful and fascinating as our *blessed* art is, charming as the results are which we are able to produce by it, yet how sensible we all are, and how sad that it is full of trouble! There is hardly a trouble that *human* flesh is heir to that we do not meet in photographic manipulations.

The trials of the sailor come upon us in the shape of mists and horrible fogs; of the soldier in the splitting of our films, defects in our images, lines, and streaks; of the intemperate failures from imperfect fixing; and of the editor, want of sharpness, transparent and opaque spots, &c., &c.

A reflecting mind will not look upon a gem of our art (not the 16-for-10-cents kind) without thinking of a victory won after a hard-fought battle, and of how much it cost to secure it.

How often we hear the despairing operator say—"Oh! what a miserably vexatious, troublesome business! I wish I was out of it." We think then of an anecdote which often cheers us, and which we heard when a boy.

Two ancient maidens were cogitating and gossiping over a mug of cider each. With long-drawn face and solemn voice, one said—"Sally, there's a *great* deal of *trouble* in this world." Silence prevailed for a few moments, and after an appeal to the mug, the other answered—"*Yes*, Jane, but there's a great deal of *good cider* in it *too!*"

And so it is with photography, good reader. There is a great deal of *trouble* in it, but there is a great deal of *good*, too. *Trouble*, however, is our topic now. You know, without doubt, that the *keystone* of the grand arch of photography, stretching from the planets above to the earth beneath, and covering all between, *is the negative*. Without a well-shaped keystone your arch will be a failure. Master masons find it a great deal of trouble to make that stone plumb, level, and square always, and so do master photographers ever find trouble in making their negatives sharp, clean, and good.

Let us then consider some of the troubles that are met in its production, and see if we cannot do something, between us, that will make such troubles less apt to occur, and less frequent. Let us repair to the dark-closet, and you do the work, while we look on and find fault. Now, coat a plate and begin. There—*cause* of trouble No. 1. Why did you blow your breath on that plate just as you were about to coat it? "Wanted to blow the *dust* off." Well go on and see what you will get. I see I have made you nervous, and you have committed two or three more blunders, though it may be your habit to practise them occasionally. You knocked a fly away with your finger, leaving a mark on the plate; you poured on too little collodion at first, and then added more, making the film of irregular thickness; and you allowed the film to become too dry before immersing the plate in the bath—*i.e.*, too long after the collodion was set. Again: you hesitated a moment when you were dipping it into the bath. Now churn it up and down a little; bring it up with one regular, constant, steady motion; put it in your plate-holder; go out and make the exposure, and when you come back we will develope it and see if there is any trouble discoverable.

You observe there *is* trouble enough. By your careful blowing you have removed the dust, but the dampness of your breath being still on the plate when you coated it, you find parallel streaks all over the portions blown upon. The marks of your finger are also there very plainly, and the film in some places is more intense than in others on account of the uneven coating. But your poor abused plate has another affliction, resulting from your allowing it to become too dry before dipping it. Remember this: better dip a plate before the film is quite dry enough than wait until it ceases to be tacky to the touch and is too dry. Acting contrariwise this time, you see there are stains upon the plate similar to oyster-shells, the veins in a piece of marble, or gas-tar or spirits of camphor floating on water.

Your hesitation in dipping your plate has caused a line to appear just where the surface of the solution was when you stopped. Moreover, feeling probably that the plate would not amount to much, any way, you dashed on the developer with so much vigour that you observe lines upon it in form much like the aurora-borealis, or splashed milk on white silk. Finally, you allowed yourself to get out of temper, and that probably caused some of your other troubles. You seem to have cleaned your plate well, and none of your troubles seem to arise from a neglect of that important duty.

Now, do you not think you are a proper candidate for a short lecture on *trouble in the dark-room?* "Yes." Here then it is cheerfully given.

A good negative, you well know, should be clean, vigorous, sharp—full of half-tone. The latter three may be secured, yet they amount to nothing unless the first be accomplished also. *Cleanliness is the all-important necessity in your business.* Its absence causes all manner of troubles, such as stains, streaks, lines, pinholes, comets, opaque and

transparent spots, and the markings already described. Zigzag lines are caused by lack of harmony between the bath and collodion; *i.e.*, the collodion is too highly iodised for the bath, or the bath too strong for the collodion. If the former, add a little plain collodion to the other. If the latter, reduce the strength of the bath. Triangular lines, beginning at a point at the bottom of the plate, and spreading outward and upward, are caused by a scum on the surface of the bath. Remove it by filtration. It is a good habit to filter the bath daily, or semi-weekly. Dark, opaque lines are caused by uneven development; frequently by holding the newly-developed plate up to the light, and allowing the developer to run down it in streaks. Never do this. Lines shaped like the parts of a turtle-shell arise from ether and alcohol in the bath. Boil down the bath about one-half, and then add rain or distilled water till it reaches its wonted strength. Wavy lines at the edges are caused by too scant a developer; by keeping the plate too long before development. Curved lines are created by too strong a developer. The remedy is obvious. In the summer you should use only about two-thirds as much iron in the developer as in winter.

Now the next great trouble in the dark room is the *fogging* of the plate. This eclipses everything else, for oftentimes you can see nothing else for it. Its causes are multitudinous. Among them are want of harmony between the collodion and the nitrate bath; lack of acid in the developer; lack, or excess, of acid in the bath; diffused light in the dark room; developing too near the light; lack of care in redeveloping; over-exposure; under-exposure; too long and tardy developments; fumes of ammonia, &c., in the dark room; sunlight in the lens or camera-box; foul air; bad water; plate too long in the bath; too little washing, and hot weather—all cause fogging. The remedies are simple and easily guessed.

We could fill half of this little book on the troubles in the dark room, but our paper has, doubtless, already become tedious to you.

Mr. Lea, in his excellent manual, just published, has devoted much space to "Failures in Photographic Operations," in which will be found the major and minor troubles treated most fully and clearly. We have endeavoured to make plain the cause of some of them, and in closing beg to have you adopt the following rules, well known to all, but *so* often forgotten:—

1. Clean your glass *very* clean.
2. Filter your bath often, and work it slightly acid.
3. Let your collodion be a good orange-yellow colour before using.
4. Use fresh and clean developer.
5. Keep white light out of the dark room, camera-box, and plate-holder.
6. Take out and develope your plate always in a weak light.
7. Keep your hands clean. Wash them after each stage of your manipulations.
8. Keep your temper. Do not be discouraged at failures. Meet them manfully, fight them bravely, and come out victoriously.

Success to you. EDWARD L. WILSON.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 11th	Society of London	9, Conduit-street.
,, 13th	South London	City of London College.
,, 13th	Manchester	Memorial Hall, Albert-square.
,, 13th	Photo. Sec. Lit. and Phil. Soc. of Man. (Ann. Meet.)	36, George-street.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A GENERAL meeting of this Society was held on the 2nd ult.,—M. Peligot in the chair.

The Chairman informed the meeting of the loss they had sustained in the death of the Marquis de Laborde, who had been devoted to photography from its origin, and was one of the founders of the Society.

M. Secretan submitted for inspection a volume entitled *Daguerrean Excursions*, and published at Paris in 1842. This work is illustrated with engravings by M. Hurlimann from Daguerrean images, amongst which figure three proofs printed in 1841 on Daguerrean plates, engraved *direct* by the process of M. Fizeau. M. Secretan stated that he hoped to be able soon to present to the Society proofs printed at the same epoch and on the same heliographic plates.

M. Leopoldo Casinol, in sending to the Society for exhibition a number of positives variously coloured and transparent, gave the following account of the process by which they had been obtained. He said:—I employ wet collodion, and the negative is obtained in the ordinary way. When once it is dry and varnished, I print a proof in black, by which to ascertain its value. If there are parts which are defective by reason of the light having been too active, I modify the same by retouching the negative. I print a second proof, and if I think it suits, I proceed with those which I intend shall serve my purpose. My paper is prepared beforehand, and the proofs are printed with nitrate of silver. After exposure I dip them in water, and as soon as they acquire a sepia tint, I wash and dry them at once in order to take them into the dark chamber, where, by the aid of a yellow light, I prepare separately with a pencil (and carefully so as not to encroach) each of the parts that require to be of a natural flesh tint; also the beards and hair of the models, and even sometimes other incidental parts. I now dry them again and thoroughly, for the purpose of reacting upon each of the parts already prepared. The effect is instantaneous. As soon as it is produced I pass them into a special bath, and from thence into water, where they are allowed to remain for the space of one hour preparatory to being placed in a gold bath—a kind of toning which blackens the parts which ought to be black, and fixes all the other tints in harmony therewith. In the last place I fix and leave the proofs in a weak chlorated bath.

MM. Meyer and Nicolyaysen, of Bergen, in sending a collection of proofs intended for exhibition, communicated to the Society the advantage they had derived from the employment in their studio of black velvet curtains for the suppression of all diffused light when lighting the model.

M. Gaumé presented (without describing his process, and solely for the purpose of recording the date thereof) two transparent proofs on paper, suitable for either positives or negatives, and for all processes—engraving, carbon, enamelling, &c. These proofs are intended to compete for the special medal to be awarded in April, 1870.

M. Ferrier presented, in the name of M. Marie, some lithophotographic proofs in black, as well as some lithochromatic proofs so obtained with the aid of photography. M. Marie, who was present, explained that, in order to obtain these latter, he had endeavoured to suppress the negative *clichés* by printing all the colours of the primitive design in silver on black or dark brown paper. In this way he obtained on glass, at the first attempt, positive *clichés*, which in transparence gave the half-tints, and which enabled him to prepare afterwards the different necessary lithographic stones for printing in colours.

M. Pinel Peschardière exhibited different specimens of photolithography and photo-engraving on stone by the process he uses—amongst them a reproduction of a hydrographic *carte* of the port of Pola, of the dimensions of the large eagle paper. Many of the proofs presented by this gentleman (one of which was from a negative of M. Davanne) were by the process of engraving on stone, and printed in great numbers; the stones thus engraved, the author stated, being capable of yielding 2,000 prints. The following explanations accompanied M. Pinel Peschardière's presentations:—The specimens of photographic engraving on stone which I have the honour to present to the Society were obtained by an easy and rapid process. I obtain a positive image in printing ink upon stone, with either a negative or positive, no matter which. When the plate is put under the press no foreign matter is permitted to obstruct the action of the roller, which, in the hands of the operator, deposits the ink immediately upon the subject, meeting with only the necessary thick ink on the one hand, and the stone prepared with acid and gum on the other. These conditions, which are entirely lithographic, give to the engraving a solidity and facility of printing, so that any ordinary printer may, without difficulty, print as large a number of proofs as by lithography.

M. Despaquis presented, in the name of M. Braquebais and his own, the following communication:—I have the honour to present to the Society some carbon specimens on gelatine coagulated with alum, according to the process explained by me at the last meeting. I now beg to add the following details of the manipulation by which they were acquired. The finest gelatine, well filtered and slightly coloured, if desired, with a little marine blue or the carmine indicated by M. Jeanrenaud, is spread in a thin layer on a proper kind of ground glass, or on cloth or paper. It is then left to dry. Whether glass, cloth, or paper be employed, it must be immersed for the space of ten minutes in cold water with five per cent of alum in it. If it be desired to quicken the coagulation add a little hot water, but the paper must not be left in the solution of alum longer than two minutes. Rinse in cold water, for the purpose of eliminating the alum which will be found on the surface, and apply thereon, while the gelatine is glutinous, the black paper exposed under the negative. Roll out the air-bubbles, then put the sheets under pressure in blotting-paper for some minutes, hours, or days, according to the time for developing afterwards in hot water. In one word, adopt M. Jeanrenaud's plan of developing, as already described by him.

M. Jeanrenaud presented, in the name of M. Relaudin, first, a wet negative-frame, by which a glass plate could be reversed at pleasure without a counter-frame; second, a dry negative frame, also for reversing *clichés* as required. M. Jeanrenaud then proceeded as follows:—The carbon process, which I had the honour at a former meeting of communicating, necessitates the reversing of the *clichés*. Two means of accomplishing this at first presented themselves—that of raising or removing the *cliché* once obtained for the purpose of reversing it; or by so disposing the glass-bearing frame as to effect the turning directly. By a simple and ingenious method M. Relaudin has arrived at a solution of the question without changing the existing frames, and almost without expense. He encloses the glass between two parallel regulators, the distance of which may be changed in the same manner as the shelves in our libraries. Each of these regulators is furnished with two ivory teeth (of forklike form, the opening between them expanding), which serve to receive the horizontal sides of the glass plate. The

lower regulator is fixed on the vertical sides of the frame by a hanger, through which the distance can be varied. Placed in the same manner, the upper regulator is furnished with a spring which yields when the glass plate is introduced, and holds it afterwards in a screw vice. The dry process, not having the same requirements as the preceding, is provided for in a different way:—The very light frame is shut at the back by a small board, which, contrary to those in use, is nailed, so as to give the greatest security. The glass plate is introduced in front, for which purpose the shutter is drawn. The glass fits in a groove at the top of the interior of the frame, opposed to which is a movable groove on hinges, which, once shut, prevents the slightest movement and completely isolates the two surfaces of the prepared plate.

M. Rousselon presented to the Society, in the name of MM. Goupil and Co., a collection of positive proofs obtained by the Woodbury process. In presenting these proofs M. Rousselon gave a brief *resumé* of the history of the discovery of M. Poitevin and the labour and assiduity of Mr. Woodbury, which had enabled them to avail themselves of the valuable properties of bichromated gelatine, and pointed to these specimens as proving how faithfully the originals were represented, although as yet they were unable to give more than an imperfect expression of the capabilities of the process. Mr. Woodbury considered—and they were of the same opinion—that the employment of gelatine mixed with colours gave the best results; for it was well known that gelatine, by immersion in tannin or alum, became completely insoluble and indestructible, being assimilated to parchment, which had enabled ancient manuscripts to be preserved for centuries.

M. Gobert said it would be remembered that at the last meeting M. Romain Talbot presented some wooden dishes for use in photographic operations. He (M. Gobert) had submitted one of these dishes to different trials, and he thought it right to communicate the result of these tests to the Society. These trays were constructed of light wood, not impregnated, so M. Talbot stated, but only covered with varnish as a preservative. However that may be, they were of good use for the greater part of the manipulations in photography. The one he (M. Gobert) used had remained for a whole month completely filled with liquids, such as water and hyposulphite baths, gallic acid, sulphate of iron, &c., and during that time it had undergone no kind of alteration whatever. Ammoniacal water was the only thing that had damaged it. He had not thought of risking the employment of these dishes for the silver bath. One of his colleagues had poured hot water into a similar basin, and though the basin gave way the varnish remained unaltered.

M. Davanne communicated to the Society the researches he had just finished in regard to the solubility of alkaline bichromates, and the density of the solutions which these salts furnish. He described and showed experimentally a simple method which, by utilising the action of heat alone, enabled him to distinguish the bichromate of potash from the corresponding salt of ammonia.*

M. le Schwarz called the attention of the Society to a question which, he said, appeared to him to deserve attention. Up to the present time, no statistics of photography had been prepared in France or in any other country. It would be worthy of the French Photographic Society to take the initiative in such a work, and accept the direction of it. It was unnecessary to say how interesting it would be, as well in a professional as in an economical point of view, to know the real development of photography, and the branches of industry that are connected with it; to know the influences it exercises, year by year, in the consumption of money, gold, &c., in the manufacture of frames, optical apparatus, &c. He (M. Schwarz) concluded by proposing that the Society should undertake this task by placing itself in an international point of view of the widest extent, and he offered personally 100 francs to commence a subscription for the purpose of defraying the expenses.

The Society, appreciating all the importance of the proposition made by M. Schwarz, thanked him and charged its committee to consider what steps should be taken in order to realise the proposition he had submitted to it.

The proceedings then terminated.

BERLIN PHOTOGRAPHIC SOCIETY.

A meeting of this Society was held on the 5th ult.,—Dr. H. Vogel in the chair.

The Chairman introduced the subject of the photographic exhibition to take place at Gröningen, in Holland, in the month of July next; and, in the absence of Dr. Jacobson, Herr Marowsky read the programme, from which it appeared that exhibitors living at the greatest distance from the town of Gröningen would be guaranteed a free pass on the subscription of fifty Dutch florins.

Herr Grabe had sent to the Society a pamphlet, entitled *Uniformity in Measures and Weights*—the object of the work being to point out the advantages that would accrue from uniformity in the measure of plates, cameras, and frames on the one hand, and in the ascertained weight of chemicals and other requisites on the other.

Herr Ernst remarked that the sizes of the plates of the same form, such as *cartes de visite*, varied considerably, and that those which, through the old apparatus, were kept to a particular form, would be unsuited to the newly-proportioned size.

Herren Kleffel, Beyrich, Meydenbauer, and the Chairman argued in favour of the necessity of a general understanding in this respect, and a committee was subsequently appointed, consisting of seven of the members present, with power to add to their number, to consider the subject and report thereon.

Herr F. Beyrich presented specimens of his pyroxyline paper.

The Chairman, after alluding to the sensitive paper of Herr Ost, laid before the meeting the proofs which that gentleman had forwarded as presents to the Society. These consisted, in the first place, of a large glass picture of about fifteen inches, which was copied on collodionised paper, toned, fixed, washed, and transferred on to glass all in four hours. Herr Ost had stated that these transfer pictures must possess greater chemical durability than paper pictures, as the collodion skins of themselves retained less of the salts than the porous papers of ordinary pictures. Herr Ost had also sent five collodion paper *cartes* and four porcelain pictures. These were handed round and acknowledged on all hands to possess much merit. According to the Chairman, such a transfer paper was of the greatest importance for the reproduction of negatives—for instance, landscape negatives. To repair an accident on one of these was often impossible, or attended with much trouble and great cost. The value of a simple process for printing fine positives of such pictures and negatives afterwards was inestimable. They were to be recommended also in that the portrait plates were more easily repairable, as they would bear strongly retouching, while the others were only too apt to be spoilt in the copying.

Herr Kleffel did not believe that collodion paper could be produced so durable mechanically as an albumen layer, and it always required skilful treatment.

On the subject of touching negatives with a blackened pencil,

Herr Schippang observed that he worked on a varnish that, without further preparation, took the pencil touchings most satisfactorily. He advised the addition of water to the lac varnish.

Herr Prümm was in favour of the collodion being covered with a solution of gelatine, and that the pencil should be applied prior to the application of the varnish.

It was remarked that in this way the work was always easy, but that the durability of such plates was uncertain, as the gelatine layer was apt to expand or be drawn together according to the moisture in the atmosphere.

Herr Ernst considered that turpentine was necessary to be used with the pencil on a varnished plate.

After some other business the proceedings terminated.

Another meeting of the same Society was held on the 19th ultimo,—Dr. H. Vogel in the chair.

Herr Lindner laid before the meeting proofs of burnt-in photographs, by Herr Einhart, of Constanz, which were originally obtained by accident.

The Chairman placed on the table a series of stereoscopic pictures by Mr. Wilson, of Philadelphia, and others, amongst which were several photographs executed by the coffee and tea dry-plate processes, which did not quite reach the brilliance of wet plates. Also, as an American peculiarity, there were several panotype cabinet pictures by How, on wax cloth, transfer collodion pictures, which were glued on cardboard. Panotype pictures were in vogue there on account of the rapid means of production in that country, while in Europe they are scarcely obtainable. There were also some successful landscapes by Herr Wilde, of Gorlitz, photographed, under difficult circumstances, with Busch's pantoscope.

Herr Wilde gave a brief account of his peculiar method of handling collodion. He mixes the collodion first with a small quantity of ammonia, and prepares for use, always according to circumstances, a collodion coloured red by tincture of iodine, to prevent fogging. For a high temperature more is needed, for a lower temperature less of the tincture, and thus, according to him (Herr Wilde), the preparation is rendered more or less delicate.

Herr Kleffel said he considered the addition of red collodion was superfluous in cases where a powerful acid silver bath was employed.

Herr Ernst thought that Herr Wilde's manner of working was a difficult one.

The Chairman resumed the subject of a committee, which had been partly appointed at the last meeting, to consider and report on the subject of uniformity in measures and weights; and the committee having been appointed, the Albert process then came under discussion, and some doubts were expressed as to its capabilities being such as had appeared in the press.

The meeting was shortly afterwards adjourned.

Bettering the Instruction.—The London Stereoscopic Company announces that its Pompeian Studio is peculiarly adapted for taking portraits of gentlemen on their own velocipedes. The enterprising photographer, near Westminster-bridge, the polite attentions of whose "touter" all who pass that way must acknowledge, has improved on the brilliant idea of the Stereoscopic Company. He announces his "Ass-yrian Studio, peculiarly adapted for taking portraits of costermongers on their own mokes."—*Punch.*

* This communication will be found at page 217 in the present number.—Eds.

Correspondence.

Foreign.

Philadelphia, April 19, 1869.

I SEND you herewith some remarks on Mr. Johnson's patent. It seems to me altogether questionable whether such a patent can stand. Supposing even that his method proved to afford the only simple means of carbon printing, it is built upon the labours of many who have gone before, and who have neither received nor asked profit from their work. If ten steps, let us say, are taken successively in improving a method, is he who made the tenth to become virtually the proprietor of the whole?

I see that Mr. Dawson has favoured me with four closely-printed columns on the subject of pyroxyline. I shall answer very briefly, for readers naturally feel that controversial articles which run to such a length are an intolerable imposition. I say, then—

1. The formulæ published in the seventh English edition of *Hardwich*, by Mr. Dawson, are not considered by those who make a business of manufacturing pyroxyline to be reliable. They may yield fair samples, but only such as are surpassed in quality by other formulæ, which are trade secrets.

2. The directions given in that seventh edition for preparing intense pyroxylines are not reliable. Cotton made by them is neither so intense nor so soluble as that prepared upon other principles.

3. In an article written by Mr. Dawson on the subject of Dr. Liesegang's papyroxyline, and translated in the *Archiv* for 15th March, 1869, he acknowledges that the results obtainedy by Dr. Liesegang are utterly different from what he would expect from such combinations of acid and temperature. These results drive him, as he expresses it, "out of the rut of his fancied infallibility." When he wrote the four columns just referred to he had evidently slipped into this rut again. It is a deep rut, and a treacherous one.

Mr. Sutton has undertaken, I perceive, the rehabilitation of cylindrical perspective—a pretty tough piece of work. That gentleman has had a curious art of being on the wrong side of every important question in photography. The insensibility of pure iodide of silver was long his hobby. Developed prints he affirmed were more permanent than direct ones. In alkaline development he maintained that soda was better than ammonia. Dry films owed their sensitiveness to the nitric acid combined with the nitrate of silver. He advocated a "tunnel system" for glass houses. In all these views he has been proved to be wrong; and now he holds that all the great artists and painters have been wrong in adopting plane perspective, and that they should have adopted another form of representation, in which the cornices and other horizontal lines of a building are represented by curved lines!

An absurd law-suit is going on in New York. It has been for several years claimed by a photographer that he could summon up departed spirits and photograph them by the side of any living relative. As he does not pretend to make them visible to the eye, although they affect the sensitive film, it would appear that these spirits reflect only the ultra-violet rays of light, which can impress a plate but do not affect the eye.

I believe that every one who tries the method of drying plates by sulphuric acid likes it. It greatly increases the certainty, and removes an important source of failures. M. Dubost writes to Liesegang's *Archiv* that, with the aid of this method of drying, coffee plates give him unvarying success.

The chief objection to coffee plates seems to me that they make the distance too dense—not always, but they tend that way. I have observed this both in my own and those of others.—Very truly yours,

M. CAREY LEA.

Paris, May 1, 1869.

I AM glad to see Mr. George Price in your pages again on the albumen question. With a view of, if possible, throwing more light upon the subject, I have perused the articles upon albumen and albumenoid substances in the new *Dictionary of Chemistry* of M. Ad. Wurtz, of which about five parts have been published. I find it stated that the constituents of albumen are carbon, hydrogen, nitrogen, oxygen, and sulphur; and, then, respecting the result of the analyses of this substance, the following remarks are to the point:—

"The impossibility of bringing the albumen to a crystalline form, and the difficulty, often insurmountable, which is found in getting rid of the mineral matters (phosphates) which accompany it naturally throw some uncertainty upon the interpretation of chemists of the numbers furnished by analyses. Do not many chemists, also, neglect the slightly-marked differences shown by an analysis? and do they not consider these bodies as allotropic modifications—distinct molecular conditions of the same product?"

M. Wurtz gives the following analysis, by MM. Dumas and Cahours, as showing the composition of egg albumen:—

Carbon	54·30
Hydrogen	7·10
Nitrogen	15·80
Sulphur	1·80
Oxygen	21·00
	100·00

"The translation of these numbers into a formula leads to very complex expressions, if it be desired to make the sulphur figure in it, with an entire number of atoms. The formula of Lieberkühn, C_{72}, H_{112}, N_{18}, SO_{22}, as well as others similar, is not sufficiently controlled to pass definitely into science. As to the molecular constitution, it remains entirely undecided for want of reactions and decompositions clearly observed. For some time M. Sterry Hunt considered albumenoid substances as nitrites of cellulose or of its congeners, and this opinion has been confirmed up to a certain point by the experiments of others. By heating neutral hydrocarbon compounds (sugar, cellulose, &c.) with caustic ammonia, these chemists have obtained nitrogenous products very similar to albumenoid bodies. The old hypothesis of Mulder, who considered albumen as formed by the union of a radical (protein) with more or less of sulphur, phosphorus, and hydrogen, is completely abandoned."

The reaction of albumen with salts of silver is thus alluded to:—

"A solution of albumen, pure or alkaline, is precipitated by many metallic salts (sulphate of copper, bichloride of mercury, subacetate of lead, nitrate of silver, &c.). With corrosive sublimate the albumen is coagulated; with acetate of lead its solubility is preserved. In the first case the precipitate contains the insoluble albumen combined as much with the acid as with the base of the salt."

The following is given as a test for distinguishing albumenous from gelatinous substances:—A solution of albumen acidulated with acetic acid, or dissolved in concentrated acetic or phosphoric acids, is precipitated by ferrocyanide of potassium. This precipitate is not observed with solutions of gelatine:—

"Albumen possesses feeble acid tendencies, and unites with bases to form but little-defined salts, the existence of which is, however, certain. The *alkaline* albumenoid compounds are soluble, and it is in this form that this substance is met with in the *animal* kingdom, whereas in the *vegetable* kingdom it is met with possessing an *acid* reaction. Gerhardt considers albumen as a bibasic acid; and this opinion seems corroborated by the experiments of Lassaigne, who has obtained the salts of two metals."

Coagulation by heat does not furnish a *pure* albumen, as it is always combined with mineral salts. To obtain a pure albumen, the following process is recommended:—The solution is coagulated by an excess of soda, the precipitate washed is dissolved in warm-water and thrown down by neutralising the solution by acetic acid. This albumen is dissolved again in an excess of acetic acid, and the liquid is submitted to the process of dialysis. When all the acid has passed through the septum an opalescent solution is obtained, coagulated by heat, and precipitated by the feeblest quantity of alkali or alkaline salt. This solution corresponds to the soluble silica and alumina of Mr. Graham. The authority for this process is M. Schützenberger.

Albumenous substances undergo an alteration—a sort of slow combustion—if kept at a mild temperature in the presence of moisture and with access to the air, and M. Pasteur considers this due to the development of infusoria, whose germs are brought by the air. *Moral:* Keep albumenised paper in a dry and cool place as much out of the air as possible. The difficulty of getting rid of the phosphates in the analysis of albumen probably accounts for the appearance of phosphorus in some formulæ. If these few remarks aid in any way the object for which they were written I shall be gratified.

Les Mondes gives this week some interesting particulars with respect to the cost of the oxyhydrogen light, and the rate at which oxygen can now be obtained. "A cubic metre of oxygen costs today, April 24," says the editor, "one franc (10d.), and it will be delivered to the city, when the new system of lighting is adopted, for 30 centimes (3d.), and to private consumers at 70 centimes (7d.) The coal gas now costs the city 15 centimes (1½d.), and private consumers 30 centimes (3d.) the cubic metre." The economy realised will be fifty per cent. by the use of the oxyhydrogen zirconia light. The editor also announces that he believes that apparatus for projections by this new light will shortly be on sale, and orders may be addressed to his office. I shall keep your readers posted up about this matter.

Caen, May 3, 1869.

After having written thus far, I started for Caen, hoping to have time to finish my letter in that town. Caen is full of subjects for the camera, and it is a real relief to come here and see something old, irregular, and timeworn, after the polish, regularity, and newness of modern Paris. I have received a letter from Dunfermline, to this effect:—

"Having frequently observed in your Paris correspondence in THE BRITISH JOURNAL OF PHOTOGRAPHY how willing you are to assist photographers going abroad, I take the liberty of writing to you, hoping you will be kind enough to give me a little information. We intend starting for the Continent in about a month, and will take about one hundred and twenty dry plates with us. We intend staying a day or two in Paris on our route to Switzerland. Can you tell me the best route from Paris to Switzerland? I have guide books, but prefer practical knowledge," &c., &c.

I was gratified at receiving this letter, as it showed that my wish to be of use to your readers was not thrown away. I shall send a private reply, and shall also answer it through your pages, as there may be many photographers to whom similar information may be useful. The summer season tickets have not yet been issued. When they are I will send my reply.

Another correspondent writes me respecting the *rôle* of electricity in the production of photographs in natural colours. He will excuse me if I refer to the matter in your pages, as it is difficult for me to find time to open a discussion in any other way. Then, if the discussion should prove of any value, why should your readers be deprived of it? He says:—

"It has occurred to me that if such a plate as described by you in your communication of the 7th inst., as being sensitive to colour after being galvanised, were subjected to the fumes of iodine before exposure, and treated after exposure in the same way as the Daguerreotype plate, that the colours then visible might be permanent in the daylight. In the former case (a case mentioned before) I propose to make use of glass through which the colours, when obtained, could be readily printed on to paper."

Now it seems to me that my friend has made two capital errors in thinking upon this subject. Firstly: The galvanisation of the plate as described by me is for no other purpose than the formation upon its surface of subchloride of silver, the only substance yet known having the properties of being impressed *in colour* by the pure coloured rays. This subchloride may be formed in many other ways, as I described, but that by galvanism, *i.e.*, the electro decomposition of hydrochloric acid, is found to be the best. No after treatment with iodine would increase the properties of the subchloride of silver; on the contrary, as I expressly stated on the authority of M. E. Becquerel, the slightest admixture of iodide of silver destroys the peculiar property of the subchloride. The colours are not *developed* on a subchloride of silver plate; they come without it. Secondly: With respect to a glass negative picture with the natural colours ever so well represented, there still remains to be found a printing process by which these could be perfectly reproduced. Show me such a glass picture, and I think I may venture to affirm that a printing process will be discovered the next day.

I may probably recur to this letter again; meantime let me refer my correspondent to my first letter reviewing M. Davanne's *Annuaire Photographique* for 1869 for the electric theory of photographic action.

R. J. Fowler.

Home.

CHLORIDE OF CALCIUM IN THE COLLODION.

To the Editors.

Gentlemen,—I have used this substance—one to two grains per ounce added to any good ordinary negative collodion—in nine-tenths of all the collodion manipulated in my studio for the last twelve months. I do so from the conviction that it gives a more creamy film, more sensitiveness, a softer and more substantial negative, seldom requiring to be intensified, and more tenacity of the film to the glass. The bath lasts as long or longer without getting deteriorated, &c.

Having experimented on all quantities, from one-half grain to three and a-half grains per ounce, my conviction is that about one and a-half grain is the best.

If this be anything new or uncommon (and I never heard of any one else using it in wet collodion), I should be glad if some of your enterprising correspondents would try it and report, and oblige—Yours, &c.,

Glasgow, May 3, 1869. Harry.

BALANCE OF CHEMICALS.

To the Editors.

Gentlemen,—Ever since I became a photographer I have heard and read of the "*balance* of chemicals," and I have always been ashamed to ask what it meant, although I do not understand the expression.

1. As applied to the ordinary wet process of bromo-iodised collodion and iron development, what is the meaning of the chemicals being properly *balanced?*
2. How am I to tell when they are properly balanced or not?
3. How am I to make them balance?—I am, yours, &c., Senex.

Lodge-lane, Liverpool, May 4, 1869.

[We reply to the above in general terms, thus:—If a certain decomposition be desired to be brought about by mixing two other solutions—for example, if chloride of silver be wanted—how shall the substances from which it is formed be so combined as to be properly balanced? If two solutions be formed—one containing 58·50 parts of chloride of sodium, and the other containing 170 parts of nitrate of silver—the two solutions will be balanced, and chloride of silver will be formed, leaving in solution neither chloride of sodium nor nitrate of silver. These two solutions were "balanced." For examples of this kind consult the table of symbols and equivalents given in our Almanac.—Eds.]

VENTILATING THE DARK-ROOM.

To the Editors.

Gentlemen,—Your Paris correspondent, in his letter of the 26th ult., mentions that M. Davanne reiterates his opinion that the dark room should be ventilated top and bottom. The one I use is simply a small closet leading out of a room at the top of the house, and at times it is very uncomfortable. If I don't cry, I certainly have tears in my eyes. If you can inform me of a good plan for ventilating it *without admitting light*, you will greatly oblige—Yours, &c., No. 827.

Liverpool, May 3, 1869.

[Two air-bricks, one at the top and another near the floor, will provide the means for ventilation.—Eds.]

COPYRIGHT IN ENGRAVINGS.

To the Editors.

Gentlemen,—You will confer a favour on some of your oldest subscribers by answering the following question in your next number:—Is the Act for the protection of copyright of engravings from piracy by copying by means of photography retrospective? Is it illegal to copy an engraving which was in existence before the Act passed?—I am, yours, &c., An Old Photographer.

Blackpool, May 4, 1869.

P.S.—I refer now to such as *Bolton Abbey in the Olden Time*, Landseer's dogs, &c.

[We believe the Act to be retrospective; it is, therefore, illegal to copy an engraving of the kind described.—Eds.]

Miscellanea.

Sable Photography.—A photograph of the first coloured voter in Minnesota has been taken, framed, and presented to the State Historical Society.

South London Photographic Society.—The meeting of this Society to be held on Thursday next is to be devoted to the exhibition of pictures and objects of interest connected with photography. The co-operation of every photographer is invited so as to make the meeting an interesting one.

Artificial Light.—Over ninety per cent of the rays issuing from most kinds of artificial lights are according to the German chemist, Landsberg, calorific or heat rays, and as such non-luminous. Sunlight has only fifty per cent of heat rays. He attributes the painful effect of artificial light upon the eyes to this large amount of heat rays. By passing artificial light through alum or mica, the heat rays are interrupted, and the light is rendered much more pleasant and less injurious.

Blair's Carbon Process.—We have to thank Mr. Blair for a capital carbon portrait of himself. The following remarks by Mr. Blair in connection with this subject are deserving of attention:—"As you seem inclined to give mine a place in your album, I enclose a better one than the experimental specimen sent you; but I think my best ones have all been given away. This one is by the single transfer albumen process that M. Jeanrenaud has been attempting to take credit for, although I suppose he was about *two* years behind me. Indeed I had published this process even before Marion had discovered the one on which M. Jeanrenaud made his improvement. The statement made by M. Davanne, as reported by M. Vidal, at the Marseilles Photographic Society, appears to me to have been rather silly. He expressed an *opinion* that I had no more right to make a reclamation against M. Jeanrenaud than M. Jeanrenaud had to make a reclamation against me. Where is the good sense of expressing an *opinion* upon a subject of that kind? The whole depends upon a *fact*, and the ascertainment of that fact would settle the question at once."

The Royal Academy Exhibition.—The number of pictures sent in this year is so great that out of 4,000 only 1,300 have been accepted. A subsidiary exhibition of the "rejected" pictures is being arranged in a neighbouring locality. One feature this year is the hanging of all the pictures on the line, so that none are either "skied" or "floored." A daily contemporary speaking of this exhibition says:—"The pictures by painters of the foreign schools have never been so numerous, or exhibited to such advantage, as in the present exhibition. The principal room has been hung with this view; the chief work of Academicians, then one from each or any of the Associates, and next, out of proper courtesy, a place is given to the best works offered by foreign artists. After this the plan pursued by the hanging committee has been to give an equal and fair distribution of the line and other places to all pictures accepted by the Council of Nine, in whom alone this judgment rests. Some examples will be noticed on the line which being accepted the hangers could only show, but we are bound to say that the only good purpose served in this is the representation of certain eccentricities in taste. * * There is certainly now none of that glaring inequality in the order of merit in the different rooms that there was in the old exhi-

bition, when artists were gradually promoted from west to east, and thus one room was inevitably almost reduced to the level of a chamber of horrors. * * The pictures by foreign artists are so unusually good that they offer a subject for special consideration. * * The water-colour drawings, though a decided improvement upon anything hitherto exhibited; form by no means the important collection that was anticipated, and there are no capital examples by any of our school. Characterising the exhibition in very general terms, and reserving more critical examination, we should say that it is not distinguished by the works of the Academicians—except in those by Sir E. Landseer, Mr. Hook, and Mr. Leighton—so much as it is by the variety and fresh energy that mark the works of artists who are yet candidates for the honours of the Academy.

EXCHANGE COLUMN.

W. M. wishes to exchange a van, thirty feet long by nine wide, on four wheels and capital springs, for a glass house of equal value at the sea side.—Address, 45, Churchgate-street, Bury St. Edmunds, Suffolk.

I have a Kinnear camera, for pictures 10×8, with two double slides and one wet slide, fitted with a first-class Lerebours lens, which I shall be glad to exchange for a camera carrying plates $7\frac{1}{4} \times 4\frac{1}{2}$, with slides and lenses.—Address, J, Lord, 26, Arnott-street, Hulme, Manchester.

Wanted to exchange an excellent microscope, in glass case, with lock and key; portable dark tent, for 12×10 plates; pair of unmounted stereo. view lenses; galvanic battery, in mahogany case—for a 12×10 Kinnear's camera or good Ross's card lens. Difference adjusted.—Address, W. H. Dodds, Shifnal.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

James Miell, Salisbury.—*Portrait of the Bishop of Salisbury, from a painting by Robert Kemm.*

Hugh Browning, Church-street, Liverpool.—*Rev. Alex. Rentoul, M.A., and Rev. S. Pearson, Liverpool.*

W. H. Richardson, Dale-street, Liverpool.—*Photograph of "The Tower," Municipal Offices, Liverpool.*

☞ *Correspondents should never write on both sides of the paper.*

Tourist.—We understand that a velocipede is not subject to toll.

G. C. H.—Boiled rain water will answer your purpose quite as well as distilled water.

Richard Trindall (Haverfordwest).—A glance at our advertising columns will supply the address you want. If you are still at a loss, enclose a stamped and addressed envelope for private reply.

Young Photo.—The ordinary landscape lenses, if good, will answer for taking views as well as any other kind. For the size of plate you mention use one from fifteen to twenty inches in focal length.

Captain, R.N.—A good standard solution of bichloride of mercury may be made by dissolving this salt in hydrochloric acid to saturation. This will keep indefinitely. A useful strength to employ is to add one drachm of this standard solution to an ounce of water.

Thos. Clark.—By substituting the common acetic for the glacial, and not taking into consideration the difference of their relative strengths, you have in effect added too little acid to your solution; and to this is owing the mishaps which you describe in your letter.

W. Henderson.—From your description of the portable tent in the possession of your friend, we believe it to be a really good one. Still, it does not appear to possess all the good qualities usually to be found in those of London manufacture; for in both design and manufacture these latter are now made in a very high state of perfection.

A. D. (Notting Hill).—You are so far right, but you must give a longer exposure and rinse the plate in distilled water before you apply the developer. It is to the presence of so much nitrate of silver that hardness is due. Recollect that a deposit of silver, so slight as to be almost invisible when looked *through*, may form a bold and decided stain when backed with white paper and looked *at*.

B. W. Ward.—Remove all the lenses from the lantern a little time before commencing your lecture and warm them at a fire. If you then replace them, you will not be troubled with the condensation of moisture of which you complain. In like manner you must have your slides made and kept warm. By the exercise of a little ingenuity you may utilise the hot air of the lantern for the latter purpose.

Two Brothers.—If you remove the lacquer by means of emery paper in the manner you propose adopting, you will give yourselves a great deal of unnecessary trouble. A better way by far is to make a very hot and strong solution of pearlash, washing soda, or washing powder, and immerse the lacquered brass in it. In a very brief period of time the brass will be found to be denuded of its lacquered coating.

W. H. R. (Liverpool).—On the subject of your letter *generally*, we say take no notice of the transactions. "Law is costly," therefore avoid it. It is certainly annoying to be troubled as you have been, but we cannot see any remedy beyond that so naively suggested by a writer in our last Almanac, who, when speaking of the photographing of children, suggests that *before* engaging on any special subject of that kind the pecuniary matter should be made all right. In some places in London the visitor has to pay the amount charged for the work on making the arrangement for the sitting, and then passes up stairs to the operating room or studio, receipt in hand. Try this in future.

J. B. & Son.—The greenness arose from some impurity. It will not affect toning properties. If we can obtain the address required we shall give it our next number.

M. B.—Not being certain whether your signature is "Magnum Bonum" "Magnus Brown," we select the initial letters. Glycerine is decompo by nitric acid; hence it is probable that the large proportion of acid prese in your bath may be the cause of your want of success. If it be so, it in cates that your bath is much too acid for any purpose. Add some carbona or oxide of silver to it, and shake well up.

M. D. (No. 2).—A very useful inverting prism may be formed of three piec of colourless plate glass cemented together at the angle shown in the artic to which you refer. Grind the edges, and cement them with marine glu The ends may be formed either of metal or glass, but care must be taken th an aperture be left through which the triangular vessel may be filled wit the fluid which has been determined upon for the purpose.

G. Farmer (Northampton).—You will manage what you desire to accomplis with your twelve-inch landscape lens stopped down to half-an-inch. I this state it will be rather more rapid than a triplet of the same focu stopped down to the same degree. Were we in your place we should emplo a stop of from three-quarters of an inch to an inch—rather the latter tha the former. We are, of course, assuming that your landscape lens is a goo one.

Chemicus.—We cannot give you more explicit directions concerning the bes manner of producing enlarged transparencies than we have done from week to week for some time past. We never grudge supplying our readers with such information in this column as any of them specially desire; but if you had been, as you state, "a constant reader," you would not now have put the question—"By what means can I make what is spoken of as a Sarony-type?"

A Bengal Officer.—The question you have put to us is quite a "poser:"—"If you were in my place, what kind of photographs would you prefer taking so as to best convey to those at home an accurate idea of the scenery in a foreign country?" We should, all things considered, prefer for this purpose a stereoscopic camera with two sets of lenses—one set being so short in focus as to include an angle of seventy or eighty degrees. The negatives should be made very thin, so as to yield good transparencies, and they should be sufficiently sharp to stand enlarging well. If a wide-angle picture of this kind be printed upon opal glass, or even on plain glass backed with another opal plate, and be examined in a stereoscope with achromatic eyepieces of *short focus* (this is imperative), a better representation of such a country as that in which you reside will be obtained than by any other means with which we are acquainted.

An Aberdeen Loon.—There are many kinds of black varnish, but you will experience much difficulty in procuring a good dead black varnish similar to that employed in blackening the inside of lens mountings. Negative varnish with some lampblack intimately dry mixed with it answers pretty well, but the resulting coating is rather grey. Drop black, or vegetable black, answers better. The proportions must be such that, when applied with a brush, the varnish must dry quite flat or dead. If it be glossy, the proportion of black must be increased; but if, on the other hand, there be too much black, the coating will not adhere, but will, on the least degree of friction, crumble away from the brass. Another formula, which we have employed with much gratification, is to rub up some drop black with turpentine and then add sufficient either of japanner's gold size or of black japan carriage varnish to give it cohesion. This is applied without heat, and adheres with tenacity.

LONDON GAZETTE, *May* 4.

Bankrupt.

William W. Herbert, Liverpool, photographer. May 14, at Liverpool.

METEOROLOGICAL REPORT,

For the Week ending May 5th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

April 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
29	30·35	59	43	45	49	ENE	—	Fine
30	30·23	61	38	48	51	ENE	—	Dull
May 1	30·18	—	43	42	45	NE	—	Dull
3	30·01	63	39	48	52	SSE	0·50	Dull
4	29 83	51	44	44	44	ENE	0·31	Rain
5	29 98	—	39	47	51	E	—	Fine

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 471. Vol. XVI.—MAY 14, 1869.

A NEW MODE OF TESTING FOR GOLD IN WASTE SOLUTIONS.

A few weeks ago we drew attention to a new test for albumenous substances which had been discovered by M. Braun. This test consisted in the employment of molybdate of ammonia, the solution of which salt, when employed in a particular way, produced a blue colour with albumenous compounds. We also owe to this chemist a very delicate and simple test for gold, which we propose to describe this week, as we have tried it, and believe it to be one which will prove very useful to such of our readers as have to ascertain whether a waste solution contains any gold to be saved.

At present, if a solution contain both gold and silver, the tyro finds considerable difficulty in detecting the former metal in the presence of the latter. M. Braun's process removes any obstacle of this kind, and permits the detection of the gold in an argentiferous solution with rapidity and certainty. The reagents are very simple, and can be easily obtained. These are—a slip of clean zinc, and a solution of *sulphide of ammonium.* The former can be obtained by dipping a piece of sheet zinc in a little vinegar until the surface is bright; the second, by saturating the "liquor ammoniæ" of the shops with sulphuretted hydrogen gas.

We will now describe the mode of applying the test. The solution suspected to contain gold, and which may or may not contain silver, is neutralised with carbonate of soda, and about one part of this solution added to two parts of the sulphide of ammonium test liquid. If any silver be present it will now be precipitated as the black sulphide; but if gold be present it will be first thrown down as the brownish-black sulphide, and then will almost immediately redissolve in the excess of sulphide of ammonium present. The solution is now filtered from any precipitate which may have formed, and into the liquid which has passed through the filter a clean, bright strip of zinc is introduced, and the solution warmed. If gold be present it will now be precipitated on the zinc—not, as is usually the case in precipitation processes, as a black, unrecognisable powder, but as a very brilliant yellow, metallic coating on the slip of zinc.

This test is not only easy of application but very satisfactory in its indications, and, moreover, is not liable to error, owing to the presence of such substances in the solution as the photographer is likely to meet with. For this purpose alone it is useful; but the solution of sulphide of gold in sulphide of ammonium may be employed for gilding articles of zinc and giving them the appearance of the fine metal. In this way we succeeded in making an irregular mass of zinc exactly resemble a large nugget of gold. Of course, this is merely an amusing use to put the solution to, but the test itself, when used as we have described above, is undoubtedly a good one.

PHOTOGRAPHS IN QUININE.

In the last number of the *Pharmaceutical Journal* Mr. Wood described a case of apparent reduction under the influence of sunlight, which will not fail to interest such of our readers as have worked at the photographic properties of the citrates and tartrates of iron.

A salt is well known to pharmaceutists called the "*citrate of iron and quinine.*" This is essentially a compound resulting from the combination of per-citrate of iron (containing some proto salt) with citrate of the well-known vegetable alkaloid, quinine. As usually sold it presents the appearance of a mass of fine greenish-yellow scales, which have been long known to be somewhat sensitive, when dry, to the action of light. The compound is so very soluble in water that it cannot be obtained in crystals; hence the solution of the substance is evaporated to dryness, and the residue sold as the citrate of iron and quinine.

But in this part of the manufacture of the compound a peculiarity has been introduced. The solution of the citrate of iron and quinine, after its preparation, is evaporated to a syrupy consistence; and now, instead of carrying the evaporation further in an ordinary dish, the syrupy liquid is painted over glass or porcelain plates, and the remaining moisture driven off in a hot-air chamber. When perfectly dry the compound is removed in greenish-yellow scales by scraping each plate with a knife. This is the general mode of making "scaled" preparations.

Mr. Wood, in preparing some of the citrate of iron and quinine in scales, conducted the final evaporation in the full light of an April sun instead of in the dark hot-air chamber; as the desiccation proceeded the salt decomposed easily under the influence of the solar rays, those parts of the plate crossed by shadows of bottles, &c., placed in a window, not giving evidence of any reduction. The change observed was simply a whitening of those parts which had been acted upon by light. The salt was now placed in water, and it was found that, instead of dissolving very rapidly as usual, a white residue was left on treatment with water, and this white substance subsequently dissolved very slowly.

The question may now be asked—What is the white insoluble substance resulting from the action of light on the double citrate of iron and quinine? Mr. Wood believes that this white substance is *citrate of quinine,* no doubt accompanied by some proto-salt of iron. If this be true, a photograph is, therefore, obtainable, in which a salt of quinine constitutes the lights of the picture; and so the title which we have given to this article is justified.

But our object in drawing attention to the matter here is to point out the curious and interesting fact (if it be so) that the simple destruction of a solvent, *i.e.,* solution of citrate of iron, appears here to be the prime cause of the production of the quinine photograph; thus affording us a more extended view of possible processes than we would otherwise have had, while the experiment alone is interesting as touching the manufacture of a beautiful compound of percitrate of iron—a substance which long since attracted attention in consequence of the facility with which it is acted upon by light.

JOHNSON'S CARBON PROCESS.

In your last number, page 216, there appears an article signed by Mr. M. Carey Lea, in which the validity of my patent for carbon printing is called in question, and my conduct as a man of honour is impugned; for the "adopting" of another man's "ideas," and

founding a patent thereon—the conduct attributed to me—I hold to be neither consistent with honour nor with honesty.

With your kind permission I will place the article referred to by Mr. Lea, in which his process is recorded, side by side with the corresponding operations in my process, when I flatter myself that your readers, instead of finding only one "singular" point of difference, will find the two processes singularly unlike—indeed, it is questionable whether any other two processes of carbon printing could be juxtaposited which have so few features in common:—

Mr. M. Carey Lea's Process of Carbon Printing. Extracted from The British Journal of Photography, April 17, 1868.	Johnson's Process of Carbon Printing. See The British Journal of Photography for April 2, 1869.
About a year since I made some experiments towards the simplification of carbon printing, which I left unfinished, with the intention of returning to them at a future day. But I have not found the time, and M. Despaquis, in his experiments on mica printing, has hit upon an idea a good deal similar to that which I was working on. But my principle was of much wider application than his, so that I believe I may do some service in publishing it before some one takes out a patent for the idea.	
It seemed to me that if I could find a method of carbon printing in which the *troublesome transfers could be done away with*, carbon printing would be considerably simpler than silver printing, because of the absence of need of toning.	In this process transfers are not dispensed with, but are reduced to an extreme degree of simplicity.
This could only be done by printing through the support. I tried paper prepared in many ways (a method which Mr. Blair has long laboured at) without getting any satisfactory results, principally, I think, because the bichromate solution penetrates irregularly into the varnished or waxed paper, and renders it unequally adiactinic. *Glass presented the difficulty* that in printing a negative, through even very thin glass used as a support for the sensitised pigment, the sharpness would be very much impaired.	I do *not* print through the support, but directly upon the sensitive pigment.
Glass, however, offers such very great advantages, by reason of its perfect transparency and its cheapness, that it seemed very desirable to overcome this difficulty, and I succeeded in doing so perfectly. I found that, by the device which I adopted, I could print a portrait through a piece of plate glass upon a carbon surface so sharply that every hair was visible.	Glass may be used as a support to the sensitive pigment, but of course paper is preferred, which does not scratch or otherwise injure the negative.
This was done by using reflected sunlight—a species of illumination which, though occasionally used in the negative process (for copying Daguerreotypes), has, I believe, never before been used for positive printing, and certainly not for the purpose here proposed, and for which it answers equally well.	No reflected sunlight is necessary, but either ordinary sunlight or diffused daylight, so that printing may be carried on in the dullest day of winter.
The best mode of proceeding is to place the frame holding the negative and the pigmented glass against the wall, beside a window at which the sun enters. Then let a mirror be placed so that the rays fall upon it almost perpendicularly, and are reflected full upon the frame. The sensitiveness of the bichromate is so much greater than that of silver paper, that even in this light four or five minutes' exposure are sufficient with an easy printing negative.	An ordinary pressure-frame is alone used.
After printing, all that is necessary is simply to wash off the superfluous pigment, and the picture is finished. It is an exceedingly easy process, as will naturally appear from my description, and, what is no small matter in these days, can be practised by any one without infringing existing patents.	After printing, something more than mere washing is necessary. The pigmented tissue, *which has now become insoluble*, has to be mounted upon a support. *Not glass alone*, but any surface impermeable to air and water may be used. Hitherto every inventor—Blair, Fargier, Swan, Jeanrenaud, Marion, and Edwards — has considered that some cementing substance was necessary to mount the printed film, until I showed that mere adhesion was sufficient if water were employed to exclude air. Albumen, starch, India-rubber, &c., &c., had been used for this purpose. I discard all, and use nothing. I must confess that I see no analogy between the adhesion of a piece of paper coated with sugar and gelatine—which sticks to the tongue and only too often to the negative, which is what Mr. Lea used for sensitising his plate—and the adhesion of the film rendered insoluble by light, and which is made to adhere for the purpose of development. The film being mounted, it is at once placed in hot water, and the development is the same in both cases; but here M. Despaquis had preceded both Mr. Lea and myself in producing his transparencies on talc.
Transparencies printed in this way may be looked at through the glass, and thus are non-reversed. *The method is, of course, not applicable to printing on opal glass, for the support must be transparent.*	My process is pre-eminently applicable to opal glass, to enamelled plates, prepared canvas, panel, &c., &c. The support has no occasion to be transparent; on the contrary, metal plates are preferred.
I cannot doubt that, with the aid of this plan of using reflected sunlight, modes will be found of working upon transparent paper such as will give good results. All pictures on pigment made without transferring must in every case be reversed. *If it is necessary to avoid this difficulty, the negative itself must be either reversed by taking it on the back of the glass in the camera*, or, if made in the ordinary way, this mode of printing by reflected sunlight will enable the negative to be printed *through its own glass*, provided the latter is free from flaws and defects.	There is no occasion to reverse the negative if the glass or metal plate be used as a temporary support, and be coated with some solid, fatty body infusible at the point of development. The print then readily leaves the glass, and may be attached to paper, cloth, &c., by any adhesive substance. Shellac dissolved in weak ammonia is preferred. The dry print on the support is allowed to absorb this, and a piece of very thin paper soaked in the solution is then laid upon it. When dry, the film, imbued with shellac and attached to the paper similarly imbued, separates readily. The combined result is no longer a simple gelatinous print; it is insoluble in boiling water, and bears any amount of friction.
Obviously, however, *the most useful application of this idea is to the printing upon thin plate glass in the manner first above-mentioned.* Connected with this, a few words remain to be said as to the best method of preparing the glass for printing.	The chief result of my process is indestructible prints on paper; that of Mr. Lea, destructible transparencies on glass, and for which also my process is applicable.
Of course the sensitive mixture can be poured out upon the glass. Mr. Swan, I believe, prepares all his "tissue" originally upon glass, and transfers it to paper. But, as this operation requires a special manipulation not immediately acquired, it will be found simpler to purchase the pigmented paper, and apply it to the glass. And here a difficulty will be found. The "tissue" must, of course, be sensitised. If dipped into the bichromate solution, and applied to the glass, it will be found wholly impossible to get rid of the small air-bubbles which form between the pigment and the glass.	In my process these manipulations are unnecessary. The tissue is merely floated for three minutes on a solution of bichromate and hung up to dry.

To avoid this put the glass first into the pan of bichromate solution, then the pigmented paper, pigment side down. Let it remain for the proper time (two or three minutes), and then lift the glass with the tissue upon it. There is not the slightest difficulty in doing this without being troubled by the appearance of a single bubble.

It is not necessary to remove the paper; it is, in fact, better to leave it on. After exposure plunge into cold water, and after a few minutes peel off the paper. Finish with water as warm as may be found necessary. M. Carey Lea.

Mr. Lea prepares his sensitive surface by coating a *glass plate*, and that alone, with gelatine, either directly or indirectly. He finds paper will not answer.	I prepare my sensitive surface on paper, or any other convenient surface, preferring the former.
Mr. Lea prints through the support.	I do not print through the support, but upon the sensitive surface.
Mr. Lea uses reflected sunlight, and can only print occasionally.	I use sunlight or any other light, and print at all times.
Mr. Lea has to use special appliances for the above purpose.	I use ordinary pressure-frames only.
Mr. Lea developes his print upon the permanent support, and on that only.	I can develope my print on the permanent support, but prefer to use a temporary support, so as to obtain direct prints on paper without reversing the negative.
Mr. Lea cannot print on opal glass, or any opaque surface.	I obtain reversed prints directly on opal glass, or any impermeable surface.
Mr. Lea's process is limited to the production of transparencies on glass, although he foresees the possibility of obtaining prints on *transparent paper*.	I obtain transparencies on glass as readily as Mr. Lea, but obtain direct prints on paper or any other surface. My attention is particularly directed to book illustrating.

J. R. Johnson.

CRACKING OF COLLODION NEGATIVES.

"I have lately lost forty-five negatives through cracking of the film," said Mrs. Julia Cameron on Tuesday evening, "and I want to know the reason why."

The lady herself described it as a cracking of the collodion under the varnish; but a slight inspection of one negative through a pocket magnifier made it at once apparent that it was merely an ordinary case of cracking of the combined films of collodion and varnish. We have frequently directed attention to the cause and cure of this troublesome complaint, but a few words on the subject may not be out of place; and in giving them we shall also present a digest of the discussion arising on the matter at the meeting of the London Photographic Society, at which Mrs. Cameron attended in person to prefer her complaint.

Cracking, as was observed by a photographic chemist of great experience (Mr. R. W. Thomas), has been an occasional attendant upon the collodion process ever since its introduction. At the meeting just referred to, he gave it as his opinion that too thick a collodion had been employed by Mrs. Cameron, who, we may state, works on plates of a large size. So long as she employed a somewhat thin collodion she enjoyed an immunity from crackings, but with a collodion possessing more body the cracks came in great abundance.

In his valuable manual, *The Modern Practice of Photography*, Mr. Thomas appears to have anticipated some of the remarks made at the meeting in question. He says:—

"I have been occasionally asked to account for cracks in negatives. Fortunately this complaint is not of common occurrence, and therefore indicates an exceptional condition of the film. I have been at some pains to collect all the *reliable* information on this subject from those who have a large stock of negatives, some of which were varnished five or more years ago. From the facts collected I have no hesitation in saying that all cracks in negatives arise from want of attention to the following points, viz., drying the negative, washing out the hyposulphite or cyanide, and, lastly, the mode of drying the plate before varnishing. I have before said that negatives should be allowed to dry spontaneously. It is of the utmost consequence as regards the permanence of the negative that the fixing agent should be thoroughly removed; also that the heat required to warm the plate before varnishing should be applied in a regular manner, and only just sufficient to accomplish the object in view. When these three points are attended to, negatives will remain intact and free from cracks, as far as my own experience goes, for an indefinite time."

Respecting the influence of moisture in producing cracks, Mr. Thomas further says:—

"Negatives should not be kept in damp and cold rooms; no matter how carefully they may have been washed and dried or how good the varnish may be, if exposed to frost and moisture symptoms of cracks will be soon evident. I have known instances of negatives becoming cracked in the film from exposure in the printing-frame for some hours in wet and cold days in winter."

An examination of Mrs. Cameron's negatives enabled Mr. Blanchard to pronounce decidedly that the reticulated cracks on them were due solely to damp.

In treating of their origin, Mr. Dallmeyer suggested as a possible cause the employment of a particular kind of glass in which there was a certain amount of uncombined alkali, which, by producing what is technically known as "sweating," would ultimately endanger the safety of the film. The remedy he proposed for this was to immerse the plates in a bath of diluted sulphuric acid. Mr. M. Carey Lea has long advocated for this purpose a solution composed of an ounce each of bichromate of potash and sulphuric acid in a pint of water. We know of no one who has employed this solution who is not well satisfied with it.

We shall further advert to merely one other point, viz., the influence that the proper packing of the negatives exercises upon their permanence. By almost universal consent the best way in which to have them stored away is not in plate boxes, but in paper. When placed in a grooved box any sudden change in the temperature is apt to cause a deposition of moisture on the surface. That this is the case will be apparent to any person who will remove one of his lenses from a cold back-room or cupboard to another room in which the temperature is high. Instantly a deposition of moisture is made on the surface. This effect, so easily discernible on the finely-polished surface of the lens, is also produced in a greater or less degree on the negative, and to obviate such result by proper precautionary measures is worthy of attention.

Of these the simplest and, probably, the best is to keep the negatives packed together in convenient batches, having one or two sheets of clean blotting-paper interposed between each. Negatives thus treated, and stored away in wrappings of paper, will be quite unaffected by the hygrometric conditions of the atmosphere; and, so far as this is a source of cracking of the film, they will never exhibit any indication of cracking.

WHAT IS IT THAT CONFERS DENSITY AND SENSITIVENESS UPON COLLODION?

IN TWO CHAPTERS.—CHAPTER I.

This is truly an important question, and one which would form subject matter for discussion much more extended than could be given to it at a single meeting of the South London or any other Photographic Society.

From a tolerably full, and, I believe, substantially accurate report which appeared lately in this Journal, I gather that Mr. Blanchard considers Mr. Hardwich's instructions for the preparation of pyroxyline to be utterly wrong and misleading. Mr. M. Carey Lea, of Philadelphia, from whom Mr. Blanchard probably took his cue, has also recently published some remarks to the same effect; but it does not appear that the former made any experiments either to convince himself or strengthen the weight of his opinion. His observations, therefore, are destitute of value and can carry no authority, inasmuch as they are based on hearsay and insufficient evidence. On the other hand, Mr. Blanchard, I am told, has manufactured pyroxyline and collodion on a somewhat extensive scale, and, for that reason, he should be in a position to utter an opinion which, if it does not carry with it the weight of conviction, should at least receive attentive consideration, expressing, as it does, the experience of a thoroughly practical man.

In the course of the remarks he made at a recent meeting of the South London Photographic Society, Mr. Blanchard stated that the best and most sensitive collodion is from pyroxyline, made in weak acids, at a temperature not exceeding 110° Fah. If he had accompanied his observations with an exact formula, which, no doubt, he possesses, seeing that his dictum was uttered very authoritatively, this part of the question could be easily settled, for or against him, by direct experiment; but he gives no formula, and, therefore, we are left in a state of great uncertainty how to set about verifying or rebutting, from a few vague generalities, the truth of a decidedly pronounced opinion. If Mr. Blanchard will kindly publish full

particulars of his process of manufacture, stating the strength, proportions, quantity, and temperature of acids, also the weight and quality of cellulose, with the time of immersion in the acid mixture, we should then be in a position for making correct comparative experiments, without which all sweeping assertions which contradict our old practice are baseless and unreliable.

The late Dr. Hadow held, and Mr. Hardwich, Mr. Sutton, and myself now hold, a totally different opinion from that expressed by Mr. Blanchard at the South London Photographic Society. Mr. Blanchard may be right or we may be wrong, but the alternative remains to be proved; in the meantime we join issue on the subject.

No one I am sure who has read our writings will charge us, of the opposition, with the fault of reaching a conclusion without careful and extensive experiments. None of us, I believe, ever succeeded in manufacturing a good photographic collodion from cotton pyroxyline made at a temperature not higher than 110° Fah., although, from Mr. Blanchard's statement, I have no doubt it is perfectly possible to be successful. The question is how to do it; but without more information we may have to grope about in the dark for a long time without solving the problem.

Speaking for myself, I have always found that the best cotton pyroxyline for a normal collodion to be used in the *wet process* should be prepared in acids of a suitable strength, at a temperature ranging between 140° and 150° Fah. When the pyroxyline is required for a *dry process* it is desirable that the temperature should be higher, and, consequently, the acids stronger. As I have repeatedly referred at considerable length to this subject, it is unnecessary at present to enter into full details.

To be brief: my experience of the photographic properties of varieties of soluble pyroxyline runs thus:—Supposing the solvents to be the same for each variety, and supposing also the sulphuric acid to be greatly in excess of the nitric, pyroxyline, from cold acids, gives a skinny and tough film very repellent of aqueous solutions, sets too rapidly and not very smoothly, is apt to show structural markings, and the negative is thin and difficult to intensify, although the sensitiveness is all that could be desired. As the temperature at which the pyroxyline is made increases, so do the bad qualities of the collodion decrease, till we reach 150° Fah., beyond which sensitiveness begins to be impaired, and no counterbalancing advantage is gained.

A leading London manufacturer's collodion is prepared from pyroxyline by Hardwich's formula of hot acids (150°). I may be mistaken, but I think Mr. Blanchard would hesitate before asserting that his own collodion was superior in sensitiveness or good qualities to that to which I here refer.

With some of Mr. Blanchard's observations respecting the nitrate bath, compounding the collodion, &c., I cordially agree. A simply iodised collodion containing very pure materials, and excited in a pure solution of nitrate of silver, I consider the most sensitive of all; but there are advantages attending the use of bromide in conjunction with the iodide which do more than counterbalance any temporary superiority of the simple iodide in respect of sensitiveness. I say *temporary*, because an iodised collodion and the silver solution in which it is excited rapidly deteriorate, and cannot by any known means be kept up to their best working standard for any length of time.

Mr. Blanchard also stated some other facts which have not received from photographers that consideration which their importance demands. For instance: as you increase the proportion of bromide, you must always increase the strength of the silver solution and prolong the time of immersion. This, I have reason to believe, arises from the particles of bromide (which seem to be finer than those of the iodide) filling up the pores of the collodion and rendering it more impervious to an aqueous solution. I have grave doubts, however, whether, unless in exceptional instances, anything is gained in the wet process by increasing the proportion of bromide higher than from one to one and a-half grain per ounce of collodion.

I look forward with much interest to the expected publication of details of Mr. Blanchard's formula. GEORGE DAWSON.

ON PRINTING ON IVORY.*

I NEED not trouble you with a lengthy preface on the beauty of miniatures on ivory, and the suitability of that substance for painting on. I may as well, also, spare you all comments on the history of this kind of painting, as I do not consider myself so competent to enter upon that subject as some members of the Society who may now be listening to me; but I will say this much, that we can all remember the time when the ivory miniatures of our native artists formed an important feature in the annual exhibitions of the Royal Scottish Academy. Now a picture of this kind is never to be seen, unless it be the stray production of some ambitious amateur. I do not allude to this for the purpose of raising a single sentimental regret, but rather the opposite, as I believe by the aid of photography beautifully-painted ivory miniatures will yet be a coveted luxury with many, produced with a saving of much weary time to the sitter, of well-saved labour to the artist, and be a source of pleasure and profit to all concerned.

My first attempt to photograph on ivory was a very natural one to make, and yet it resulted in a signal failure; it was made about a dozen years ago, and I have never yet been able satisfactorily to account for it. I shall be happy if I succeed in making my account of it tonight sufficiently interesting to you to induce you to help me to come to some conclusion on the matter.

But, first of all, let me tell you what led me to make the experiment. I had made a transparency by the now common mode of putting a wet prepared plate behind a negative, and, as it was night, holding it pretty close to the gas burner. I was so much pleased with the result that I proceeded to improve upon it by mixing up some plaster of Paris, and varnishing it with that. I got then, but on a smaller scale, something like the now new Sarony picture. Perhaps I may as well complete the history of this specimen, as it may be interesting. It was placed over the fireplace to gratify myself and all who chose to admire it; but after the lapse of a week a spirit of mischief or some inspiration entered into me, and I could not resist the temptation to insert the point of my penknife and split off the stucco. My curiosity was rewarded by finding that I had now two pictures instead of one, the picture on glass appearing nothing the worse, and on the pure white glassy surface of the stucco was a perfect and delicate duplicate, formed by abstracting the surface deposit from the developed positive. I remember showing the stucco picture to a now eminent sculptor, and his admiring remark was—"You ought to make something of that;" so I must protest against any of you taking out a patent for this without consulting me. Now that it strikes me, could not Mr. Macbeth, with a few touches with coloured crayons on this stucco picture, so improve it that, by putting the two together again, something original and striking would be produced? But this is a digression.

It was a natural step to think next of producing a print by the camera upon white glass, and I made a run through all the shops in Edinburgh inquiring for white glass similar to a piece of a gas globe I produced, but with no success, until an enterprising glass agent offered to get me some of the various photographic sizes, and since then there has been no scarcity of the article in this country at least, thanks to Mr. J. A. Forrest, of Liverpool; although it must not yet be an article of commerce in Paris, as we see that a learned Frenchman has lately been lecturing photographers how to make bits.

But to return to the ivory, leaves of which I had no difficulty in procuring. One of these I proceeded to prepare as if it had been a plate of glass (after having made a preliminary trial with glass to ascertain the exact time of exposure, and to ensure that everything was in proper order). Everything went well until I came to develope, when I was puzzled at finding that the image, or a trace of anything like a picture, refused to appear, and that no amount of patience or coaxing or forcing gave me anything but development stains of all known and unknown kinds and descriptions. I then wiped off the film of collodion, which carried with it all the stains, and discovered below—nothing; no stains, no marks, no appearance of anything particular or remarkable, further than that the ivory had somewhat changed its complexion and assumed an uniform, useless yellow colour. The only conclusion I could come to at the moment as to the result of the experiment was, that ivory was not glass, and that there was no use repeating that experiment. I then dropt it in disgust, and started off, with some compunctions as to misspending time, to look after something else. That I felt disappointed with this poor piece of ivory I am sure; but I am not so sure that I did not feel positively angry with it. At all events, I rather think I must have cast a reproachful glance at it; for, somehow or other, the poor castaway caught my eye, and I relented. I took it up and looked at it. It was the same piece of ivory, but it was changed. It was now uniformly and intensely black.

I took another plate of ivory, and prepared it in the same way, only omitting the application of the developer and exposure in the camera as superfluous. Wiping off the film as before, I placed it at once under the negative, in a pressure-frame, and this time I was not disappointed. I looked frequently at the progress of printing, which the flexibility of the ivory readily permitted, and perceived that any depth of impression could be obtained.

* Read at a meeting of the Edinburgh Photographic Society, May 5, 1869.

I found that it was necessary to employ a certain kind of collodion for the purpose, and that, for example, a collodion sensitised with iodides simply and alone would not answer; that the kind that answered best was one much in vogue at the time, as it suited for making both positives and negatives nearly equally well, by simply varying the time of exposure in the camera, and suiting the development to the kind of work required. This was Keith's positive collodion. It seemed to all appearance to owe its virtue to a trace of free bromine, and I was fortified in this opinion by being able to make a collodion otherwise unsuitable to serve the purpose by adding to it a few drops of the chloride of bromine. Here, then, is a problem for the Edinburgh Photographic Society to solve:—What was the combination here? Was it a bromo-phosphate of silver and lime, or what was it? For you will observe that the ivory deprived the film of the sensitiveness which it otherwise undoubtedly had, as it would yield no image under development; and, on the other hand, the film imparted to the ivory a sensitiveness which it possessed not of itself to bestow the property of yielding an image without development.

In The British Journal of Photography for April 30, one of the Editors, in an article *On the Sensitiveness of Chlorine, Bromine, and Iodine Compounds*, says:—"The analogy between heat and chemical action is so close that we may easily consider bodies that are sensitive to heat as, to a certain extent, representing those which are sensitive to light;" and then adds:—"If eight parts of the metal bismuth (fusing point 518°), five of lead (fusing point 612°), and three of tin (fusing point 442°) be melted together, an alloy or a mixture is obtained which easily melts in boiling water, or at a degree of heat less than half that required to melt tin, the most fusible of the constituents of the alloy." The Editor, if I read aright, wished us to understand from this that, if we could discover the proportions, we might hit upon a combination of the iodide, bromide, and chloride of silver much more sensitive than anything we yet had. Now, I wish to put in a claim to consideration for the phosphate.

I contented myself with the method described of preparing the plates, as I could hardly imagine anything simpler or quicker, and produced many prints upon ivory in that way, toning in a slightly alkaline and weak solution of chloride of gold, and fixing in fresh hyposulphite of soda.

But I must not disguise the fact that, although the large painted specimen shown, which was done in this way, and is now not less than ten years old, speaks well for the permanence of such prints, having been subjected to a prolonged exposure to summers' suns and winters' colds in a show case. It *is* a matter of difficulty and perhaps uncertainty to know, in some cases, whether the chemical salts, of whatever kind they may be, are thoroughly eradicated, and, before putting work upon them, it is absolutely necessary to test them in strong light for a day or two, occasionally wetting the surface—to know, in short, whether they have been properly fixed. If the latter, this treatment will only tend to make them clearer; but if they become darker, or if the grain of the ivory begin to appear offensively distinct, I consign them remorselessly to a bath of cyanide, which quickly causes the picture and everything disagreeable to disappear; and, after due washing and giving the plate a new surface by scraping, &c., the old plate will generally be found to be more depended upon than one that had not been used before.

But I have, perhaps, said sufficient on this first method of proceeding, and will pass on to notice two other methods I have used for producing pictures on ivory, in neither of which salts of silver are used. The second, of which I show an example, is one with which you must all be more or less familiar: it is just to veneer, as it were, a paper print with a thin sheet of ivory. This plan, although it increases the work of the painter, as every part of the surface must be carefully gone over, has the advantage of being all but a pure miniature on ivory, and is very easily prepared. A transparent leaf is selected for this purpose, and the thickness is reduced sufficiently to show the picture pretty distinctly below. The surface of the photograph (previously mounted on stiff cardboard and dried) is covered with starch paste; the ivory is also pasted, and, in spite of its disposition to curl up when moist, is laid on its face between folds of blotting-paper and two pieces of card. It is at once passed through the rolling-press, when the adhesion is perfect.

The third and last method which I have to mention is perhaps the best and most perfect of all, as you may have the most beautiful photograph without tampering in any way with the native purity of the ivory. You may make your photograph of any colour you please, so as best to suit the complexion of the subject; add to which, that the artist can produce his best effect with the least possible labour. This is neither more nor less than a carbon print transferred to ivory. I prefer to follow Swan's first-published method. Make your tissue, print through the collodion, mount temporarily with India-rubber solution on white paper, and, after the picture has been duly developed and while still moist, lay it on the prepared ivory so as to exclude air, and the carbon print will dry hard and fast to the ivory without the intervention of any medium. The film of collodion is washed away with ether and alcohol. William M'Craw.

NOTES ON PHOTO-ENAMELLING.

The importance of the art of photo-enamelling is such as to warrant us in occasionally reverting to it, for in it, better than in any other process whatever, are solved the two problems of durability and fineness.

Our present object is to make some observations on the subject of enamelled or vitrified photographs, giving a more prominent position to the history and general methods of the art than to the details of its practice.

The processes by which photo-enamels may be made are few in number, and we shall class them in three divisions:—

First.—Those in which a vitreous powder is applied to an enamel tablet in a body of gelatine, gum, or asphaltum, the vitrifiable pigment superseding the carbon or other pigment usually employed in the carbon printing process, Pouncey's, Woodbury's, and similar processes.

Secondly.—Those processes which depend upon the discovery of Salmon and Garnier, that when a surface composed of gelatine or albumen mixed with bichromate of potash and saccharine matter is exposed to the light, and afterwards removed into a damp room, it becomes "tacky" in an inverse proportion, according as it has been acted upon by the light. In this state the latent image may be developed by being dusted over with finely-powdered ceramic pigment, which adheres to the tacky surface, and which, when placed in a suitable muffle and fused by heat, forms a ceramic photograph.

Thirdly.—Those processes which depend upon the fact that the finely subdivided metal composing the image in a photographic transparency may, by a process of substitution, be ultimately converted into a metallic oxide, which, superposed on a white enamelled plate and varnished, as it were, by a suitable vitrifiable flux, will present a durable image possessing all the details in the original negative.

So far as we have experimented, or seen the results of the experiments performed in any of the directions above indicated, the sharpest enamels have been obtained by the general process last described. To that let us, therefore, briefly turn our attention.

The first mention we have of photo-enamels is by M. Lafon de Camarsac (who has since so successfully laboured in this field), and it appears in *Comptes Rendus* of June 11, 1855. In this memoir he says that with pictures produced by the aid of collodion, albumen, gelatine, and by the ordinary processes of the salts of silver, he developes the image by nitrate of silver until the half-tints are overdone and obscured, and the deep shades are covered with a thick deposit presenting the appearance of a bas-relief. The proof is then placed in an enameller's muffle; the organic matters disappear under the action of a suitable temperature. On white porcelain or enamel or glass the blacks of the image are formed by the metallic deposit, which he then treats with solutions of salts of gold, tin, or chromium. Various tones are obtained by the solutions above named. A very thin layer of an appropriate and very fusible flux serves to fix the image on the ground. This process, it will be observed, is similar to that which MM. Marechal and Tessie du Mothay published some years afterwards.

We have known of fine purple tones having been obtained by printing the picture on a ground similar to that employed by Mr. Fox Talbot in his process of photoglyphic engraving, and, after washing it in distilled water and destroying the organic matter by the action of heat, applying washes of the salts of gold and tin. In this, as in the former case, a flux must be had recourse to.

Many persons who would like to amuse themselves by producing photo-enamels shrink from doing so for want of a proper muffle. One of the sharpest pictures we have ever burnt in was done on the top of a hot coke fire in a kitchen, no muffle whatever being employed. For experimental purposes, a square, flat, iron vessel, with an iron cover, answers well. A quantity of sand must be laid on the bottom, and on this the enamel must be placed. When the cover is put on, and this iron muffle is placed on a suitable fire, a sufficient degree of heat to fuse the vitrifiable substances may easily be obtained.

The "fluxing" is a most important point in the production of fine enamels. On this subject we cannot yet offer such observations as would, in our estimation, be practically useful to those of our readers who are experimenting in this elegant branch of our art-science. We have, however, a number of reliable formulæ for the production of vitro-pigments of various colours which, together with other "small matters" connected with enamelling, we shall give in our next number.

THE BACKGROUND AGAIN.

Shakespeare tells us, through the voice of *Hamlet*, that the purpose of playing, "both at the first and now, was, and is, to hold, as 'twere, the mirror up to nature," and in reference to dramatic representations he goes on to say that anything "overdone, or come tardy off, though it may make the unskilful laugh, cannot but make the judicious grieve," the censure of one of which latter should, he adds, "o'erweigh that of a whole theatre of others." In the matter of pictorial delineations, whether photographic or otherwise, the writer of the present article is most certainly of opinion that, in the main, they, as well as dramatic productions, should "hold, as 'twere, the mirror up to nature," and he is also of opinion that any natural points which in a picture are "overdone," or in reference to which the said picture might "come tardy off," though they may please some unreflecting enthusiast, cannot but fail to grieve the judicious observer.

There are other questions besides that of the position of the horizon line which may be asked in reference to pictorial backgrounds; as, for instance, "Should the background be sharp or ill-defined?"—"Should it be bold and vigorous with pure whites and blacks, or weak and suggestive without either?" and "Why should it be one thing in preference to another?" Writers on fine art generally lay down very emphatically how things should and how they should not be, but, as a rule, they steer pretty clear of any sound reasons in support of their assertions. That Ruskin said it should be so, that Corregio did it so, or that Turner liked it so, seem to be amongst the most powerful arguments in favour of any particular advocated course. That Ruskin was wrong, that Turner was wrong, or that Corregio was wrong, I for one should be sorry indeed to say, and most sorry, indeed, to think, as I have had but little art education, and only look upon these matters from what I conceive to be a commonsense point of view. Nevertheless, I am decidedly of opinion that a substantial reason should be given for any particular advocated course; and, for my own part, I do not consider the fact that a given course was pursued by a great man as being a sound reason why we should pursue that course also.

We are told, in standard works on optics, that the human eye possesses the most perfect adaptability to the various circumstances under which it is required to act, and that its focus is readily and involuntarily altered to suit the differing distances of objects upon which it is alternately brought to bear. When looking at a person situated at a short distance from us and backed by a distant landscape, we fail to see the landscape clearly and in focus whilst our attention is fixed upon the individual, because of the differing focal adjustments required in the eye to enable it to see distinctly objects situated in widely different planes. This being so, it is a very reasonable question to be asked by those who hold, with the writer, that the object of the representation is to hold "the mirror up to nature"—Whether we should not represent our subject most efficiently, under such circumstances, by leaving the background out of focus? Not only in nature, under the circumstances indicated, do we see our background imperfectly *defined*, but, from that very imperfect definition, we also fail to perceive the individuality of the blacks and whites which appear, according to circumstances, more or less commingled; hence it may be asked—If to be true to nature, should not a background be both out of focus and subdued in light and shade?

There is, however, something else to be considered. If we turn our eyes from a real figure situated a few yards from us towards the distant objects of the adjacent background, the *figure* loses its clearness of definition, and the details of the background—at least the particular ones under our immediate inspection—are crisp and sharp. Obviously, then, a picture, to produce the most perfect illusion of reality, should give us an out-of-focus and subdued background when we look at the figure, and an out-of-focus and subdued figure when we look at the background; and it just becomes a question how far this is possible.

The actual amount of subject seen by the eye in a state of perfect rest, in absolute definition, is, we are told by opticians, very small, and comprised within the limits of a circle of only a few degrees diameter; hence but a few degrees even of the figure are at one time seen in a state of perfect definition. The fact that the visual area available to the motionless eye is so small is a fact which very few would be aware of if not told. There must be, therefore, something to compensate for this smallness of area actually visible at one time (otherwise every one would know of it without being told). This compensation is found in the involuntary movement of the eye, and hence we are not readily conscious of this smallness of area, although the wanting definition in widely differing planes is much more readily perceived.

In the representation of a landscape alone, every portion of which is seen in the reality with equal definition during the involuntary optical movement, it seems to the writer every portion should be rendered with equal sharpness to obtain the natural effect; but where there is a figure in the immediate foreground and a landscape in the distance, it would seem not only in accordance with artistic taste but also with sound sense and reason that the background should not be so conspicuous and distinct as the figure. Any great loss in definition, however, is to a greater or less extent offensive, and not in accordance with the impression left upon the mind after viewing attentively some interesting object situated at a short distance which is backed by a landscape afar off, for in such an observation the scrutiny results in a vivid impression of the details of the interesting object inspected in conjunction with only a subdued and vague remembrance of the details of the landscape, which, notwithstanding, the eye remembers as having distinctly defined shapes, although it fails to remember with any vividness what those shapes were. This effect, it seems to the writer, is best produced by making the background subdued both in light and shade rather than greatly out of focus—an effect which is produced excellently well in the deservedly admired pictures of Mr. Edge, apparently by printing a delicate tone all over the background, and afterwards impressing faintly upon it the well-defined details of a suitable landscape.

Binocular vision affords in many respects—amongst them in the one now under consideration—much better opportunities than monocular vision for the adequate representation of natural effects; and, as I shall probably attempt to show at some future time, is, apart from the illusion of solidity which it so perfectly furnishes, the grandest means at our disposal of "holding, as 'twere, the mirror up to nature."

D. Winstanley.

PHOTOGRAPHY IN COURT.

COURT OF QUEEN'S BENCH.—May 8.

Sittings in Banco.—(Before the Lord Chief Justice, and Justices Lush and Hannen.)

EXPARTE G. B. WALKER.

Mr. Underwood moved, on behalf of G. B. Walker, now under sentence for having pirated certain photographs, the property of Mr. Graves, the eminent publisher, for a rule calling upon Mr. Graves to show cause why certain entries of copyright in the books at Stationers' Hall should not be expunged, on the ground that Mr. Graves had no legal right or property in them. The Copyright Act states that any person who believed himself to be aggrieved should have power to dispute the right of the person registered, and the question was whether Walker, who was now confined in one of the cells of the Surrey prison, under sentence for piracy, was a person aggrieved within the meaning of the statute.

The Lord Chief Justice said it had been held, and very properly so, that a person aggrieved under the Act was one whose title conflicted with the registered owner. The applicant was a pirate, and had no interest in the work. It might be that the registration was imperfect, but it was quite clear that Walker had no interest in it.

Mr. Underwood said Mr. Graves employed a man to photograph the engravings of the paintings of the old masters, and then registered them and claimed to have a copyright in them, when it was clear he could not comply with the requirements of the Copyright Act. He could have no assignment from the author.

Mr. Justice Lush: Your client is not aggrieved by that.

Mr. Underwood: We are put in prison.

Mr. Justice Lush: And properly so. (Laughter.)

The Lord Chief Justice said it was only at the instance of the party aggrieved that the court could be put in motion. That had been properly held to be a person who had a conflicting title, and not a person who speculated on the possibility of showing that this registration was imperfect.

Rule refused.

ANOTHER SEIZURE OF OBSCENE PICTURES.

At Bow-street Police Court, on Tuesday last, before Mr. Flowers, Sidney Powell, photographer and dealer in photographic slides and pictures, was brought up on a warrant charging him with selling obscene prints.

The prisoner was defended by Mr. Abrams.

Inspector Parker went to the prisoner's shop in Chandos-street in private clothes, and accompanied by a person who introduced him. The prisoner showed them a large number of obscene photographic slides, of which his friend purchased one, and Mr. Parker bought a slide which could hardly be said to be of that character. The prisoner showed them two oil paintings of a most disgusting character, but painted with considerable artistic skill, and asked Mr. Parker if he thought he could find a purchaser. Mr. Parker replied that perhaps he could, and asked the price. The prisoner replied that the price was 100 guineas. That day (Tuesday) Mr. Parker went there again accompanied by Police-constable Chamberlain, whom he introduced as a gentleman who wished to look at the paintings. The prisoner showed them to him, and he offered twenty guineas for them. This being refused, he offered fifty; but the prisoner said it was of no use, he would take nothing less than 100 guineas. They then asked to look at some prints. He said he had none; he had sent them all away the previous day. He added that he could get them any they wanted, but he would not keep them in the house in future, as he was obliged to be cautious, for the police were getting very sharp, though they would have to get a great deal sharper to catch him, which, indeed, they would never do. Mr. Parker replied that he was an inspector of police, and held a warrant for the prisoner's apprehension; at which announcement the prisoner was very much startled.

The two oil paintings and a large quantity of pictures were seized upon the premises.

Mr. Abrams said he was not prepared then to call witnesses, whose evidence, if he was correctly instructed, would satisfactorily account for the prisoner's possession of these articles. He must, therefore, ask for a remand, and he trusted that Mr. Flowers would take moderate bail.

Mr. Flowers said he would not object to a remand, but he would certainly not take bail at this stage of the proceedings. Of course, if, at the next hearing, Mr. Abrams could produce evidence tending to show that there was a good defence to the charge, he would then reconsider the question.

The prisoner was remanded in custody.

Pirating Pictures.—Job Lawrence, who was found guilty of pirating pictures without the consent of the proprietor of the copyright, Mr. Henry Graves, publisher, of Pall-mall, as reported in our last issue, page 220, was called up for judgment, before the Recorder, at the Central Criminal Court, on Thursday, the 6th inst., and sentenced to twelve months' hard labour.

Contemporary Press.

PRACTICAL DIRECTIONS FOR PRODUCING CHROMO-PHOTOGRAPHS.

[Bulletin Belge.]

In order to colour a portrait in oils with all the delicacy of nature, it is almost necessary to be able to paint the picture oneself, and as much may be said of the smallest water-colour; but it is not so as regards chromo-photography, which unites the advantages of the other two in a simple process accessible to everybody.

Two evils are scarcely avoidable in the ordinary colouring:—The one, when painting in body colours, through which the proof is often made quite unnatural, unless in the hands of a consummate artist; the other, when painting in water-colours, has the effect of completely changing the value of the tones, in consequence of the violet or brown base of the toning, so that a photograph, when coloured, never has the freshness and beauty of a miniature on ivory or a water-colour on card-paper. In landscapes, or portraits with flaxen hair, the difficulty is still greater. Many attempts have been made to colour shades on a white base, but it has always endangered the stability of the image.

In chromo-photography a proof is painted at first in thin varnish, which is then rendered transparent and spread upon a perfectly white glass. This image is but feeble, and, even when placed on white paper, the most shady parts are scarcely very apparent. But, instead of this white foundation, a second proof of the same negative is employed, which compensates, in the clear parts, for the want of vigour the transparency had occasioned in the first proof, and the laying of one proof over the other produces a surprising effect, not to be surpassed by any water-colour.

Such is the principle of the process; its execution is as follows:—Two proofs are printed, one of which is strong, the other feeble, on chromotype, rose, or thin Rive's paper, not albumenised. These two proofs, as has been shown, are intended to complete the picture, by being placed one over the other. None but the most perfect negatives are employed, exempt from such retouching as it would be impossible to hide. The two proofs are spread on a board like ordinary drawing paper—that is to say, the reverse side is moistened with a wet sponge, and the corners are pasted with gum arabic. Without further preparation the colouring of the light image is proceeded with. This must be sufficiently distinct, however, for the clear, fleshy parts of the model to be defined. Experience is the best master in regard to this; but care must be taken that the printing of the proof is very strong, as this can afterwards be modified, if required, by giving so much less vigour to the underlying image. This is the general rule, but sometimes the employment of the two images is reversed, and the stronger image is placed uppermost. This is the case when there are vapours in the distance, or clouds on the horizon.

It has been remarked that artists who are considered to have the best taste prefer a very light base for the top of the head, and that the shading gradually increases downwards. Pure water is passed over the head with a brush, and a general tint is given by means of a mixture of weak varnish of lake, rose madder, and bright ochre, always avoiding too frequently passing over the same touches. When this layer is dry, a slight glaze of rose madder is passed over the cheeks; for the tanned faces of men a layer with a base of ochre is employed, the cheeks being glazed with madder and Pouzzola earth. The shades about the eyes, below the nose, and under the chin are touched with ochre, the darkest parts being strengthened with burnt sienna. For blue eyes, the cobalt blue is employed; for grey eyes, a little ochre is added; for brown, the sienna. Light hair is made with light ochre, chesnut hair with dark ochre, brown with sepia, and black with neutral tint.

It must be observed that the colouring of these proofs differs widely from the ordinary colouring of photographs, inasmuch as the colours are not put on, but simply glazed over. It is clear that on these there is not much repeating. That which the shades of carnation gain by reflection they lose by transparency; they should, therefore, be covered *at once* without retouching the shades of the hair, the costume, and the ground. Certain accessories—such as uniforms, ribbons, orders, &c.—which are of a yellow, orange, or bright red, are translated into black in photography. It is evident that these cannot be treated by glazing; the only resource, therefore, is to paint them suitably in the negative and with the greatest care, so that they may retain their brightness in the tinted proof.

Objects in gold are slightly glazed with Indian yellow; the luminous part is finely marked, on the reverse side, with an opaque colour. Lace ornaments, when well printed in the proof, are washed lightly with a bluish tint. For a full ground without shadows, a mixture of vandyke brown and a little green may be used with advantage.

The second proof—which is to be printed with the greater strength, and which serves at the same time to complete the shades and to set off the colours—is executed in a similar manner to that above described, only that shades of carnation are effected with vermilion, which by transparency gives an excellent effect. It is the same with regard to light hair: the luminous parts are treated with a mixture of ochre and a little chrome white and yellow. If the shady parts are too black, they are brought to orange colour with ochre and chrome yellow. Shaded drapery may be brought out in the darkest parts by gum slightly coloured.

The two proofs being thus coloured, the weaker is pasted on a white glass by means of wax pomade composed as follows:—

In a vessel of hot water place, first, six parts of virgin wax, then six parts of gum dammar, and, lastly, two parts of Canada balsam; instead of wax, white whale oil, paraffine, or stearine is generally employed. This mixture must be well spread after heating the glass plate over a stove, getting rid of the bubbles by passing a folding-knife over the proof, but first allowing the glass to cool for a short time.

The second proof is, in like manner, stretched or pasted on a glass plate, and the two surfaces are placed exactly one over the other, and pasted at the corners by means of a band of paper. Between the two images small pieces of glass or card or wax are placed at the corners, which have the effect of softening the transitions and preventing hardness in the contours.

It is unnecessary to say that, in order to avoid dust and the risk of damage occurring to them, these chromo-photographs must be at once mounted in frames. These are mostly of velvet, which heighten in an extraordinary manner the brightness and freshness of the portraits—in fact, the proofs would be nothing without them.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 19th.......	Edinburgh......................	Hall, 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on Tuesday last, the 11th inst.,—the President, James Glaisher, Esq., F.R.S., in the chair.

The following gentlemen were elected members, viz.:—Messrs. A. J. Melhuish, William Cobb, Edward Davenport, Alfred Hughes, William Wainwright, Frederick York, and Captain Fred. Pocklington.

In the absence of Mr. J. R. Johnson, through indisposition, a paper by that gentleman *On Carbon Printing* was read by the Secretary. It appears that Mr. Johnson was to have given a practical demonstration of the working of his new process of carbon had he been present; this, however, was necessarily deferred till the next meeting. There were several specimens placed on the table as illustrations of the process, and, in allusion to them, the President, in proposing the thanks of the meeting to Mr. Johnson, said that any process by which such pictures could be produced was worthy of their most serious consideration. There was no discussion on the paper.

Mr. Griggs exhibited and presented for distribution a number of photolithographic prints from a very old engraving.

The CHAIRMAN said it was a matter of regret that ladies did not more frequently attend their meetings. He was glad, however, to observe two present, one of whom, he believed, wished to address them.

Mrs. JULIA CAMERON said it was not her intention to say anything beyond stating that several of her negatives had become cracked all over. The collodion, she thought, had cracked under the varnish, and what she wanted to know was the cause of this cracking and how it could be remedied.

Some negatives were then handed round for examination, and it was not difficult to observe, by the aid of a magnifying glass, that it was a simple case of reticulated cracking of both films, namely, the varnish and the collodion.

Mrs. CAMERON said that forty-five of her negatives had gone in the same way, and made a statement concerning the various collodions and varnishes she had been using.

Mr. R. W. THOMAS said that, ever since the introduction of the collodion process, cracks in the negative had been found to take place under all circumstances; and no matter what kind of collodion or varnish were used, this cracking would occasionally take place. It arose from a certain incompatability between the collodion and the varnish. Change of temperature would frequently bring it about. Negatives that had been stored away with paper between them never cracked, while those kept in an ordinary plate-box had been subject to the disease. His own experience was that a specially thick collodion gave negatives which were more liable to crack than when a thinner collodion was employed. Even the same bottle of collodion was thicker at one time than at another. When first opened it might be thin and fluid, but from the evaporation of the ether it gradually became thicker, and thus gave a more contractile film.

Mrs. CAMERON suggested that she was perhaps to blame for using old plates over again.

Mr. THOMAS said that cleanliness was undoubtedly of the very greatest importance. When Dr. Diamond first introduced the chloroform and amber varnish, he flattered himself that that would prevent cracking of the film; but negatives protected by it really did crack when stored away. The cause lay in the contractility of the film.

Mr. BLANCHARD observed that he understood that Mrs. Cameron resided at Freshwater, and her collodion, &c., were therefore much exposed to saline influences. Moreover, they had had, during the past six months, one of the wettest seasons on record. The cause of the reticulated crackings was damp. He saw a large plate-box on the table, and he supposed that Mrs. Cameron kept her negatives in that box.

Mrs. CAMERON: Yes.

Mr. BLANCHARD continued by saying that if the negatives had been stored away in paper instead of in that plate-box they would have been preserved. As Mrs. Cameron had asked for a remedy in the case of the negatives that were cracked, he would suggest the application of a little soot or lampblack, which, when rubbed lightly over the surface, would prevent the cracks from being noticed.

Mr. HOOPER had observed, especially in large plates, that some slight condensation of the breath sometimes occurred on the surface before the collodion was applied. Some persons had obviated that by suggesting that the plate to be coated with collodion should be covered with another plate of glass kept separated from it by a cork at each corner, and having in the centre a hole through which the collodion was poured on to the plate underneath. He also could attest the value of packing the negatives, not in grooved boxes, but in paper, with a sheet of blotting-paper between each.

Mr. DALLMEYER would not say anything on the chemical part of the subject before them, but he would on the optical part. Certain kinds of glass decomposed much more rapidly than others, producing an effect known by opticians as "sweating." It was possible that Mrs. Cameron had recently been employing a different kind from that she formerly used, and to that might be attributed the cracking. In some glass there was an excess of alkali which was not combined. If the glass could not be wiped clean, it should be dipped in a solution of sulphuric acid—one part of the acid to four parts of water—and that would ensure freedom from any ill effects arising out of the decomposition of the glass, one consequence of which might be the production of such crackings as those in the negatives before them.

Mr. F. W. HART said that, in consequence of the escape of steam from a pipe, part of his wall had been rendered damp, and on examining a cupboard there, in which were some negatives of little value, he found that the negatives had become cracked. It was probable that the film had first risen up from the glass in ridges, which, when they had subsided, had left the fine cracks.

Mr. HOWARD said that one of the most efficacious methods of protecting the negative from the effects of damp was to have the plate made sufficiently warm before the varnish was applied, and also well heated afterwards, so as to drive off the excess of spirit.

Mr. HART observed that it was well known among chemists that alcohol absorbed water very rapidly; hence, if it were not driven off from the varnish by heat, dampness would be apt to ensue.

Mr. ELIOT had always large numbers of negatives passing through his hands, and he could say, from experience, that the best method of preserving them was to keep them packed in paper — clean paper, and not newspapers or printed sheets. It would also be advantageous to wrap them up in brown paper rendered waterproof by means of India-rubber or gutta-percha varnish.

The CHAIRMAN said they were all indebted to Mrs. Cameron for having brought forward a subject which had led to such a profitable discussion.

Captain Lyon then exhibited a very large and beautiful collection of photographs of temples and similar archæological remains, taken by him in Southern India and also in Egypt, and expressed his sense of the efficient aid rendered to him in the undertaking by Mr. Dallmeyer.

Messrs. Schmerl and Ellis exhibited a number of interesting vitrified photographs burnt-in on porcelain. The tone of these was a rich brown colour.

A considerable number of prize pictures of the Amateur Photographic Association were exhibited by Mr. Melhuish, the honorary secretary of that body. We had not an opportunity of examining these pictures properly, but intend to avail ourselves of the Chairman's invitation to visit the offices of the Association in Baker-street and examine them more at leisure.

After an intimation by the Chairman that a committee had been appointed to watch over a fine arts' bill about to pass through parliament, the meeting was adjourned to the 8th proximo.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

THERE was a meeting of this Society held on Wednesday, the 5th instant, Mr. Goslett presiding, but most of the time was taken up with private business.

Mr. Bensa presented a copy of his excellent "Photographer's Reference Table," and Mr. Taylor exhibited some *carte* prints on Obernetter's paper; after which the meeting was adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THIS Society met on the evening of Wednesday, the 5th inst., in the Hall, 5, St. Andrew-square, Mr. James Ross presiding.

The minutes of the former meeting having been read and approved of, the following prints were presented to the Society's album:—Two landscapes by Mr. Peat; two ditto by Mr. Burns; together with portraits of Mr. Burns and Mr. Jamieson.

Mr. M'CRAW then read a paper *On Printing on Ivory*. [See page 230.] Mr. M'Craw exhibited specimens which had been painted for a number of years, to show that they could stand the test of exposure to at least all kinds of light.

In the course of the discussion which followed the reading of the paper,

Mr. MACBETH stated that he had not painted on ivory, although he much regretted the almost total disappearance from the walls of their exhibitions of the fine examples of ivory miniature painting which used to adorn them. Silver printing would in colour, he thought, be quite unsuitable for the delicacy and transparency of ivory painting, and, therefore, some of the tints in carbon probably would be the best. Before concluding he might mention that there was a medium sold for that kind of painting which was able to stand a wash, and that simplified greatly the process, as without it the colour was easily removed; while if much gum were used, the colour curled off the tablet.

Mr. W. H. DAVIES said that one peculiarity mentioned by Mr. M'Craw was common to both the process then before the Society and that brought before it on a previous occasion by Mr. Lothian—he meant the rapidity of printing; and that, in both instances, was produced by other agents than the plain chloride of silver. In the instance before them there must be some compound of the nature of phosphate of silver formed, and, singularly enough, that salt was very early (in 1839) used by Dr. Fife, of Edinburgh, to produce the first photolithograph, copies of which, he believed, were then in the library of the Royal Scottish Society of Arts. What he wished the Society to infer was, that if rapidity is conferred by the use of different salts and compounds in printing, experiment should lead them to arrive at the same results in the sensitising bath, and so great good might arise in that way from attention being freshly directed to the idea. As to the transferring of pigments to ivory, with gelatine, that was a very simple process and exceedingly easily worked. The other method, that of thinning down the ivory and pasting a print on the back, was, if he mistook not, first proposed by Mr. Collings.

Mr. Tunny stated that at one time he had experimented with the ammonia-phosphate of silver, which proved remarkably rapid. It was one of a set of experiments made at the time of the introduction of the Wothlytype process, and he thought it deserved attention. He had called attention to the fact in the journals at the time.

Mr. Nicol stated that it by no means followed that the contact of nitrate of silver with so complicated a substance as ivory formed phosphate of silver—only, no doubt, from the large quantity of phosphate of lime in it, that would be a part of the reaction; but only a part, as there must be several other salts and substances, any one or all of which might be equally involved in the reactions which resulted in the increased rapidity.

In moving a vote of thanks to Mr. M'Craw,

Mr. Ross suggested that it might be a very proper and wise thing to enter into a series of exhaustive experiments on the subject, as anything which could be done to increase the rapidity of the sensitising bath was of immense importance to the future of photography. He threw out the suggestion in order that Mr. Nicol, and others like him, competent to do the work, might be induced to go into the matter.

Mr. T. H. Douglas then exhibited a number of prints taken on Obernetter's prepared paper, which he had toned in various ways, and he presented several to the album, in order that they might remain for testing by time, that being the only true test of permanence.

The meeting was then adjourned.

Correspondence.

Foreign.

Paris, May 8, 1869.

On Friday evening was held the monthly meeting of the French Photographic Society. There was a large attendance, and a great deal of interesting matter was brought forward.

One of the first presentations was that made by Mr. Sarony, who exhibited a number of his beautiful photo-crayon pictures, their lithographed backs, method of mounting, advantages, &c. The patentee came over to Paris for this meeting, and, it being announced, he was warmly and cordially received. All appeared to agree in the beauty of the pictures, and the only point of doubt in some minds was, whether it was wise and artistic to be limited to a certain number of backgrounds and tints—whether it would not be better to make a background exactly suited to each picture, and not be limited in choice. Theoretically it would be better; but practically I fancy that 100 different backgrounds will be stock enough for most photographers and their customers.

A number of carbon prints, transferred negatives, prepared gelatinised cards, coloured "tissue," and an India-rubber brush used in the operations were presented to the Society by Mr. Ernest Edwards. The ingenuity of the brush seemed to take greatly, and all must have been struck with the many applications of this simple and easy carbon process. Full reports will appear in the next *Bulletin* of the Society, when we shall learn more of the official mind on these two presentations.

A very beautiful and well-got-up album of *carte*-sized photographs of the female characters of Gœthe was handed round for inspection. The text was exquisite, the photographs good, and the binding excellent. It is published by an American house in New York, I think.

A communication upon the preservation of negatives was read; and although the plan proposed did not contain any novelty, it did no harm in reminding photographers of its existence. The plates are to be covered with a mixture of albumen and water, dried, plunged into a seventy-five-grain silver bath for coagulation, washed, and passed through a concentrated bath of hyposulphite of soda; again washed, then dried and varnished. Negatives thus treated last much longer and bear more printing from than if merely varnished.

A communication from Mr. Blair, of Perth, claiming priority in the use of the transfer albumen process over MM. Marion and Jeanrenaud, was read. Mr. Blair appeared to make out a strong case, and his communication was ordered to be printed in the *Bulletin*, which would be proof of its having been received and noticed by the Society.

M. Franck de Villecholle brought a photographic grief before the Society, and solicited the aid of his brethren in explaining it. Many of your readers have experienced the same disappointment, which consists in seeing a valuable negative disappear under the influence of the varnish. M. Franck was puzzled, having tried all sorts of remedies—even to the extent of buying a bottle of Sœhnée varnish, which, as far as dissolving his negatives went, was no better than that made by himself.

M. Davanne considered the gun-cotton with which the collodion was made was at fault; he had had similar experience once, and it was when he had made an *extra soluble* cotton—some which would dissolve like sugar in tea, without a residue. This cotton was *too* soluble, and was dissolved by the strong alcohol of which the varnish was made.

M. Franck seemed to see that that might be the cause, for with some bottles of the *same* varnish he had had no dissolution of film. This he accounted for by supposing that this varnish had been prepared longer than the other, which attacked the film, and had been left in imperfectly-corked bottles, from which a portion of the alcohol had evaporated, leaving a less spirituous varnish, which would not dissolve films of soluble cotton. Sœhnée varnish, being made of strong alcohol, would act upon any cotton at all liable to alcoholic dissolution. M. Franck introduced to the notice of the meeting, a paper prepared with gelatine instead of albumen. The object of this is to cheapen the paper, and to render its manufacture more uniform and certain. The proofs submitted to the meeting would not induce many to give up eggs and take to gelatine, I think.

Whilst upon the subject of paper, allow me to refer to a letter signed "H. H." in your number of April 30. Your correspondent wishes to find a "rougher surface than ordinary albumenised paper on which to print studies of large heads," &c. I had the pleasure this evening of making the acquaintance of Mr. A. A. Taylor, of Marseilles, a gentleman whose name is already well known to many of your readers, and whose actinometer I described in a recent communication. Recollecting that Mr. Taylor had suggested the use of a solution of shellac in borax for preparing positive paper, and thinking of the wants of your correspondent, "H. H.," I hoped to get a little information which might be useful to him. Mr. Taylor informed me that he uses this shellac process regularly, and he can obtain a great variety of warm tones with it. He also uses Whatman's drawing-paper for his positives, and upon this and similar paper he can obtain any amount of "grain" he may require. He can print upon blotting-paper, if necessary, with the shellac process. Visitors to the photographic exhibition, at present open in the Palais de l'Industrie, will be able to inspect a number of these shellac prints. They appear to be quite permanent, and, I think, if "H. H." would try this process, an account of which he will find in one of the back numbers of this Journal, he will find all he requires for his studies of heads.

M. Davanne introduced some pictures which were produced, according to the programme of the evening, by a new system of heliochromography. A little disappointment was naturally felt when it was found that these pictures did not belong to the class generally understood to be heliochromographs, such as the productions of M. E. Becquerel and M. Niepce de St. Victor, but were obtained by a process in which light certainly played a part, but only as much as in Woodbury's and kindred processes, the production of which cannot be correctly termed photographs. Your readers may remember a critique in one of my letters upon a work eminently theoretical, issued by a M. Cros; these pictures were the result of carrying out a similar theory. I can best explain the idea upon which this "new system of heliochromy" is founded by showing how a "heliochromograph" is obtained from a transparent coloured picture. This picture is laid upon a piece of sensitive paper or a dry plate, and a negative is obtained representing all the *blues*, say, in the picture. This is accomplished by interposing a piece of glass coloured with a pure blue, between the picture and the negative surface. Another negative representing the reds is taken in a similar way, and another for the yellows. Thus three negatives are obtained, representing the primary colours of the transparent picture. To print these colours, paper is prepared with gelatine, and the desired colours are mixed with it, as in a carbon process. The reds are printed from the red negative, the blues from the blue, and the yellows from the yellow *cliché*. As your readers will see, these pictures are not "naturally-coloured photographs;" the light does not produce the colour, but only aids in fixing them. The pictures produced at the meeting were certainly pretty good, and, for first attempts at a theory, might be considered encouraging. M. Davanne suggested the application of Woodbury's process to this system, each colour to be printed from a separate metallic "negative." It is probable that we shall hear more of this system.

A piece of apparatus serving for a variety of uses was shown towards the end of the meeting. It was a "bellows camera," with box, upon which it fitted, after the style of the achromatic stereoscopes of Messrs. R. & J. Beck. The box contains the accessories, and with these the apparatus can be used as—1. Ordinary photographic camera, for portraits and views. 2. An enlarging camera. 3. A solar photographic microscope. 4. An ordinary solar microscope. 5. An ordinary compound microscope. The box containing all is rectangular, eighteen inches long by thirteen wide, and serves as a stand for the instruments. Further than this, in clever hands, it can be used as—6. A terrestrial telescope. 7. A photographic telescope, for obtaining large photographs of distant objects. 8. An instrument for enlarging directly on to paper; and, lastly, a photographic ophthalmoscope!

Some photographs of microscopic objects, obtained by the oxyhydrogen light of M. Tessie du Mothay, were shown, and were very good. Other good photographs, of various kinds, showing the capacities of this instrument, were also handed round. It is called the apparatus of Borie et Tournemine, and costs from £20 upwards. I may probably refer to this again. Some one suggested a good use for the phototelescope arrangement, and thought it would take well if it would photograph sitters without giving them the trouble of "getting up stairs."

The exhibition of photographs in the Palais de l'Industrie is now opened, and the following is a copy of a poster to be seen on the blank walls of the city:—"Exhibition, 1869.—Palais de l'Industrie. Pavilion south-east. Door No. X.—Photographic Exhibition will remain open

from the 1st of May to the 31st July, 1869, every day, from 9.30 a.m. to 5.30 p.m. The Exhibition includes the works of French and English photographers, views, monuments, portraits, types, costumes of various countries, reproductions of works of art, photographic transparencies and enamels, impressions in carbon and printing inks on metal and on stone, practical demonstrations; picturesque and scientific photographic projections, by M. Duboscq; enlargements by the oxyhydrogen light of M. Tessie du Mothay. Entrance, 50 centimes, by door X. of the Palais, the side facing the Place de la Concorde. Entrance can also be obtained through the exhibition of paintings at the extremity of the gallery of the Pastels, and at the garden, by the great staircase of the South-east Pavilion."

I hope many of your readers will come and see this Exhibition if it be worth it. I expect to report upon it in my next, and also upon some new apparatus for the oxygen light of M. Tessie du Mothay.

R. J. Fowler.

Home.

IN RE PYROXYLINE.

To the Editors.

Gentlemen,—Your able American correspondent, Mr. M. Carey Lea, in his letter at page 224, makes three categorically-numbered assertions which I not only dispute but believe to be utterly incorrect. In dealing with them I closely imitate his manner, and briefly assert—

1st. That the formulæ published in the seventh English edition of *Hardwich* by Mr. Dawson *are* considered by the best makers of collodion in this country to be reliable.

2nd. The directions given in that seventh edition for preparing intense collodion *are reliable*, and cotton prepared by them is at least as soluble and sensitive, and certainly more intense, than that prepared by any other method.

3rd. In referring to the article written by me on the subject of Dr. Liesegang's papyroxyle, and translated into the *Archiv* for March 15th, 1869, Mr. Lea misinterprets my meaning. In the article, to which I suppose he refers, I inferred, without any information from Dr. Liesegang, that the papyroxyle was prepared in cold acids, because the collodion made from it showed structural and crapy lines while setting, was deficient in intensity, and unfit for the collodio-bromide process until it had been kept for some time.

Mr. Lea confesses to have made no experiments in the manufacture of pyroxyline; and when he tells us there are trade secrets about the matter, he is misinformed. I can easily conceive a professional pyroxyline maker, when applied to by any one to make an intense pyroxyline by Hardwich's formula, to shake his head mysteriously and say, like Southey's knife-grinder—"Story! God bless you, sir, I've none to tell." Of course, none of these pyroxyline men have a story to tell. They say they have got secrets, which I repeat are no secrets at all to those who will take the trouble to read and practise.

If I am not mistaken, Mr. Lea has applied the word *intensity* to denote a pyroxyline capable of yielding a collodion which gives, with ease, great density of image by the wet process or the dry. In this country we are in the more correct habit of calling such collodion organic in its reactions and porous in structure. Any kind of collodion acquires intensity by age; but I believe the only way to produce, in a new collodion, those porous and organic qualities which are invaluable in most of the dry processes is by making a pyroxyline (from cotton I mean) at a high temperature—certainly over 150°.

To make the matter short, I will undertake, before a competent tribunal, to produce a pyroxyline, made in acids at a temperature over 150°, quite as soluble and sensitive, vastly more *intense*, and possessing better flowing properties than Mr. Lea or Mr. Blanchard can prepare in acids at a temperature under 120°.

Will Mr. Lea or Mr. Blanchard accept my challenge?—I am, yours, &c.,

King's College, May 8, 1869. George Dawson.

THE PHOTO-VELOCIPEDE.

To the Editors.

Gentlemen,—In your last issue your "Peripatetic Photographer" asks the following question:—"Which is the better machine for the photographer—the bicycle or the tricycle?"

Now this is a question something like the following:—Which is the better for a landscape photographer to use—the "wet" or the "dry" process? Both questions are difficult to answer, as the replies to both entirely depend upon the requirements of the photographer. Enough has already been said concerning the second question, but, as yet, with regard to the first we have not come to any very definite point, except that velocipedes are "good things" for photographers.

Now, if a photographer, either amateur or professional, wishes to use a velocipede as a means of transporting himself and his apparatus from place to place, he must first settle with himself two things—Is he going to use the "wet" or the "dry" process, and what size plates does he intend to carry. If he mean to use the "wet," however small his plates may be he *must* use a tricycle in order to be able to carry his tent, chemicals, &c.; but if he go in for the "dry," and the plates do not much exceed 9 × 7, the bicycle is by far the better machine for the purpose.

The advantages are pointed out by Mr. Swan in your last Almanac, and the camera, &c., is strapped on behind as described by him in his article on the subject.

I possess both a bicycle and a tricycle, and I much prefer the former. I intend to use it on my coming dry-plate summer tour, and I have no doubt if other photographers were to try this mode of travelling they would be greatly benefited in many ways.—I am, yours, &c.,

Harrow, May 10, 1869. W. J. A. G.

SUTTON'S ALBUMENISED PAPER.

To the Editors.

Gentlemen,—My attention having been called to a paragraph in your Journal of the 23rd ult., relating to the paper known as "Sutton's Patent Albumenised Paper" (prepared with India-rubber solution), I wish to state that Mr. Sutton prepares that paper with considerable improvements, and has appointed me sole agent for the sale thereof.

As the notice in question appears to refer to my advertisement, I trust you will allow this explanation to appear in an early number.—I am, yours, &c., T. Ordish.

90, *Newgate-street, E.C., May* 10, 1869.

A RECTIFICATION.

To the Editors.

Gentlemen,—In justice to Sir Frederick Pollock, I hasten to rectify a mistake I inadvertently made in my "Notes on Passing Events" in your Journal of this morning. On examining an authentic report of the trial, Talbot *versus* Laroche, supplied to me by a friend, I find that the question, as stated by me—"Is hyposulphite of soda an acid?"—should, to be correct, have the words "*a bromide*" substituted for "an acid." And further, and more particularly, that instead of the question having been put by the Lord Chief Baron, it was put by the Lord Chief Justice (Jervis).

The fact that the trial took place in 1854 must form my excuse for haziness in my recollection of that event, which, although much spoken of at the time, has, it appears, from the lapse of time, become impalpable in its details. Your "Peripatetic Photographer."

May 7, 1869.

[No person knows better than our correspondent that because a lawyer puts what *appears* to be a question betokening ignorance on his part, it thereby follows that he is *really* ignorant. For example: a celebrated Scotch advocate whose skill in piscatorial pursuits was such as might well render him the terror of the finny tribe, and who, moreover, was a lucid writer on such sport, was once engaged in defending some complicated case of salmon poaching, and astonished his brethren of the long robe by saying to a witness whom he was badgering—"I do not know how a salmon is caught; you must explain the whole operation." In reply to the broad smile which this evoked, he remarked—"*As a lawyer* I know nothing about salmon fishing except what I am told by the witness." The skilful use he made of his "ignorance" gained him his case. And, in like manner, even had the late president of the Photographic Society put the question, wrongly attributed to him, he could only have done so *as a lawyer*, for we have undoubted evidence for saying that, *as a layman*, he was at the time of the trial in question well up in photography.—Eds.]

QUERIES IN NOMENCLATURE.

To the Editors.

Gentlemen,—Will you kindly answer me the following questions:—

1. If liquid ammonia be added to a solution of nitrate of silver till the oxide of silver which it throws down is redissolved, what is the name of the solution thus obtained?

2. What becomes of the nitric acid of the nitrate of silver in the original solution?

3. When oxide of silver is dissolved in a solution of nitrate of ammonia, what is the name of the solution?

4. What is the name of the solution when oxide of silver is dissolved in liquid ammonia?

5. If a solution of nitrate of silver be added to the solution obtained in No. 1, what is the name of the mixture?

6. Are all of these solutions different? and, if not, which of them are identical in composition?

By answering the above, you will oblige one who is—No Chemist.

[We may dispose of queries Nos. 1, 3, 4, and 5 by stating that the solution obtained as described in asking the first question is that generally called ammonio-nitrate of silver solution. The others have

no special names.—2. The nitric acid is supposed to remain partly in combination with the silver and in part with the ammonia.—6. If "No Chemist" will refer to our recent articles on the action of these several argento-ammoniacal solutions upon albumen, he will see that all these compounds vary more or less in their reactions.—Eds.]

OBERNETTER'S PAPER.

To the Editors.

Gentlemen,—It is advised that prints on Obernetter's paper be mounted while wet. How are they to be cut to proper shape, under a glass cutting shape while wet, without injury to the film? I have very hastily printed one proof on Obernetter's paper. I enclose it for your opinion. It was toned with the ordinary acetate bath.

I am inclined to think that, with care and a little over-printing, the ordinary toning bath will be found to give more satisfactory results than Obernetter's rather complicated formulæ.—I am, yours, &c.,
London, May 10, 1869. Oxoniensis.

[The print is quite as good as any we have seen by Obernetter himself. Respecting the mounting of them, we have yet made no trial. Will any reader state his experience in this direction?—Eds.]

COPYRIGHT IN LANDSCAPES.

To the Editors.

Gentlemen,—Kindly answer the following:—If a photographer take a view from a certain spot and register the picture, am I infringing his copyright if I plant my camera on exactly the same spot and take a picture similar to his?—I am, yours, &c., Ajax.
Brighton, May 8, 1869.

[So long as you do not copy the *photograph* there is no infringement. You may take as many *facsimiles* of registered pictures as you please, provided you take them from nature.—Eds.]

A NEW CARBON PROCESS.

To the Editors.

Gentlemen,—Some time ago I sent a picture in carbon to a contemporary, upon which he expressed on the whole a favourable opinion. Since then I have spent four days with the author of the method. I send you by post a sample for your judgment.

I am not allowed now to give full details concerning it, but this much I saw and may state:—The pigmented material or paper was sensitised as for silver, dried, and exposed for about three or five minutes, plunged into warm water, developed, dried, and mounted in one hour, no transferring being required. The paper in the unsensitised state will keep any time, and can, therefore, and will, be sent out just like albumenised paper. The method of preparation previous to sensitising I am not yet allowed to make known; yet, if simplicity and rapidity, with good results, are a recommendation, I think this method will make its way. The negative was my own, taken years ago, and was somewhat dense.

Allow me a word, in conclusion, upon another subject, namely, to thank you for your shrewd remarks upon the critique sent you of a local exposition that took place here of the so-called "adaptations of photography." When will a good and witty book be written upon the hollow *art* of puffing. In the long critique you read there was not one sentence really true.—I am, yours, &c., John Beattie.
2, *Westbourne Place, Clifton, May* 10, 1869.

[The print alluded to by Mr. Beattie possesses such good qualities as to warrant us in indulging an earnest hope that the process will soon be made public.—Eds.]

COPYRIGHT IN ENGRAVINGS.

To the Editors.

Gentlemen,—You are in error in supposing that an Act of Parliament can restore copyright to engravings from which it has lapsed, or give it to those in which it has never previously existed. Acts of Parliament are not retrospective.

The picture, *Bolton Abbey in the Olden Time*, has been repeatedly engraved. In the case of one plate, at least, the terms of the Act were not complied with, and, therefore, it is no piracy to copy that plate by photography or other means. The same argument will hold good in most engravings published prior to the passing of the Act of July, 1862.—I am, yours, &c., F. D. B.
Gloucester, May 12, 1869.

LONDON GAZETTE, *May* 11.

Bankrupt.

B. Woodwards, Trowbridge, photographer. May 24, at Trowbridge.

Folding Photographs.—A valued correspondent desires us to inform our readers that when any of them send a folded photographic print through the post they should never fold it *inwards*, but always with the face outwards. He further says that the thumb nail should never be run along the fold; and, if possible, the picture should always be put outside of the letter to keep the folds round. By adopting these precautions, almost any print could be sent unmounted through the post without its being destroyed by a permanent crease.

Reutlinger's Studio.—This celebrated artist gives to the *Philadelphia Photographer* a description of his studio, from which we make a few extracts:—"My studio, made of glass and exposed to the north, is quite plain, and has a length of 9 metres 50 centimetres; but of this there are only 5½ metres built of glass; the balance was a small room, which was added to give it more length. The glass side is 2 metres 90 centimetres high, which is divided into three parts:—1. The lower part is a wall 50 centimetres high. 2. The middle part, 1 metre 10 centimetres, of stained glass. 3. The top, 1 metre 30 centimetres, of common white glass; the whole length, of 5½ metres. The whole roof of this is also made of stained glass. I have, therefore, only 1 metre 30 centimetres of white glass, the balance of the light coming through stained glass. The whole width is 3 metres 35 centimetres, and the side wall being 4 metres 10 centimetres high, it gives a fall of 1 metre 20 centimetres to the glass roof. To guard against the strong rays of the sun in summer, I have a blind over the whole length of the roof, which has a height of about 1½ metre, and is managed by a crank inside of the studio. Besides, I have inside six different screens or curtains of blue calico, to shade the light from the top, and also to guard against the reflection of the sun from the houses opposite. These curtains cover the whole length of the stained glass, so that most of the time I only get my light from the 1 metre 30 centimetres of white glass. As you may judge from the above, I have only one side where I can sit my models, and it is only when they sit for small vignettes that I can place them on the other side, on account of the shortness of the studio. This accounts for all my productions being ighted from the same side, which is very troublesome with a great many subjects. Another inconvenience is the small width. For this reason I am unable to have my background on frames, as is usually the practice. The only two I have I am compelled to place at angles; but I have eight others on rollers, which are let up and down, with balustrades, chimneys, columns, &c., as auxiliaries."

Spiritual Photographs.—We have lately directed attention to an extraordinary trial at New York in connection with the humbug of spiritual photography. The New York correspondent of the *Standard* writes:—"A trial of a very remarkable character has been going on for some days in the police court in this city, in which the knavery and delusion of modern spiritualism have been manifested in an extraordinary light. One Mumler, a New York photographer, has been driving a very lucrative business for some time past in taking spiritual likenesses. The humbug had been pushed so far that the authorities deemed it worthy of notice, and Mumler was accordingly arrested and charged with obtaining money by trick and fraud. Large numbers of persons have crowded the court room where the trial is in progress. The device of the charlatan consisted in his executing photographs of living sitters, who paid an extra price for the portrait of some lost relative or friend which should appear plainly recognisable, though in ghostly presence, on the same picture. Many specimens were produced in court. Sorrowing widows, in decorous mourning garb, were taken with the *simulacra* of their lamented husbands' rising over them. Mothers, with the apparitions of departed children in their laps, looked at the court from *cartes de visite* of the customary pattern. Mumler's defence is bold enough. He insists upon the supernatural character of his photographs. He asserts that the disembodied spirit takes its place by the side of the sitter of flesh and blood, or hovers in dim angelic outline overhead, as represented by his mysterious art. Very many witnesses were examined whose testimony was favourable to the photographer. It was of no importance that believers in spiritualism, like Judge Edmonds, deposed that they believed in the deception, and found in the phantom features the exact lineaments of their lost ones. But it was startling enough when experts in photography, who had no faith whatever in spiritualism, swore that they had themselves prepared the plates and adjusted the camera when Mumler took the living likeness, and that, nevertheless, the spectre came out from the negative, vague and yet palpable to vision. The question was, indeed, puzzling, how the attenuated shadow of a shade, invisible to mortal eye, should chemically affect the collodion on the plate of glass. But the delightful mystery was cleared up, to the satisfaction of all but confirmed spiritualists, by the production on the part of the prosecution of other photographers, who showed that Mumler's ghosts could be evoked in many ways, by a lens introduced into the camera, by the imposition of a positive plate upon the negative and the transmission of light through it in the bath, &c. Pictures were exhibited in court, in all respects as curious as Mumler's which had been produced by these methds. The decision has not as yet been rendered in the trial; but, whether the police commissioner shall succeed in putting a stop to this miserable mode of swindling or not, he deserves the thanks of the community, for the exposure he has made of it, and the rational explanation he has given of a trick well calculated to unsettle weak minds."

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Six volumes of this Journal—1860, '63, '64, '65, '66, and '67—will be exchanged for a warranted Ross's card lens.—Address, C. H., Clerical Rooms, The Close, Norwich.

A rolling-press, with steel plate 18 × 12, will be exchanged for a 12 × 10 or 7½ × 5 bellows portable camera, or a two-inches focus card-view lens.—Address, M. G., Sherborne, Dorset.

A 10 × 10 mahogany swing back sliding front bellows camera, quite new, or a Ross's 10 × 8 landscape lens, will be exchanged for a Dallmeyer's rapid or wide-angle rectilinear, or Ross's wide-angle or ordinary doublet for plates about 7 × 5.—Address, W. J. A. Grant, Rev. Dr. Butler's, Harrow.

A 7½ × 5 portable binocular bellows camera, swing back, focussing screw adjnstment, extra fronts and plate carriers, in condition nearly new, will be exchanged for a Dallmeyer's No. 1 rapid rectilinear lens, 1A W.A. landscape lens, or a pair of six-inches focus stereo. lenses by same maker.—Address, Messrs. Cartwright, Opticians, Fishergate, Preston.

ANSWERS TO CORRESPONDENTS.

Photograph Registered During the Past Week.—

J. Wardley, Lytham.—Copy of picture entitled *Disappointed Cheap Trippers.*

☞ *Correspondents should never write on both sides of the paper.*

C. D. Smith (Fleet-street).—Received. In our next.

Confucius.—Thanks for the information. See an article on photo-enamelling in the present number.

O. F.—Thanks for your information, but if you refer back to our last number but one, you will see that we have already published it.

Ignoramus.—We are surprised that you cannot obtain hydrochloric acid in your village. Your general dealer will probably know it better if you inquire for muriatic acid or spirits of salt.

A Disappointed One.—You are not exceptional in your experience of Ferrier's slides. We have a number of them which a few years ago were of a rich brown tone, but are now of a dirty black.

Claribel.—It is probable that a cement composed of alum and plaster of Paris will answer your purpose. They must be mixed together with water and used in the liquid state. It is said to be very hard.

"Rest and be Thankful."—A description of Harrison's head and body rest has already been published. It is very rigid and convenient, but for the detailed account of its parts we must refer to page 220 of our 14th volume.

J. E. D. (Dundee.)—Mr. Pouncey applied for a patent for some process in connection with photography over three months ago; but we have no means of knowing the nature of the process until the expiration of the six months of provisional protection. When such time has expired we shall publish it.

A Country Reader.—To make liquid glue, make a solution of shellac in methylated spirits of wine; let it be rather thicker than cream. Another kind of liquid glue may be made by melting common glue in the usual manner, and then stirring in a small proportion of nitric acid. Both of these solutions must be kept in a bottle, closely corked.

Bothered.—You will never obtain good portraits until you reduce the power of your top light. To this alone is owing the deep shadow which obscures the eyes in all the portraits enclosed. Place a blind over the sitter's head, and you will thus get greater force, by comparison, in your more horizontal illumination. The exposure will be longer, but the pictures will be better.

Senex (Hull).—To transfer a collodion positive to patent leather add nitric acid to alcohol in the proportion of two drops to the ounce, and with this mixture moisten both the leather and the picture and press them in contact, allowing them to remain so until dry. Now gently raise up the leather at one corner and introduce a drop or two of distilled water, when the picture will come away clean from the glass.

Tourist.—The grooves in a plate box should not be cut straight, but should be slanted something like the teeth of a saw. If the face of the plate be next to the slanted side of the fissure, it is evident that the surface of the collodion plate cannot be torn or damaged in the least. Fluted sides for placing in plate boxes, and made in the manner described, may be obtained from many of the dealers in materials.

A Would-be Enameller.—The field of research in photographic enamels is much wider than you imagine. You are, however, quite wrong in your supposition as to the manner in which either M. Lafon de Camarsac or Mr. Henderson produce their enamels. While we are not in a position to comply with your request to give a detailed account of the manner in which these gentlemen operate, we can at once put you out of suspense by informing you that they adopt quite a diffierent method from that which you suggest.

Wm. Beah —Render the bath neutral, then add a few drops of a weak solution of permanganate of potash, shaking after each addition; continue this addition until the liquid remains of a delicate pink tint for about ten minutes after the last addition. Now place it in the sun for a few hours, or even a day or two, if necessary, and after filtering the clear liquid from the black sediment which will have formed, add to the former some new nitrate of silver solution which has not been iodised. Acidify slightly, and you will find your solution to work as well as ever.

Auld Lens.—There are isolated specimens of the globe lens in this country; but they have not come into general use, because the qualities requiring that particular form of combination have been secured in a more satisfactory manner by the wide-angle lenses of English manufacture.

W. Norman.—Neither can we tell how either the leptographic or the Obernetter paper is prepared. We have reason to know that both are prepared by chloride of silver held in suspension in collodion; but we are not conversant with the exact method of making either the one or other of the papers named.

Peter Fraser.—The optical centre of the orthoscopic lens is not situated where you have indicated in your drawing, but is really outside of the combination. Hence, if you have two lenses of the same focus, measured from the flange—one of them an orthoscopic and the other a landscape lens of the usual form—the image made by the former will be considerably larger than that by the latter. From this you may deduce the following:—If you have a rigid camera and desire to obtain the image of the greatest possible size, you must employ the orthoscopic lens; if, on the contrary, you wish a wide angle implying an image of smaller size, you must then give the preference to the meniscus lens, the optical centre of which is nearer to the ground glass.

No. 827 (Liverpool).—1 and 2. Let the box be *a little* larger than the negatives you intend enlarging, letting the dimensions from front to back be similar to the camera in which you employ the lens you are about to use.—3. There is no necessity for the boxes being light tight in the absolute sense.—4 and 5. The condenser must be placed as near as possible to the negative, and the light must then be placed in the conjugate focus of the condenser; this position you must ascertain by direct experiment. In your case it may be at a distance of three or four inches. We are assuming that you are employing a double condenser.—6. The lamp may be conveniently placed in a box behind the negative, in the manner you suggest. No light should be permitted to escape in the apartment.

An Author and Traveller.—You may utilise any of your views in the following manner:—Place a bit of lithographic tracing paper over it, and, by means of a fine pen and transfer ink, trace, in a free, sketchy style that part of the subject required, thus translating the photograph into a pen-and-ink sketch. Now hand this to a lithographic printer, under whose supervision you had better make your first attempts, and he will lay it upon the stone and pull from it as many proofs as you desire. Your success with this will enable you to decide upon the advisability of illustrating your proposed volume in this manner. It is of no consequence that some of your pictures are "photographic atrocities;" by the method proposed you may select what is good in each and reject what is bad.

Francis W——n.—It is so very difficult to define quackery as applied either to photography or anything else that we shall not attempt to do so. The person who demanded five pounds for what he designated a valuable secret may or may not be a photographic quack. That there are secrets, and valuable ones too, connected with photography it were vain to deny. *Everything* does not find its way to the public through the medium of photographic literature. There are, for example, processes of photographic engraving and photo.-enamelling which are practically secret, and some of these would be worth much more than five pounds to any person who wished to practise them. But, again, the secret offered for disposal in the present case may be something already published. If the secret-monger be aware of this he is an impostor.

Zeta.—There existed no necessity for the lengthy explanation of your reasons for adopting a *nom de plume*. We *never* publish the names of those correspondents who prefer being answered under an initial or *nom de plume*. If you introduce matters of fact you must attach your name, although not necessarily for publication if you prefer an initial. If you merely wish to ask one or more questions, we shall at all times answer them to the best of our ability, even although we possess no knowledge of the inquirer. We need not say that we are always pleased to be able to recognise our numerous correspondents; but we never permit the want of this knowledge to interfere with our supplying to each querist all the information sought for.

Received.—Report of the council meeting of the Amateur Photographic Association held on the 7th inst., which only reached us as our "formes" were going to press; S. Highley; W. H. Harrison; "Amateur Experimentalist;" and others.

METEOROLOGICAL REPORT,

For the Week ending May 12th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

May 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
6	29·34	64	48	52	54	E	0·04	Dull
7	29·18	67	53	57	60	SW	0.10	Dull
8	29 28	60	50	54	55	S	—	Dull
10	29·52	67	44	58	60	SW	—	Dull
11	29·74	60	51	49	53	NNW	0·01	Dull
12	30·04	—	44	47	54	NE	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 472. Vol. XVI.—MAY 21, 1869.

A DRYING BOX FOR SENSITIVE PLATES.

During the season just commenced dry-plate photography will, no doubt, be practised even more extensively than it has hitherto been; for we find that preparations are now being anxiously made for the summer campaign, and, so far as numbers go, the dry-plate workers are largely in excess of the advocates of the wet process. As a large proportion of our readers will probably employ the now well-known and valued coffee plates and other similar dry processes, we may from time to time touch on such matters of detail of practical value as we may have either used ourselves or have seen employed by others with advantage in dry-plate operations.

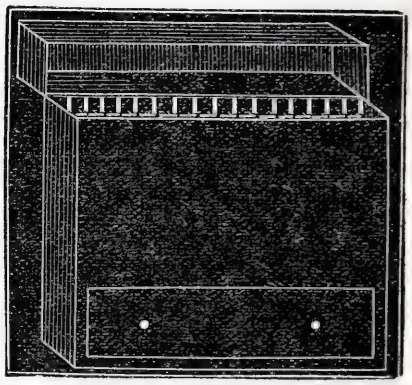
Amongst the many valuable practical suggestions which have emanated from our friend, Mr. M. Carey Lea, few have been of greater interest than that relating to the complete desiccation of the various "dry" plates, since a little reasonable care on this point seems to guard the operator against many of the evils and annoyances of dry-plate work. The method proposed by Mr. Lea for drying the plates is, as our readers well know, to suspend the plates after preparation, and prior to packing away for use, over a surface of concentrated sulphuric acid or oil of vitriol. This body having, when strong, an intense affinity for water, attracts the latter from any tissue containing it, and so dries completely the film, of whatever kind it may be.

Mr. Lea employs a layer of the liquid acid laid on a porcelain or leaden tray, placed in the bottom of a convenient box; over this the plates to be dried are suspended in any secure manner. In using the acid in this way there is the chance of splashing—always unpleasant with such a corrosive liquid as sulphuric acid; moreover, the upper layer of the oil of vitriol becomes quickly saturated with water, and has then but little tendency to mix with the dense layer of concentrated acid below, so that the acid requires frequent mixing in order to keep it in good working order. It has been also recommended to saturate pumice stone with the acid, so as to expose a larger surface for absorption of moisture.

Keeping in view any points that might be urged against the various plans adopted for effectually drying our sensitive films, we have arranged the drying-box shown in the opposite column, which is convenient, effective, and clean; and we can, therefore, recommend it to such of our readers as intend to follow Mr. Lea's plan of completely drying their sensitive films.

We may premise, however, that we do not put forward our drying box as infinitely superior to everything of the kind which has been previously constructed. Makeshifts in many ways often do remarkably good and useful service, and far be it from us to despise such; but we have always found that there is greater comfort and security in using any piece of apparatus—whether photographic or otherwise—which was specially and carefully constructed with a view to its employment for the purpose to which we apply it. In dry-plate photography, especially, the use of "harmonious" and effective apparatus can be best appreciated, as the rapid preparation of a large number of sensitive plates requires that our arrangements should be carefully made, if we desire that our operations should proceed smoothly, and that our plates should correspond as nearly as possible in preparation and, therefore, in properties. It is by no means a satisfactory state of things to find, on developing a number of plates which we expect to afford a good set of negatives, that inequality in preparation has upset all our calculations, and, instead of obtaining twenty good negatives, probably two or three bad ones are our sole results.

The annexed diagram renders the construction of the box sufficiently plain, and a very few words of description will suffice. A plate box is made of the size the operator is most in the habit of using, the only difference being that the box is made about four inches deeper than is necessary for the length of the plates. At a height of about three and a-half or four inches from the bottom, four or five long, thin wooden slips are fastened at right angles to the direction of the grooves of the box, and also at right angles with the plane of a plate fitted into a groove. These wooden slips, then, obviously act as stops and supports for the plates over the yet empty bottom of the box.



The next step is to cut, neatly and accurately, a piece from the front of the box, so as to admit of the free but close fitting of a drawer, as shown in the diagram. This drawer must occupy the space between the bottom of the box and the wooden slip supporting the plates above. The drawer must fit neatly, so as to exclude light, but yet capable of easy removal. This drawer is now fitted with a little leaden or porcelain dish; the latter may be occasionally obtained of the proper size at the delf shops, but the former is on the whole most convenient. The edges of the pieces of sheet lead of which the dish is made should be scraped carefully, and *fused* together with the mouth blowpipe, not soldered.

Having prepared the box, we now set it to work in the following way:—Half a pound of *asbestos* is purchased for a few pence at a druggist's; this wool-like mineral is placed in the leaden tray of the drawer, and then thoroughly moistened with oil of vitriol. This is effected by pouring on the acid and turning over the asbestos with a piece of the sheet lead. When the mineral has been well moistened with the acid the drawer is put into the box, and our drying-closet is complete. After two or three batches of plates have been dried in the box it is well to remove the drawer, turn over the asbestos, so as to expose new surfaces, and replace it again in the box.

By using this arrangement desiccation of a large number of plates can be quickly effected, owing to the large absorbent surfaces exposed; and the maximum drying effect can then be obtained from a given quantity of sulphuric acid. When it is desired to change the acid it is only necessary to wash the asbestos in water, dry it in an oven, and moisten it with fresh acid.

It is scarcely necessary to point out that an old plate-box may be

converted into a drying closet similar to the foregoing by removing the bottom and substituting a few slips of wood to act as stops for the plates. This top can now be fitted so as to act as a cover to a rectangular wooden box, of about three inches in depth, which can then be employed in the same way as the drawer for asbestos shown in the diagram.

ARTISTIC EFFECTS IN PHOTOGRAPHIC PORTRAITS.

It is now almost twelve months since Mr. Rejlander, at a meeting of the South London Photographic Society, introduced a subject for discussion—this method having been found, on the whole, to give rise to a freer and fuller discussion among that body of practical men than when the more formal one of reading a paper was resorted to.

In the course of his observations, Mr. Rejlander laid it down as a condition in the finest portrait negative that it must have only the *very* deepest portions of the shadows represented by clear glass and only the *very* highest lights opaque, and that, further, these portions of the picture should be limited in extent. In the former case power was conferred upon the negative to the same extent as in the latter. The parts in a photograph, therefore, which must be perfectly white must be few in number.

At the last meeting of the same Society Mr. Cocking, the Honorary Secretary, exhibited some prints which, although not embodying any startling or scientific novelty, were yet highly suggestive to artistic photographers. The portraits alluded to were soft and delicate, but the middle tones, in which they abounded, so to speak, were rendered so perfectly as to emphasise any encroachments on the domain of tint; that is to say, many portions would have been considered as belonging to the highest or lightest tones had there been no standard of comparison belonging to a still higher school.

The means by which these effects were obtained were found to be, when explained by Mr. Cocking, very simple in the abstract, although they might not have suggested themselves to every person, even after a careful inspection of the pictures.

Let us, then, suppose that a portrait has been printed in which, from the constitution of the negative or from under-printing, there is a large amount of pure high light. The object now is to slightly lower this mass of light, and to introduce something still higher—something which, by comparison, will cause it to assume a much lower place in the scale of tones. We will now direct attention to Mr. Cocking's mode of procedure.

He first prints the portrait in the usual way, leaving large masses of pure light, or, at any rate, tones, which, if toned and fixed at this stage, would represent white when finished. On removing the print from the pressure-frame he fits carefully over it a plate of glass of the same size, on which he has made sundry opaque marks—spots or streaks, as the case may be—by means of any opaque body, such as water colour, oil colour, or varnishes. The exact spot where this opaque body has to be applied is ascertained by interposing the plate of glass between the negative and the eye, a strong source of illumination being behind both, and touching out here and there those points and spots where the highest light is wanted, such as on the eye, the ridge or tip of the nose, the shirt breast, &c.

When a glass is thus prepared it is placed over the printed and still sensitive photograph now removed from the pressure-frame; and, the greatest care having been taken to secure perfect registration, the picture is exposed to the light for a sufficient time to allow a decided tint to be printed all over, except of course in those parts covered by the opaque touches on the plate of glass. The effect of this second exposure is that the whole of the picture previously printed is lowered in tone, with the exception of the touches referred to.

Some parts—as, for example, a touch of light on the eye—should be sharp and well defined; others may be softer and vignetted, so to speak, in the surrounding semitone. The former is obtained only by the opaque stopping being effected on that side of the glass placed next to the print. Softness of outline, on the contrary, will be obtained by working on the side of the glass farthest removed from the paper.

Photographers are usually so extremely fertile in resources that we feel assured they only require the *hint* in what direction, and by what means, they may secure superior effects to stimulate them to follow the track thus indicated until it leads them to the desired goal.

But it must be specially borne in mind that the power indicated above is one which must never be attempted to be controlled except by a photographer of thoroughly artistic feeling. In the hands of any other it will only help to degrade photographic art and make it the jest of persons of refined taste. Let Mr. Cocking's excellent suggestions be wisely acted upon.

WHAT IS IT THAT CONFERS DENSITY AND SENSITIVENESS UPON COLLODION?

IN TWO CHAPTERS.—CHAPTER II.

I HAVE a few more practical remarks to make in reference to the statement made by Mr. Blanchard, at a recent meeting of the South London Photographic Society, when he charged Mr. Hardwich with giving misleading instructions for the manufacture of photographic pyroxyline. Not being in possession of the details of Mr. Blanchard's secret formula, I stand at great disadvantage in testing its merits; but, taking for a starting point, his dictum, namely, that the temperature of the mixed acids should not exceed 110° Fah. at the time of the immersion of the cotton, I have made a few experiments which go far to show Mr. Blanchard's error, and to substantiate the views which I have always entertained on the subject. Of course, until Mr. Blanchard publishes the grounds for his opinions, it may turn out that I have mistaken his object and his mode of attaining it. How far I may misunderstand him I know not, but if I take 110° (the temperature he recommends) for my standard of comparison, and work on each side of it, I cannot be very much out in my estimate of what is and what is not true.

It would occupy too much of your space, and be of little interest to your readers, were I to enter into minutiæ of the formulæ, &c., adopted in the experiments which I have just completed. A general summary or table of results will be sufficient for my present purpose. To avoid unnecessary repetition, it will be as well to mention that the cellulose operated on had been, in every case, previously cleansed in a weak solution of caustic potash, washed, and thoroughly dried before immersion in the mixture of acids. The time of immersion, unless when otherwise stated, was always ten minutes; the strength of the acids was regulated with the requisite quantity of water, and when the number of grains of pyroxyline added to the solvents (equal parts of strong ether and alcohol) is mentioned, it is to denote a collodion possessing, as nearly as could be judged, a *uniformly viscid body*.

Experiment 1.—*Cotton:* said to be Sea Island. *Acids:* three parts sulphuric to one of nitric. *Temperature:* 165°. *Pyroxyline:* gain in weight 11 per cent., rather powdery and very soluble, six grains to the ounce of solvents required. *Collodion:* excellent in every respect; sufficient density of negative readily got by the first application of the iron developer, without reinforcing.

Experiment 2.—Same proportion of acids and cotton as last. *Temperature:* 150°. *Pyroxyline:* gain in weight 28 per cent.; somewhat disintegrated and very soluble. *Collodion:* required five grains to the ounce; quality excellent. *Negative:* required some reinforcing.

Experiments 3 and 4.—Materials, &c., same as in the two previous experiments, except that fine bleached linen was substituted for cotton. *Results:* nearly alike. There was somewhat less gain in weight, and about one grain more of pyroxyline to the ounce of solvents was required in both collodions.

Experiment 5.—Same proportion of acids. *Temperature:* 110°. *Cotton:* gain in weight 33 per cent.; fibre but little disintegrated; soluble with little sediment. Four and a-half grains required to the ounce of solvent. While setting, the collodion film was covered with reticulated structure, which disappeared on drying; skinny, very sensitive, but required much intensifying.

Experiment 6.—Same materials, &c., as last, with linen. *Collodion:* required five grains pyroxyline; flowed better, and was more easily reinforced than No. 5.

The proportion of acids was now changed to two parts of sulphuric to one of nitric, and afterwards to equal parts of each, due regard being, of course, paid to the quantity of water added. At the various temperatures mentioned above, and with these proportions of acids, I did not observe any very appreciable difference in the character of the collodions, beyond what was apparent when the proportion of acids stood at three to one. Probably, however, time will develope marked changes, which are not at present very observable.

A piece of unsized paper, which I was assured by the manufacturer was made exclusively from linen, was next immersed for one hour in a mixture of three parts sulphuric and one part nitric acid, at the temperature of the atmosphere (about 60°). The product very much resembled Dr. Liesegang's papyroxyle in all its properties. The collodion, which required five grains pyroxyline, possessed good flowing properties; the film was too skinny and tough, but it was very sensitive, developing, however, very feebly by the first application of the iron, and requiring much reinforcement.

Cotton wool, steeped in a similar mixture of acids for the same time and at the same temperature, was very deficient in good photo-

graphic properties, flowing badly and, with all care to avoid them, setting in ridges. But I have little doubt if this collodion be kept for a considerable time, till it has partially undergone decomposition and changed its physical structure, it may be quite as well suited for work as any of the others.

It is very likely Dr. Liesegang is right when he supposes the good quality of his papyroxyle, which is made in cold acids, to be mainly owing to the previous thorough disintegration of the linen fibre in the pulping machine. If so, it is very clear we may substitute *disintegration* for *temperature*—in some instances, at least; although I do not see why any advantage can be gained thereby, nor do I think such substitution can be efficiently made with cotton wool. With the same treatment, it may be concluded, linen fibre gives a more fluid and structureless but less dense collodion than cotton wool.

Altogether, I have not yet come across any fact in the course of my own experience, nor have I learnt anything from the observations of others, which in the least shakes my faith in the reliability of the elaborately and carefully-worked-out recommendations contained in Hardwich's book. It is all very well for Mr. M. Carey Lea or Mr. Blanchard to speak disparagingly of Hardwich's formulæ, which have been well tried and approved of; but, until these gentlemen or some one else instruct us how to make a better pyroxyline, we must be content with the information which we have already obtained.

George Dawson.

ON A GREATLY SIMPLIFIED PROCESS OF PRINTING IN CARBON OR OTHER PERMANENT PIGMENT.*

I.—Preliminary Observations.

The process about to be described, and all those alluded to in the course of these observations, are based upon the fact discovered by Mungo Ponton, viz., that a solution of a salt of chromic acid, and particularly the bichromate of potash, becomes sensitive to light when spread upon paper.

Becquerel showed that the action was much more energetic upon the size of the paper than upon the paper itself. Poitevin showed us that albumen and other analogous substances have their properties entirely changed by the joint action of light and the bichromates; thus, instead of mixing with water in all proportions, they become insoluble in that menstruum, and acquire an affinity for fatty bodies. He thus laid the basis of all subsequent processes of photolithography; indeed his process, which has ever since been successfully worked by MM. Lemercier & Co., of Paris, is superior to most of the modern processes of photolithography, which are only capable of rendering line or stipple, while the original process of Poitevin enables us to obtain considerable half-tone, thus resembling the modern processes of Tessie du Mothay and Albert.

A fact of greater importance to our present purpose is his application of the insolubility of albumen under the action of light and the bichromate to fix or imprison a pigment mixed with it, and thus to obtain a coloured image; hence all our subsequent efforts at pigment printing, for all start from this point. To effect this he simply mixed a finely-ground pigment with the sensitive substances, albumen and bichromate of potash, and spread the mixture upon the surface of the paper in an extremely thin layer. When this was dry it was exposed under a negative, and, after exposure, was well washed and sponged in water, when the parts unacted upon by light washed away, and those acted upon remained attached to the paper. If the subject be in line or stipple, considerable success may be achieved, but little or none if the subject be in graduated tint—that is, possesses half-tone.

If any one repeat this mode of operation with Swan's gelatine tissue, he will find that neither line nor stipple is obtainable; in fact, the conditions are totally dissimilar. Poitevin, to be successful, must have a minutely thin layer that will be penetrated by the light transmitted through the finest line of the negative; while Swan lays on so thick a coating that it is practically impenetrable by the barest portion of the negative.

Pouncy, whose first patent (never completed) follows that of Poitevin, succeeded more perfectly than his predecessor towards the production of half-tone. He operated precisely like Poitevin, but used a porous paper, and brushed the sensitive coating into its pores. By the action of light, the mixture becomes insoluble under the transparent parts of the negative, and even those least acted upon were more or less retained, being in contact with the paper instead of having a coating of soluble gelatine interposed beneath them.

Burnett and Blair are still more worthy of note, having introduced a new feature into their operations—that of printing from behind, so that the parts rendered insoluble may be in contact with the support, and the soluble gelatine, unacted upon by light on the surface, easily removed by water without undermining the insoluble portions forming the picture. By rendering the paper supporting the sensitive coating translucent by means of oil or varnish, Mr. Blair obtained a considerable amount of success; but there were certain objections which induced him to abandon it for other and more complicated methods. We would, however, here again point out the wide difference between the prepared paper of Mr. Blair and the paper tissue of Mr. Swan, which is the basis of the process I am about to describe. In its perfected state, Mr. Blair's paper is transparent and impervious to water, a quality which would entirely unfit it for use in Swan's and analogous processes.

The next important step was made by Fargier, who coated a glass plate or other plane surface with the sensitive compound, exposed it under a negative; when exposed, he coated it with a layer of collodion; he then plunged it into warm water. The fluid penetrated the collodion, dissolved the gelatine where unacted upon by light, when the pellicle of collodion floated, bearing with it the insoluble-pigment picture. Most delicate results were thus obtained; but the manipulations were found tedious and uncertain.

We now come to the most important step in pigment printing which had yet been made—that of Mr. Swan. Most unworthy attempts have lately been made by interested persons and their agents to decry the labours of this gentleman; but the fact remains undisputed that, by his modifications alone of the processes I have quoted, has carbon printing been made a practical and commercial process, instead of one merely experimental and tentative. It has been worked on a larger scale than any other by M. Braun, of Dornach; and the two folio albums on the table, part of a series of thirty-five similar volumes full of different specimens, show to what extent and with what success it has been practised.

Mr. Swan commenced by coating his plate with gelatine, like Fargier, but poured the collodion upon it previously to exposure; this he called a tissue. He subsequently made this tissue more easily manipulated by backing it with paper, and, this being successful, he ultimately found that he could dispense with the collodion coating. The evidence of a most respectable and influential inhabitant of Newcastle, who followed with much interest Mr. Swan's experiments, has been given on oath to show that these modifications were made by Mr. Swan himself before their publication by others, and were therefore legitimately inserted in the full specification, the law allowing six months' delay for the express purpose of making such improvements and modifications.

The tissue thus formed may be either made sensitive by the introduction of the bichromate at once, or by subsequent floating. When dry it is exposed under a negative, and the hardened insoluble image or potential image is then on the surface, and would become undermined and wasted away if the tissue were immersed in water, as in the processes of Poitevin and Pouncy.

Mr. Swan, therefore, mounts the tissue upon a support previously to development. This support may be either temporary or permanent. If permanent (that is, if the picture be intended to remain upon the support finally), albumen coagulated by alcohol or heat is the cement employed; but in this case the images are reversed, if ordinary negatives have been employed. Mr. Swan, therefore, proposed to mount the picture previous to the development on a "temporary support," using India-rubber as the cementing substance, heavy pressure being required to bring the surface of the coated gelatine and the paper coated with the caoutchouc into perfect contact.

He then mounted the developed print upon another paper by means of gelatine or other similar cement, and removed the temporary support by softening the caoutchouc with benzine, tearing the two papers asunder. The gelatine was afterwards rendered insoluble by the immersion of the print in alum. In the *Yearbook of Photography* for 1868 Swan described a peculiar manipulation, by which the use of the press and the subsequent immersion in alum were dispensed with. He took a weak solution of gelatine and added a small quantity of chrome alum to it. He then immersed both the developed print and the paper upon which it was to be mounted in this solution, and brought the two surfaces together under it, thus expelling all air. With certain precautions the adhesion was perfect. Edwards substituted the gelatine compound of Swan, just referred to, spread upon paper for the albumen paper rendered insoluble by spirit—a modification of very doubtful value. But the substitution of Mr. Swan's manipulations hitherto only used in one part of the process for those which Mr. Swan had alone used in another part is due to Mr. Edwards; and its advantages, if any, were first recognised and applied by him. They were suggested

* Read at a meeting of the London Photographic Society, May 11, 1869.

long previously to Mr. Edwards's plan to Mr. Swan, but he failed to see their importance.

In the preceding observations I have omitted to mention in its proper place that M. Despaquis, the holder of M. Poitevin's patent for carbon printing, has for some time past made very beautiful carbon prints upon talc, by coating that substance with the sensitive compound, and printing through it, washing away the soluble gelatine from the back.

In The British Journal of Photography, April 17, 1868, Mr. Carey Lea shows a very similar plan, but substitutes glass for talc, to which he confines himself, finding that paper rendered transparent will not do, but predicts that in the future the difficulty of using transparent paper may be overcome. The only novel features in Mr. C. Lea's contribution are the use of reflected sunlight for printing through the glass, and a method of coating the plate, before the exposure, with gelatine previously spread upon paper, which, inasmuch as it contains sugar, and sticks readily to the moistened fingers, and only too often to the negative, is a very obvious proceeding.

I have thought it necessary to bring before you these matters (although they are well known to many of you, and have been already recorded very fully and in a most lucid manner by Mr. Simpson, in his work on pigment printing), because they have lately been the subject of much comment and much distorted statement in the pages of an obscure publication. I venture to think, Sir, that the history of the invention of carbon printing is a worthy subject of discussion for this Society, and I recapitulate these known facts as a challenge to those who dispute them, in the hope of raising that discussion.

II. Principles Involved in the New Process.

I will now proceed to describe the process which is the chief subject-matter to which I have to call your attention.

I venture to think that its main features are new, and that they are founded upon several observations which have escaped previous experimenters.

1. The first observation is one which I arrived at by a process of exhaustion. Being desirous of attaching the exposed film to a plate of metal for the purpose of development, I tried every form of cement, until at last I found that no cement at all was necessary, but that, if the film was well washed in water, the sugar being removed, the insoluble, inadhesive film would really adhere to any plane surface impermeable to water, if air were excluded. The novelty of this fact has been called in question by Mr. Carey Lea, on the ground of his having previously stuck the soluble, adhesive tissue upon glass previously to development. I appeal to you whether there is any analogy between the two cases, with the single exception that water is the common medium employed. The immediate object is different, the substance employed is different, and the ultimate end is different — his sole object being to obtain transparencies on glass, my chief object to obtain perfect photographs on paper.

2. The second important observation is, that if we cover the surface of a plate of glass or metal with a minute layer of some solid fatty or resinous body the adhesion still takes place, and is sufficient during development (while the film is wet), but prevents the adhesion after the film is dry. Hence a plate of metal or glass so prepared may be used as the temporary support during development, provided that that body is infusible at the temperature employed.

3. The third important observation is, that the dry film, when separated from the greased plate of glass or metal, has exactly the surface of the support. If this be polished the surface of the film is polished; if this be mat the film has a mat surface; and if the surface of the plate be grained or tooled, the removed film of gelatine presents corresponding granulations or tool marks. Prints may, therefore, be obtained at will with every kind of surface, from the highest polish to the grain of coarse sketching-paper or its imitation.

4. The fourth important fact is that the gelatine film, which, although insoluble, absorbs water readily, and softens under its action, and which is attached to paper by gelatine and alum, forming a cement which is likewise more or less absorbent, may be rendered entirely non-absorbent, and may be so fixed to paper that no friction, or even water at a boiling temperature, will remove it. This is effected by using a solution of shellac in ammonia as the cement, and allowing sufficient of this to be absorbed into the gelatine film before it is attached to the paper. The result is no longer gelatine, but insoluble gelatine (leather), rendered waterproof by resinous cement, and attached firmly to paper by the same cement.

III.—Applications.

The applications of this process are very numerous. I will at present merely allude to them:—

1. We obtain pictures on glass, in carbon or other pigment, by simply mounting the tissue on a clean glass and developing the picture, merely backing it with another glass for transparencies, and with paper or plaster for pictures to be viewed by reflected light. There is no transfer, and no cement. The picture is not inverted, being viewed through the glass.

2. We obtain pictures on opal, porcelain, panel, prepared canvas, prepared paper, &c., directly and without transfer; but the pictures will be inverted if ordinary negatives be used.

3. We obtain non-reversed pictures on paper, which may be boiled in water and rubbed like linen, by mounting the exposed tissue on a temporary support, such as a plate of metal or glass coated with a fatty body, and, after development, transferring the print-paper by simple contact, by means of the shellac cement.

IV.—Manipulation.

The manipulation is of a very simple character, but more easily shown than explained, and this I will at once proceed to do.*

J. R. Johnson.

ENLARGEMENT OF SMALL LANDSCAPE NEGATIVES BY THE SOLAR CAMERA.†

It has long been the desire of amateur photographers to make small landscape negatives in the field, and, after having returned from the expedition, to have solar enlargements made upon paper of various sizes, obviating the necessity of carrying large cameras and bulky apparatus when travelling for pleasure. Formerly it was impossible to depend upon such an arrangement, as the prints were very deficient in sharpness; but, recently, improvements have been made in solar cameras and photographic lenses which give a result but little inferior to contact printing.

It is of the greatest importance that the negatives for enlargement should be *first-class*, of medium intensity, perfect sharpness, and fine detail. It must also be remembered that slight defects, such as would scarcely be noticed in contact printing, are much increased by an enlargement of ten or twenty times the original size.

That there is a prejudice against solar enlargements cannot be denied; but much of the complaint of the present time has originated by photographers furnishing negatives for enlargement entirely unsuitable for the purpose, not giving a good contact picture in a printing-frame. No apparatus can ever be made to give satisfactory results from such negatives.

Although not desiring to enter into a discussion as to which is the best form of solar camera, it is but justice to say that the views exhibited this evening were made from half-size negatives with a Shive instrument, by Mr. Albert Moore, of Philadelphia, who excels in that department of photography. Nineteen of these cameras are in constant use at his establishment, some of them of mammoth size, making a print 34 × 44 inches.

Great care and attention is required to make good solar work. The focus must be exact, and, during exposure, the position of the box altered every minute, so that the sun's rays, passing through the condensing lens, strike exactly in the centre of the focussing lens. This is easily arranged by having two openings, through which the sunlight passes, cut upon the outside edge of the box, about twelve inches apart, and parallel with the focussing lens. By watching the spot of sunlight on a projection of the box, the apparatus is kept in the right position. Should it be allowed to remain stationary for several minutes, the focus of the condensing lens (altered by the position of the sun) will strike at an angle, causing a blurred image; there is also danger of fire. Intense negatives are often broken by the heat of the sun, as a long exposure is required. Good negatives should take about forty minutes to make a print.

John C. Browne.

SPIRIT OF THE AMERICAN JOURNALS.

The Velocipede.—The *Scientific American*, from week to week, is devoting a portion of its space to the subject of velocipedes. It is reasonable to suppose that this mode of locomotion will be much utilised by photographers in this country. Meanwhile we have not heard of any experience with it which may be considered strictly photographic. We are, however, aware that one gentleman of our acquaint-

* As will have been noticed from our report of the meeting in last number, Mr. Johnson was prevented from giving the promised practical demonstration of the mode of working his process—being absent from the meeting through indisposition—but intends doing so at the June meeting of the Society.

† Read at a meeting of the Photographic Society of Philadelphia, April 7, 1869.

ance is having a tricycle constructed with special reference to photographic pastime, and, after he gets into "working order," we are promised a communication on the matter.

Reliable Tea Process.—Mr. H. J. Newton has perfected a reliable dry process in which the preservative is an infusion of tea. He first experimented with several samples of "Oolong tea," with different results in nearly every instance. He then procured some Japanese tea, and the results were very fine. They were also good when other samples of tea were employed. He makes a strong decoction of tea, consisting of a large tablespoonful of the leaves to eight or ten ounces of boiling water. It is covered over and kept hot for about an hour. After being made up to twelve ounces, sugar of milk is added in the proportion of fifteen to twenty grains to the ounce of solution, and, when cold, it is ready for use. Instead of the sugar of milk described, he had used loaf sugar and sugar candy, but he prefers sugar of milk. He made a very sensitive plate by adding a grain and a-half of acetate of morphia to an ounce of the tea solution. The sensitiveness was such that pictures were obtained in one-fourth of the usual time, but whether they will keep he is unable to say. The solution itself will *not* keep.

Developers.—The writer above-named makes the following remarks upon developers:—

"I have experimented much with different developers, and have been thoroughly converted to the doctrine of those advocating strong developers. I have always found that a developer at least twice as strong as usually recommended, used with not more than one-half the nitrate of silver commonly used, produces much finer results, beside lessening the time of exposure one-half. Negatives developed with a strong developer and the smallest trace of silver are always soft and full of detail. For a stereoscopic negative two drops of a ten-grain solution of nitrate of silver is sufficient.

"I have succeeded in compounding an iron developer which works well, and the exposure of the plate is reduced about to the same time required when the alkaline developer is used, and the results are as good in every respect. It has the advantage of being much more simple. It is prepared as follows:—

Gelatine	20 grains.
Double sulphate of iron and ammonia	80 ,,
Sulphate of iron	80 ,,

"Soak the gelatine in cold water fifteen minutes, then put the above together in a bowl with the gelatine and pour on boiling water, ten ounces. When the gelatine and iron have dissolved, add ten drops of concentrated ammonia and shake thoroughly; then add sufficient glacial acid to dissolve the precipitate, which will be about one drachm; then add twenty grains of tartaric acid. This developer works the best after it is two weeks old. For a plain pyro. acid developer use eight or ten grains to the ounce of water, and four or five grains to the ounce of citric acid. I have, however, used a developer made as follows, which is very energetic, and produces beautiful wine-coloured negatives with very short exposure:—

Hot water	5 ounces.
Gallic acid	30 grains.
Pyrogallic acid	30 ,,
Citric acid	30 ,,
Glacial acetic acid	30 drops.
Saturated solution of acetate of lead	10 ,,

"The glacial acetic acid dissolves the precipitate formed by the addition of the acetate of lead. Unless hot water be used the gallic acid will dissolve very slowly, as that amount is a saturated solution in cold water."

Permanganate of Potash as an Intensifier.—Professor Towler (in the *Philadelphia Photographer*), in submitting to the test of experiment the processes which appear in the journals, with the view of condemning or recommending them, as the case may, has commenced with the subject indicated by the heading to this paragraph. A bath composed of ten grains of the permanganate to the ounce of water is employed for immersing the negative, which may be either fixed or unfixed. The image changes colour, becoming first yellowish and afterwards an orange brown. Dr. Towler says:—

"It is supposed that the salt becomes deoxidised, and its oxygen is imparted to the silver in the picture, and also that an oxide of manganese is deposited upon the prints. Be this as it may, for practical purposes we have to deal with results and not with theories; enough, the plate is intensified easily, effectually, apparently without any granulations, and of a non-actinic colour. There is, however, a drawback in the original process, and one that would deter the photographer from its use; in fact, I saw one of our fraternity throw down the negative in a passion, after he had intensified it to perfection, and was immediately before in ecstacy. The drawback is this:—The deposit, the colouring matter, or whatever else it may be that forms the intensity, is soluble in the alcoholic varnish, which sometimes leaves the picture utterly useless.

"But this drawback is easily remedied, and then the intensifier is just all that can be desired.

"Immediately after the proper intensity has been attained, the plate is carefully washed, and then finally coated, while wet, with the following solution:—

Gum arabic (picked)	10 grains.
Rain water	1 ounce.

"The plate is then dried before the fire or near a flame, and then the regular coat of varnish is applied in the usual way. The intensified film is not at all changed after the gum has been applied, and for a very good reason, gum arabic being insoluble in alcohol.

"Permanganate of potash, therefore, applied as directed, is one of our best intensifiers, and is worthy of recommendation. The selfsame salt has been recommended also as a corrector of the silver bath, from the property which it possesses of removing or combining with organic matter. I have not much faith in this suggestion, but I will put it to the test, and not condemn without trial."

Process-Mongers.—The *Philadelphia Photographer* says that the country is at present flooded with persons who sell useless and impracticable processes, and also with those who collect wastes from photographers to refine, and who never make any returns. We had really given our American friends credit for being more 'cute than to allow themselves to be thus overreached; but human nature is, we suppose, the same on both sides of the Atlantic. One of the "secret" processes is a method for mounting albumen paper prints on opal or "porcelain" glass, and is described as follows:—

"First make the print transparent by immersing it in a solution of—

Gum mastic	½ ounce.
Turpentine	4 ounces.

"Dissolve in a hot-water bath. Now take the porcelain plate, heat it, and apply the following mixture to its surface:—

Balsam of fir	½ ounce.
White wax	1 ,,
Turpentine	20 drops.

"Dissolve as above. Press the print to the plate while warm, and the picture will be completed."

Halation.—Dr. Vogel, in the same journal, thus writes on this subject:—

"On such photographic portraits where a dark part of the clothing is contrasted with a light background, we often notice that the dark portion shows a light fringe; this fringe becomes most prominent when the developer flows from the dark part towards the lighter ones. The reason of this is, that the developer carries the silver solution, which is necessary for the development, from the place where the developer is poured on towards the opposite side. Besides this circumstance, the margins of the lighter parts will find in the darker spots which do not attract silver an abundance of silver-producing material, and in consequence they will cover themselves more thickly with it than other light portions not so favourably situated.

"A modification in the mode of pouring the developer on will partially remedy the evil, but a light object on a ground—as, for instance, a hand on a black cloth coat—will always appear too light. Shading the hand will somewhat lessen this defect; but usually the contrast of light and shade appear stronger in a photograph than what they actually are.

"A curious case which belongs to this class of appearances I have lately observed. If we focus exactly on a drawing or a piece of white paper, and now take a picture in such a manner that we open the plate-holder successively, after one, two, three, four, five, six seconds time, we will find on development that the stripes are differently coloured. The same stripe will look lighter on the side where it follows a more transparent one, and darker on the side next to a denser part."

SPIRIT PHOTOGRAPHS.

No subject within the present year appears to have caused such interest among the photographers of New York, and such sensation among scientific men and "spiritualists" in that city and district, as the trial of W. H. Mumler, the spirit photographer, of No. 630, Broadway. A brief notice appeared in our last number, but on the present occasion we are fortunate enough to be able to present a more detailed account of the trial, commencing with the opening scene, for which we are indebted to the *New York Herald* of the 17th ult. And we may state, that we have made arrangements to obtain the various papers in which the subsequent reports of the trial will have appeared, so as to keep our readers *au courant* with the latest photographic sensation.

We may here mention that while we write we have on our editorial table three portraits of a New York banker (Mr. C. F. Livermore),

taken by Mr. Mumler, and which bear his imprint on them. Criticising the photographs from the artistic standpoint of this country, we should say they are very bad; but there is in each picture, and apparently standing behind the sitter, a female figure—the position being different in each picture, but the person being evidently the same. The gentleman named has stated that all these are faithful portraits of his deceased wife, that there was no chance of Mr. Mumler having had access to any previously existing portraits of her, and that, in point of fact, he could not have known who he was or what were his domestic relations. We, ourselves, could very easily produce "spirit photographs" of a higher class than those in question, but we could only do so from negatives in our own possession; and how Mr. Mumler contrives to do it in such a way as to elude all discovery by photographic experts present with him during the sensitising and development of the picture, is even more puzzling than the intimate knowledge he must necessarily possess of his sitters and their deceased friends. With these remarks we give the report of the trial.

The Spirit Photographs.

Persons of spiritualistic proclivities, as is well known, make up the majority of those appearing at the Tombs Police Court. It was so yesterday. The spiritualistic proclivities of the morning's assemblage, however, were diverse from the ordinary channel—not the besotted, wretched, maudlin subjects of benzine and fusel oil, but those having to do, or rather professing to have to do, with the spirits of the vasty deep, or heavens above, or anywhere where the spirits of the dead make their abode when freed from the cerements of our earthly clay. In other words, the crowd was made up of spiritualists. The occasion of their presence was an expected examination in the case of William H. Mumler, the spirit photographer, whose arrest on a charge of perpetrating deception and fraud upon the public through the medium of alleged spirit photographs, has already been announced in the *Herald*. Ex-Fire Marshal Baker and Albert Day appeared as counsel for the accused. Ex-Judge Edmonds, though doing most of the little talking that was done, announced himself only as the friend of the prisoner.

"Are you ready to proceed with your case?" asked Judge Dowling.

"Yes, sir," answered ex-Judge Edmonds. "We have from twenty to thirty witnesses here from Boston, Poughkeepsie, Buffalo, and elsewhere."

"The Mayor sent the case here," remarked the Judge, "and expressed a desire to be present at the examination, and asked me to postpone it on account of his inability to be present this morning."

"Of course the Mayor's wishes must be regarded; but will you allow," asked the ex-Judge, "Mr. Baker to read a paper prepared on behalf of the accused, as showing the line of defence we propose to enter upon."

"Why do you wish to read it now?" inquired Judge Dowling.

"The late publications in the papers have destroyed Mr. Mumler's business, and through giving this equal and immediate publicity we desire to restore the public confidence, to which he is justly entitled," urged ex-Judge Edmonds.

"I have no objection to having the paper read," answered the Judge, and it was read accordingly. The document was as follows:—

"We propose to prove that there is no trick, fraud, or deception in what are called 'spirit pictures' by the accused; that, in order to produce those pictures, nothing more is done or used by him than by ordinary photographers in producing these pictures than merely resting his hand on the camera; that the spirit pictures coming or abstaining from coming is in no respect subject to his control or volition; that the process of taking them has been again and again carefully scrutinised and watched in its every step by men of intelligence and by those skilled in the art of photography, whereby it has been ascertained, beyond doubt, that there is no fraud or deception about it; that there has been produced on the same plate with the picture of a living person, the picture or ghost-like image of persons who have died, which has been recognised by those who knew them in life; that this has been done in cases where there was no likeness or picture in existence of such deceased person, and whom that operator had never seen or heard of; that it is now some thirteen or fourteen years since these spirit pictures were first heard of in this country; that within the last four or five years the taking of these pictures has been publicly heard of and known in Boston, and there frequently investigated with the utmost care and scrutiny; and that simultaneously with their production in New York they have been produced in Paris (France), and in Poughkeepsie, Waterville, and Buffalo in this state; that in the various attempts to imitate these pictures, and which some photographers claim are the same thing, there are essential points of difference plainly to be discovered by the practised or the discerning eye, and which distinguish the genuine from the false, and which cannot be produced by imitators; that the accused does not know and never has pretended to know by what power or process other than that of producing an ordinary photograph these spirit pictures are produced; that he has often solicited and obtained the closest scrutiny by men more capable than himself of understanding the process, and he is now at all times ready and willing to have his work scrutinised and watched in the most critical manner, and to that end he invites an investigation by a delegation of the most expert and experienced photographers in town, and pledges himself to afford the fullest opportunity therefor; that there are a great many intelligent men and women who, after a careful investigation, are firm believers that the pictures are truly likenesses of the spirits of the departed, and every day the number of sitters, investigators, and believers is increasing; and that he and such believers are of the opinion that the taking of these pictures is a new feature in photography, yet in its infancy surely, but gradually and slowly progressing to greater perfection in the future, requiring for such perfection time and a scientific knowledge of the power that is operating."

At the conclusion of the reading of the preceding document came a discussion upon the time to which to adjourn the case. The Judge wanted to put it off two weeks, but the defence had an important witness who lives in Texas and would have to leave for home before that time. Regarding this witness—a very grey-haired and grey-whiskered gentleman—the Judge stated that he had been informed by an officer that he was a sort of an outside *attaché* of the establishment, and did a certain amount of roping in of customers through showing pretended spirit photographs. It was finally arranged to have the examination take place at 9 a.m. of the 21st inst., in the court room of the Special Sessions. This matter arranged, the spiritualistic gentlemen left, and business in the court room settled down to common "bummers" and low-lived larcenies and assaults—things decidedly "of the earth earthy."

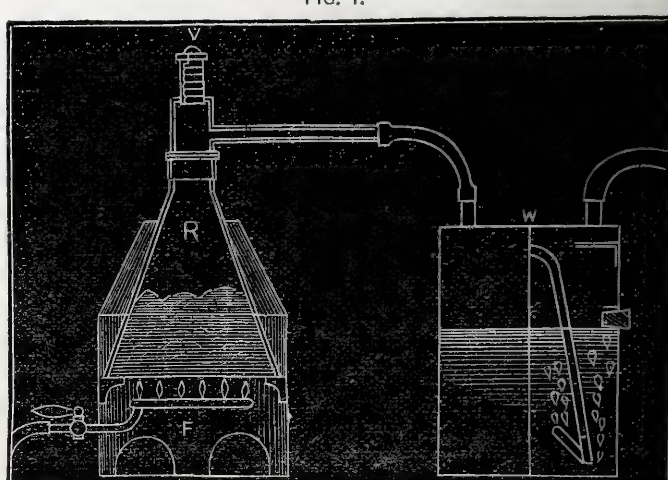
The *Herald* of the 21st ult. says:—

The case of Mumler, the alleged spiritual photographist, was up today before Judge Dowling, and excited great interest. The evidence submitted was mainly favourable to the accused. Several photographers, not spiritualists, testified that they had been unable to detect any trickery or fraud in the taking of the so-called spiritual photographs. Judge Edmonds, the well-known spiritualist, and others of that faith, testified that, after the strictest scrutiny, they could find no evidence of fraud or deception in the process employed. Judge Edmonds said the spirits were material, and there was no reason apparent to him why, under certain conditions, they could not be photographed. He had himself seen and conversed with spirits. The examination was adjourned until the following Friday.

ON LANTERN CONSTRUCTION IN RELATION TO PHOTOGRAPHY.*

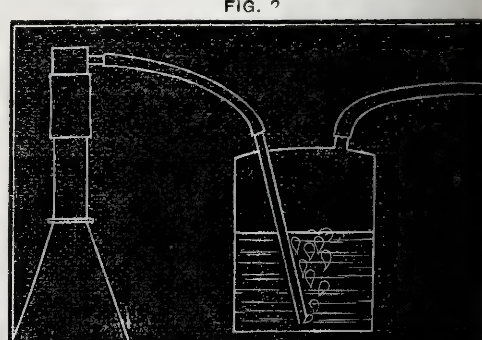
Sources of Light.—The author first referred to his safety-oxygen-generating apparatus, which we described in our number for February 5th, page 64, but which will be made clearer by the annexed illustrations:—*Fig.* 1 shows the conical retort R, with its safety-

FIG. 1.



valve V within its "jacket furnace" F, with a lever-tap burner for regulating the flow of gas if coming over too fast or too slow; and W the wash-bottle, divided into two compartments, so that the retort shall not be in direct communication with the water (as in the old arrangements shown in *fig.* 2), by which a "suck back" of the water into the red-hot retort, on all the oxygen being given off and a vacuum formed, is avoided.

FIG. 2.

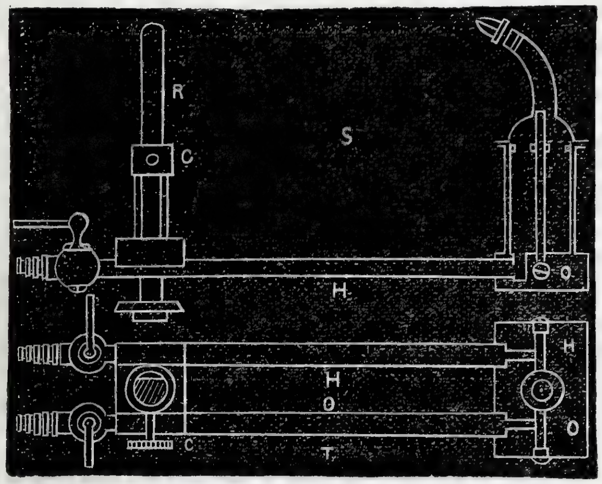


The following illustrations show Mr. Highley's new "convertible jet" for the oxhydrogen lantern:—*Fig.* 3 shows S a sectional side and T top view of the arrangement, H being the course of the supply for hydrogen and O that for oxygen to the jet, the nozzle of which

* Continued from page 195. Through a misunderstanding as to the woodcuts relating to this paper being ready for press, they have been deferred to the present number, instead of being intercalated with the text of the paper.—Eds.

is separate, to allow of coarse or fine bores being used according to the amount of pressure employed, &c., or getting at the nozzle if

FIG. 3.



accidentally blocked with dust or dirt; R the rod on which the jet is optically adjusted, and clamped with an efficient arrangement C, contrived by Mr. Highley, and shown in detail in *fig.* 4. He says:—"Most workers must have experienced the difficulty of firmly clamping any form of burner or jet—that has, through its length, much leverage—on to the thin rods usually attached to the lamp tray. To overcome this I tried larger rods and powerful clamps, but with slight advantage, till I hit upon the plan of filing away the side opposite the thumb-screw, so that two sharp edges were left to bite on to the adjusting rod."

FIG. 4.

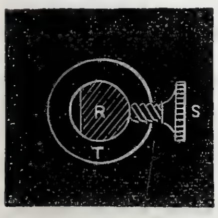


Fig. 5 shows the ordinary arm for supporting the lime ball L, whether the "convertible jet" is employed for the "mixed gas" or "oxyhouse-gas" arrangement. The lime is adjusted by a screw-pin S, and the support clamped by C between the gas tubes H O, *fig.* 3.

Fig. 6 shows a small lime clock support for the lime ball L, that replaces the ordinary arm, if great pressure is to be used, especially when the condensed gas bottles are to be employed, "for as the extreme pressure quickly cuts a deep hole in the lime ball, which has the effect of throwing the point of light out of accurate focus, and so causing a decrease of light on the screen, it is essential that the lime ball should be kept in constant rotation—at least till we can get supplied with limes of greater hardness than those ordinarily obtainable, or some indestructible substitute, such as zirconia; for, even when it is kept mechanically rotated, a fine spiral groove is cut in the substance of the lime." Mr. Highley makes the lime pin double the usual length, for the purpose of keeping a reserve lime warm and ready for action should the one in use crack. K represents the key of the lime clock; and, to facilitate winding up without disturbing the adjustments of the jet, the clock is supported on a little tray T that is clamped by a nut N between the gas tubes H O, *fig.* 3, so that it can be removed bodily from the lantern; the tray allows of the lime being adjusted nearer to or further from the nozzle for producing the best light attainable.

FIG. 6.

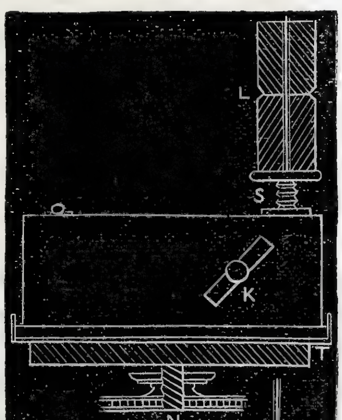


FIG. 5.

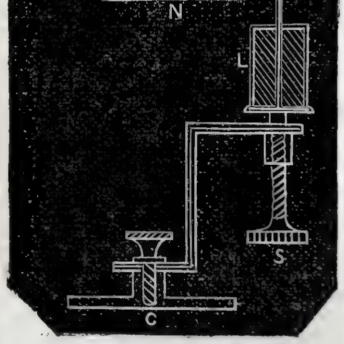
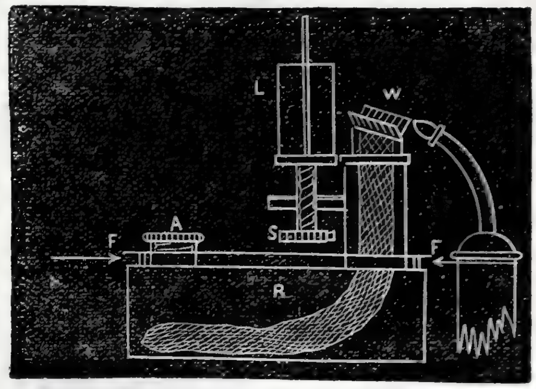


Fig. 7 represents a spirit lamp reservoir R, with a large double divided flat wick W, with lime L on its screw support S, and A the screw-capped aperture through which the spirit is poured, even when the lamp is burning. F represents a false top to the reservoir, to

FIG. 7.



allow of an air passage for keeping the spirit cool. Like the clock it is supported in the tray T shown in *fig.* 6.

Lantern Construction.—*Fig.* 8 shows the form of chimney C, with two diaphragms D D originally employed by Mr. Highley; but he says:—"These interfered too much with the ventilation, for, by dispensing with them, I could place my hand on the top of the body, even after the lantern had been in use some time, it was so cooled by the draftway. This is not the case with the usual form of contracted chimney. By this arrangement a double body is not necessary."

FIG. 8.

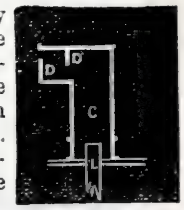
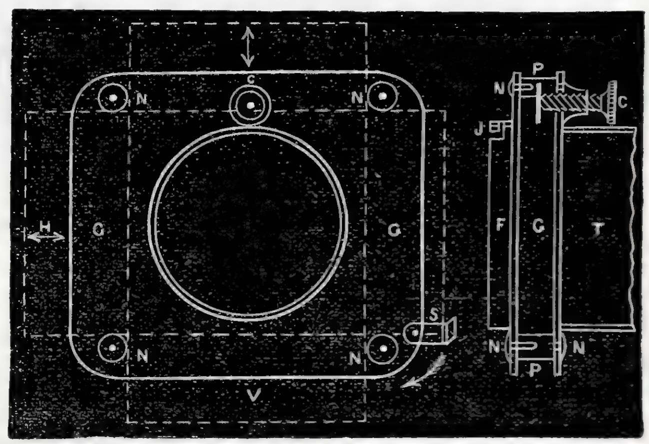


Fig. 9 shows the form of stage as arranged by Mr. Highley. The two stage plates G are connected together by four brass pillars P (N being the clamping nuts for the same), so as to leave the stage open at the top as well as the sides for the introduction of vertical slides,

FIG. 9.



effects, &c., V, as well as the ordinary horizontal ones H. The width between the stage plate is one inch, to allow the thickest mechanical slide, the slides of ordinary thickness being kept in position, or the mechanical slides clamped by a quick-action screw C, but which can be turned back to admit slides of any thickness. The stage is removable, being fitted to the "flange-plate" that carries the condensers by a bayonet-joint J, on a counter tube at the back of the stage-plate.

FIG. 10.

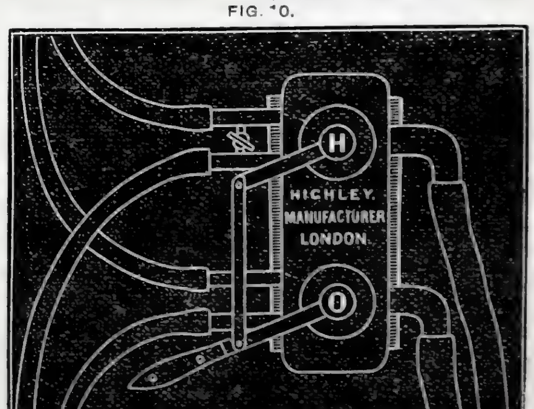
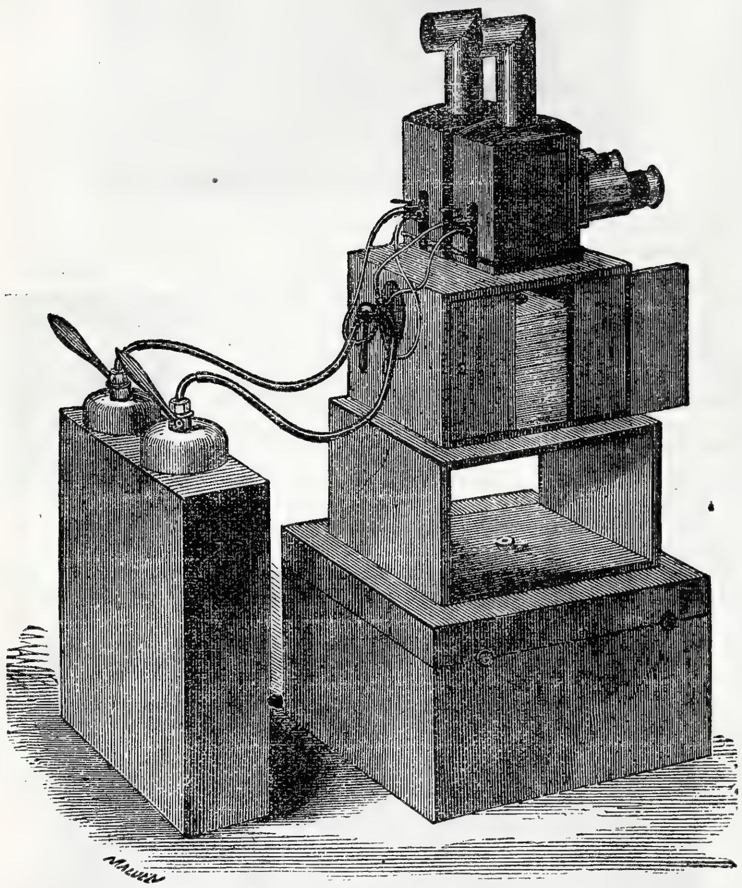


Fig. 10 shows the principle of the "Highley-Malden gas dissolver," but which the maker has now arranged to work with one cock and lever arm, as described in our number for Feb. 5th, page 65. The advantages of this arrangement are, that it not only economises both gases, but gives the exhibitor greater command over the "effects" produced.

Fig. 11 shows the manner Mr. Highley arranges his "slide cabinet," its shell, and the packing case for the same and the lantern, to

FIG. 11.



form a stand for the latter, so as to centre with the screen when they are all clamped together. It also shows a pair of the condensed gas bottles, arranged in connection with the gas dissolver referred to above. Mr. Highley also exhibited at the meeting a model of his portable opaque white screen, the packing-case for which forms a supporting frame for the same, as described at page 65, and so forms "a complete system of lantern apparatus" for the travelling exhibitor.

SAMUEL HIGHLEY, F.G.S., &c.

PATENT SPECIFICATION.

PROTECTING THE SURFACE OF PHOTOLITHOGRAPHS.

ANALOGOUS to the coagulation of the albumen coating of the collodion film in the well-known "hot-water process" of Dr. Ryley, is a method of protecting prints, patented by Mr. F. W. Hart, and the specification of which we now subjoin:—

THIS invention consists in protecting the surfaces of lithographs, photolithographic prints, placards, plans, maps, and printed surfaces of a like nature, in an economical and effectual manner by means of a coating of albumen applied thereto. Hitherto such surfaces, when desirable, have been varnished or protected by spirit varnishes or gelatine, but such processes have been subject to several objections. For instance, in the application of spirit varnishes it is necessary that the paper on which the prints or designs are produced or impressed should first be especially non-absorbent to the spirit, and, in addition to this, the application of a spirituous solution or fluid is prejudicial to the health of the operators, and is likewise dangerous to property, owing to its inflammable nature. Again: in the application of gelatine a surface of metal or glass is first coated therewith, and the gelatine is then transferred to the surface to be coated; in this state it is subject to injury by moisture, and in order to render it permanent must be subjected to chemical treatment. In both the processes above referred to much time is occupied, and considerable expense necessarily incurred.

In carrying the present invention into effect, I prefer that the prints or designs should be on a well-sized hard paper, but when this is not the case, and the paper is unsized or insufficiently sized, I lay the prints or designs down on a level surface, and sponge both sides thereof with a warm solution of starch or other sizing material, and then hang them up to dry; if calendered or rolled after this treatment the paper is then in the condition preferred to be used. I then prepare a sufficient quantity of albumen by taking the whites of eggs and breaking up the mass into an uniform liquid by a beating machine or whisk, as is well known to persons conversant with the preparation of photographic albumenised paper; I then coat the printed surface of the paper (the same having been previously dried) with the albumen thus prepared. It is desirable to introduce into the albumen, during the operation of breaking or whisking, matter of a deliquescent nature, such as chloride of calcium or nitrate of ammonium; and I find that about one per cent. of such substance is sufficient for the purpose of preventing the albumen on the paper becoming thoroughly desiccated, as in this state it is conveniently rendered insoluble. The paper having become dry, in the ordinary sense of the term, I proceed to render the surface coating insoluble (in the same sense as varnishes are insoluble) by means of steam or boiling water. The like result may be obtained by the use of well-known chemical solutions and hygroscopic gases possessing the property of rendering albumen insoluble, but I prefer the use of steam as being cheaper.

The following is a convenient mode of carrying out this portion of the process:—The coated sheets of paper are suspended from rods or cords in a steam chest properly protected to avoid loss of heat by radiation. A small amount of aqueous vapour is allowed to pass from the steam generator or boiler through the steam chest; and when the latter is filled the steam is turned on, and the temperature raised to at least from 170° to 190° Fahrenheit as rapidly as possible. The sheets of paper with their surfaces thus protected are then removed and at once piled face downwards, the result of the treatment above described being that the prints or designs are covered with a most efficient protective coating, whilst the prints or designs have a depth and tone imparted to them which has been unattainable by the methods hitherto adopted, from the fact that the black or deep shadows have a greater amount of surface given them than the high lights.

Having thus declared and ascertained the nature of my said invention, and the manner in which it is to be performed, I would observe, in conclusion, that what I consider novel and original, and therefore claim as constituting the invention secured to me by the said hereinbefore in part recited letters patent, is the application of albumen to the surfaces of lithographs, photolithographs, and like printed surfaces, as and for the purposes hereinbefore described and set forth.

F. W. HART.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 25th	Liverpool Amateur	Free Public Library and Museum.
„ 27th	Oldham	Hare and Hounds, Yorkshire-st.
„ 27th	Bristol	Philosophical Institution, Park-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held in the City of London College, Leadenhall-street, on Thursday, the 13th inst., when there was a large attendance of members. The Rev. F. F. Statham, M.A., President of the Society, occupied the chair.

The following gentlemen were proposed and admitted as members:—Messrs. Schmerl, J. D. Newsome, and F. Henry Warlick.

A letter was read from the corresponding Secretary of the Philadelphia Photographic Society, asking the members of the South London Photographic Society to exchange some of their artistic productions with their brethren of Philadelphia. A committee was appointed to make arrangements for an exchange of the nature referred to, not only with the Philadelphia, but with other photographic societies.

The CHAIRMAN then announced that, according to previous intimation, the present meeting would be one partaking of the nature of an exhibition, and he would therefore call upon the members present to lay before the meeting their art-treasures. Accordingly a large, varied, and excellent collection of photographs in different styles, by various artists, and representing divers processes, were submitted for exhibition. As it is not usually the reporter's province to aspire to the office of critic—at least in a marked manner—the reporter in the present instance will content himself by stating the following dry facts:—

Mr. Bockett exhibited a large collection of microscopic photographs, which were rendered visible to the eye by the aid of a portable microscope, fitted with a Ross power of an inch. The photographs were greatly admired, but scarcely more so than some specimens of microscopic caligraphy executed, as Mr. Bockett informed the meeting, by means of a simple instrument of the pentagraph order, consisting of a long

vertical rod of wood suspended in gimbals near the upper end, which carried a finely-pointed writing diamond.

Mr. Schmerl exhibited the group of ceramic photographs to which reference was made in the report of the London Photographic Society in our last number.

Mr. A. L. Henderson submitted for examination a large collection of photo-enamels, which showed that this artist has made great strides in advance, even since he last exhibited his productions of a similar kind before the Society.

Mr. Howard's album, or rather folio, was examined with great pleasure.

Mr. Blanchard's contribution consisted of only two or three pictures, but these were quite sufficient to establish his reputation, even had his works been previously unknown. With the posing and lighting of his figures the most hypercritical person must have been satisfied; but a lens of longer focus or smaller aperture would have rendered the pictures still better.

Mr. Warlick showed specimens of coloured photographs, small and enlarged, executed very skilfully in both oil and water colours.

A number of prize pictures from the Amateur Photographic Association were exhibited by Mr. Sebastian Davis, and also some prints from old calotype (paper) negatives. The sharpness of the latter was remarkable.

Mr. Hunter also exhibited a few specimens by himself and others connected with the Amateur Photographic Association just named.

Mr. Simpson showed several prints by Albert's photolithographic process, by which the greatest delicacy is now obtained. Some details of the process have already appeared in our pages.

Mr. Cocking exhibited some portrait crayon drawings, which were enlarged copies from small photographs. He also exhibited several effective portraits, executed by a process to which reference is made in another page of the present number.

The examination of the contributions above indicated gave pleasant occupation to the members till a late hour, and the Chairman expressed the satisfaction which every one then present must have felt at such a plethora of excellent works of photographic art—a sentiment which was echoed by every person present.

The meeting was then adjourned.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of the above Society was held on Friday, the 7th inst., at 12, York-place, Portman-square,—James Glaisher, Esq., F.R.S., in the chair.

The minutes of the last meeting having been read and confirmed, the following members and subscribers were elected:—Geo. Dundas, Esq.; B. Greene, Esq.; J. A. Prout, Esq., B.A.; G. W. D. Green, Esq.; Capt. H. E. White; F. S. Teesdale, Esq.; A. R. Hunt, Esq.; C. Harrison, Esq.; Miss Cumby.

The Secretary then laid before the Council the following prizes, amounting in value to about eighty pounds:—

A large silver goblet—J. W. Richardson, Esq.
A silver goblet—Lieut. Senior.
,, ,, D. Pudumgee, Esq.
,, ,, W. Baily, Esq.
,, ,, F. Beasley, Jun., Esq.
A silver mounted claret jug—Capt. Bankart.
,, ,, ,, Lieut. Senior.
,, ,, ,, W. D. Howard, Esq.
,, ,, ,, A. Booty, Esq.
,, ,, ,, E. R. Hall, Esq.
,, ,, ,, F. E. Currey, Esq.
A large album, elegantly bound in morocco, with silver name plate } Major Gresley.
,, ,, ,, J. S. Hyde, Esq.
,, ,, ,, E. Milsom, Esq.
,, ,, ,, J. H. Ritchie, Esq.
An album elegantly bound in morocco—J. H. Ravenshaw, Esq.
,, ,, ,, F. S. Schwabe, Esq.
,, ,, ,, Rev. J. Freke.
,, ,, ,, R. Murray, Esq.
A revolving stereoscope—J. S. K. Moss, Esq.

The meeting expressed great satisfaction at the prizes; and, on the motion of Dr. Farre, it was decided that they should remain on view throughout the following week.

The SECRETARY reported that he had received a reply from the Earl of Rosse, stating that his lordship would "feel much pleasure in becoming a member of the Council."

The proceedings then terminated.

COLOURLESS VARNISH.—The following is said to form an excellent colourless and hard varnish:—Dissolve two and a-half ounces of shellac in a pint of spirits of wine; boil for a few minutes with five ounces of well-burnt and recently-heated animal charcoal, filter, and, if not quite colourless, add more charcoal.

Correspondence.

Foreign.

Philadelphia, May 1, 1869.

THE last number of your Journal received contains some interesting remarks made at the meeting of the South London Photographic Society, by Mr. Blanchard, to the effect that whilst with a thirty-grain negative bath a very highly-bromised collodion gave effects far inferior to those of an ordinary collodion, yet, when the two were tried with a fifty-grain negative bath, the highly-bromised collodion gave a magnificent negative, whilst the result with the ordinary collodion was greatly inferior.

These observations lead me to put on paper some results that occasioned me some surprise and annoyance at the time. I was making negatives of natural scenery, carrying the plates some distance, and I found it convenient to use a larger allowance of bromide by a good deal than I had been in the habit of employing. The negatives were very successful, looked quite perfect, but the prints by no means came up to the promise of the negatives. There was a deficiency of brilliancy in the print, even when the negative looked absolutely free from any such defect. Portions of the films, which to the eye looked tolerably opaque, allowed the light to pass through them much more freely than would have been supposed. This is a serious objection to the use of three or four grains of bromide, for the development must be carried beyond the point at which the eye is accustomed to consider it right, and in such cases it is not easy to know just how far to go. Of course there is nothing more familiar to photographers than that a large dose of bromide tends to softness: that is not what I am here speaking of, which is that with very much bromide the negatives *print* as being much thinner than they *seem to the eye.*

For impeaching Mr. Hardwich's views on the production of pyroxyline, I have lately been very discourteously attacked, and at great length, by Mr. Dawson, of whose connection with Mr. Hardwich's seventh edition I was not at the time aware. I am glad to see that in my views I am far from standing alone, and that Mr. Blanchard and Mr. R. M. Gordon have expressed, in very decided terms, their dissent from the views expressed in that generally reliable manual upon this subject. Dr. Liesegang's results were in themselves an emphatic condemnation of Mr. Dawson's views, and I do not in the least believe that, at the present day, any manufacturer of first-rate collodion would consent to employ the formulæ which Mr. Dawson supports.

In washing negatives many operators forget that the film is not a tissue of the nature of paper, for example, composed of interlaced fibres, between which water can penetrate, but it is more in the nature of a membrane—it is continuous. Water, therefore, penetrates it only very slowly in comparison with paper, and when a portion of solution has penetrated it, some time is required to wash that solution out. It has, therefore, been correctly remarked, that the essence of good washing for removing hyposulphite lies more in *time* than in *quantity of water*. It is, of course, an advantage to have plenty of both; but it is well to know that time is indispensable, no matter how much water is applied. Indeed, if I had my choice, I would rather trust a $6\frac{1}{2} \times 8\frac{1}{2}$ negative to a half-gallon of water applied with time and care, than to any quantity, no matter how large, poured over it for a couple of minutes only. With an abundant stream from a rose five minutes is the least time that I would like to trust to, and should greatly prefer seven or eight. To wash effectually with a small quantity of water the negative should be first rinsed off, back as well as front, and then be placed in a pan with successive portions of fresh water. This is pretty much according to the practice described by Mr. Russell Sedgfield, except that, to my notion, he cuts down the washing a little too far. I would also use the water which finishes the plates for rinsing others—that is, take the end water of one plate for the beginning of another.

If it were at any time necessary to wash the greatest number of plates perfectly in the smallest possible quantity of water, I think it might be done by *displacement*. A grooved box should have the sides an inch or too higher than the plates. The box being filled with water, should have one plate after another, as soon as fixed and lightly rinsed, slid into the grooves till full; then a piece of filtering paper should be laid on the top of the edges of the negatives, and the box should be filled an inch above it. Water then being slowly introduced at the top and allowed to escape at the bottom, it would, in descending, displace the solution on the film and replace it with clean water. The object of the filtering paper is to prevent any mixing, and to allow the fresh water to descend regularly in a horizontal stratum. I believe that in this way a dozen plates might be washed with the water often consumed in washing one, and it is not unlikely that the idea might be found useful by those who work wet photography in the field. It is scarcely necessary to say that, in such a box as that spoken of, the grooves must be saw-tooth grooves, so that the plate is supported against its back and edge only, the film not touching, or it would be exposed to danger of tracing.

A New York illustrated journal publishes a number of woodcuts of the "spirit photographs" produced by Mr. Mumler, who is now under-

going trial. This trial, so far from putting down the pretended photography of departed spirits, seems likely to help Mr. Mumler by answering as a complete and inexpensive advertisement. I have already explained my own belief as to the manner in which it is done, viz., by dissolving a picture out and using the film over again.* Some experiments made some years ago by Mr. Shepard and myself showed that the image, the iodide, bromide, and everything visible, could be dissolved away and yet the image reappear by a second development. Of course these plates, after dissolving out the iodide, bromide, and image, by simply drying them would appear exactly like plain glass. They could be collodionised over again, exposed in the usual way, and, in developing the second sitter, a shadowy image of the first would rise up. I am perfectly satisfied that Mr. Mumler either uses this method, or that this method could give the same results. In my opinion, no journal is justified in alluding to this imposture without distinctly qualifying it as such. To the intelligent men who have so strangely testified their belief in this photographing of spirits, it should be asked—Why do these spirits emit actinic light for Mumler only, and why do they not appear on the negatives of other photographers equally?

O'Neile, in his book on *Dyeing*, of which I have just looked over the new edition, gives the following method of dyeing a photograph on cotton:—

The stuff is impregnated with the peroxalate of iron and of ammonia or soda, and exposed under a negative. Red prussiate of potash produces a blue image, which, after washing, is treated with dilute alkali. This leaves a brown image of oxide of iron. Oxide of iron acts as a mordant, and the stuff may be dyed with madder or other colouring matter, which will take on the iron mordant and not on the rest of the stuff.

I have never seen finer photographic weather than this spring. During the month of April just passed we have had no rain except at night, and but little cloudy weather.

I will send you by same mail the illustrations above referred to of the so-called spirit pictures, interesting, not in themselves, but as showing what absurdities people can be induced to believe.—Very truly yours, M. Carey Lea.

[The spirit photographs said by our correspondent to have been dispatched by him have not yet reached us.—Eds.]

Paris, May 18, 1869.

The two subjects I expected to write upon in this letter were the apparatus for the zirconia light and the exhibition of photographs at the Palais de l'Industrie. Beginning with the last first: I paid a very hurried visit to the collection of photographs, and was much pleased with the first sight, the arrangements, and the quality and variety of pictures.

Mr. Woodbury's process may be seen in operation, and full explanations given by the clever manager of MM. Goupil & Co.

A number of transparent photographs, illustrative of the many applications of photography to lantern demonstrations, are daily exhibited in connection with this exhibition of the French Photographic Society.

I noticed, in the short time I was able to devote to the photographs, that photolithography and kindred processes were abundantly represented.

Some very well-executed chromo-photolithographs, by M. Marie, attracted my attention.

Salomonesque portraits are more abundant than in 1867—disciples of the master being found both in France and England. The English exhibitor, Mr. N. Briggs, approaches the nearest to the originals, and shows the best portraits, "after Salomon." M. Salomon exhibits some fine specimens; they seem finer than those of 1867 in tone and effect.

Several enlargements by Monckhoven's apparatus are exhibited by the Marseilles house referred to in one of your recent numbers.

Mr. Edwards exhibits a good variety of carbon pictures, and there are pleasing portraits from photographers in the Isle of Man, whose names I do not remember. Of course I intend to devote much more time to this exhibition, and to report more details to your readers.

At last some lamps are ready for scientific men to try the magnesia and zirconia lights proposed and used by the Oxyhydrogen Gas Company of M. Tessie du Mothay. I spent an interesting evening a short time since in witnessing various experiments with the lamps, and the remarkable effects of substituting oxygen for common air in ordinary gas burners. In the rooms of the Company every appliance of burner and arrangement for using the mixed gas can be seen. In the first room a handsome chandelier is suspended from the ceiling, and about six zirconia or magnesia jets are lit up with as much ease as ordinary gaslights. The light produced is far too intense for the eyesight, and therefore ground glass or opaline glass globes are placed over the jets. The light then is most agreeable, is perfectly *white*, and allows shades of colours to be nicely distinguished.

Then we see an Argand burner supplied with oxygen instead of air, and an ordinary Argand is placed a few feet off, to show the difference between the two. The oxygen-fed burner gives the light of six ordinary Argands fed with air, for the same expense, and the light is far superior. The ordinary gaslights look dirty, dull, and yellow in comparison.

Then we see pedestals of glass and metal of a variety of designs, intended for use on the tables or mantelpieces of offices, libraries, &c., all arranged so as to burn the mixed gases without danger upon magnesia or zirconia cylinders.

Then we are shown the lamps for scientific purposes. There is one in which the light burns in a globe of glass, and which is intended for use in mines, &c. There are two little exit holes for the water and products of combustion at the lower part of the globe, and these form the only communication with the outer air.

The lamp of most interest to the readers of this Journal is that intended for "projections," and for the production of a great light for various photographic operations, such as enlargements, printing, aiding sunlight on dark days, or even as a substitute when the sun's rays do not appear at all. These lamps are made of brass, and are formed of a substantial foot, from which rises a stem which can be lengthened at will by a telescopic adjustment. From the sides of this stem are two arms provided with blank taps and stopcocks. The latter allow the entrance of or cut off the supply of oxygen on one side, and hydrogen or coal gas on the other; the former, which can only be moved by a screw driver, are for regulating the proportion of the two gases to the burners provided with the lamp. This regulation is made for each lamp by the makers, and the blank taps should not be disturbed from their positions afterwards. The burner for use with the magnesia cylinder is composed of four or five small jets, by which the crayon of magnesia is enveloped by the flame of the mixed gases. The crayon is supported by a little bent wire, which can be adjusted by means of a screw. In the same wire holder is placed the little zirconia cylinder, the burner to be used for which is composed of a single jet only. This description of the lamp will only be useful, I am afraid, to those who see the instruments themselves, for without a diagram it is difficult to describe an instrument so that it may be palpable to the mind's eye of the reader.

The magnesia crayon is about an inch and a-quarter long, and the thickness of a goose quill. The light obtained from this is *highly photogenic*, and can be employed for a great number of photographic operations where great intensity of *dispersed* light is required. The crayon of magnesia being equally ignited all round, throws out beams in *all directions*. It differs in this respect from the electric, the magnesium, and the ordinary forms of oxyhydrogen and oxycalcium lights, for in these the light is more intense at one point than another. Although this intensity at one fixed point is a quality advantageous for purposes of projections by the lantern, &c., still the advantages of a *dispersed intense light* are self-evident. The lighting up of caves, tombs, dark underground works, for the purpose of obtaining photographs of the objects found therein, is better accomplished by a diffused than a concentrated light. In taking portraits, either by its aid alone or as an auxiliary to sunlight, the diffused will be found superior to the concentrated light, especially when the diffused light is nearly as intense.

But there are purposes for which the concentrated light is to be preferred, and then it can be obtained by this lamp, by using the little cylinder of zirconia. This affords a small globe, about the size of a large pea, of a most intense white light, admirably adapted for all "projections," &c. If this light be nearly as intense as the electric light, it will be invaluable in lecture demonstrations as so often shown at the Royal Institution, as the saving in trouble and expense over the use of the electric light will be very great. The magnesia crayons require heating a little, first, by the ordinary gas flame, and then they becomes rapidly incandescent when the oxygen is turned on. When the mixed flame is turned off some little time elapses before the crayon loses its luminosity. This renders its use rather difficult in dissolving view apparatus, where the dissolving is done by turning off the gas. The zirconia cylinder, on the contrary, becomes white hot at once, and loses its incandescence as soon as the gas is turned off. The magnesia crayons are not easily cracked, and one can be used for several nights.

The zirconia cylinders are indestructible, and last for ever. If it be required, they can be remoulded in the cylinder form, and used again without injury. Should oxygen become cheap, I think there is but little doubt that these lamps, or some other form of them, will supersede all other modes of obtaining artificial light for photographic operations. The problem of cheap oxygen has been solved here. There are oxygen gas-works near Paris, where it is produced in abundance, and it can be brought into the city compressed in cylinders of metal. The time is probably not far distant when pipes will be laid down as for common gas, as the advantages in economy in use are proved to be very great. In many places the compressed common gas is now supplied in cylinders.

In using all the burners I have described care should be taken that the pressure should be as *regular as possible*, and with the "photographic lamps" the pressure should be great, *i.e.*, greater than ordinary gas pressure, and about the same as when gas bags are used. This is a point of importance in order to obtain the best lighting results,

* We have been informed by a person who was present in Mr. Mumler's dark room, and saw the the whole operation of producing the picture, that it was *not* effected by the method described by our esteemed correspondent.—Eds.

although the burners are all "safety." A burner has been contrived called the "differential or compensating burner," by which the gases can be burned without flicker under any pressure; but these are intended chiefly for the lighting of cities, halls, hospitals, &c. I hope to have further information still to communicate to your readers.

R. J. Fowler.

Home.

IN RE PYROXYLINE.

To the Editors.

Gentlemen,—Will you allow me a word on this subject as opened in your last number?

I think many of the opinions expressed by the writer are in opposition to views of the present day. Mr. Hardwich, in writing on the matter of pyroxyline, is, I believe, thought by most to have become confused and involved, and in a great measure failed to elucidate the subject as he ardently desired. His enthusiasm and keen search after truth, as well as his own high personal character, mainly gave the interest which some years ago attached to the writings of that gentleman; but I differ entirely from Mr. Dawson in thinking that his formulæ possess value at the present day.

Mr. Hardwich was unfortunately not gifted with personal dexterity in taking pictures, and much of his writing consisted of profound theoretical studies of occult points of chemistry, having little bearing on the real matter. Less learned but more practical men have superseded the formulæ given by Mr. Hardwich, with palpable advantage to the photographic world.

Mr. Dawson, referring to Dr. Liesegang's papyroxyle, says he found collodion made by it give—first, structural markings; second, to be wanting in power of giving density; and third, to be unsuitable, without keeping, for the collodio-bromide process. Please allow me to say that such findings are the very reverse of my own and others. I find it give a film—first, with the most complete immunity I ever knew from structure; second, to possess the power of acquiring density in a very remarkable degree; and third, to be suitable for the collodio-bromide process in an unusually short time after mixing. These conclusions are the result of my own trials and not hearsay.

I differ entirely from Mr. Dawson in his belief that collodion for a dry process requires the mixed acids at a high temperature. For dry work of any known process nothing can work better than collodion made from Liesegang's papyroxyle, and this, as has been explained before, is made with acids at a low temperature.—I am, yours, &c.

Surbiton, May 18, 1869. Samuel Fry.

PROTECTING NEGATIVES.

To the Editors.

Gentlemen,—If a piece of thin brown wrapping-paper be varnished over with a solution of gutta-percha in naphtha or benzole, it will then be so perfectly tight as to exclude damp air from any negatives which may be wrapped up in it.

Since reading your observations on the cracking of negative films, in the last number, I have prepared some paper of this kind, and intend to use it for the purpose referred to. It is very easily made.—I am, yours, &c., Geo. Markham, M.D.

May 18, 1869.

[A solution of India-rubber, either in sulphide of carbon or benzole, will answer better than the above.—Eds.]

MOUNTING OBERNETTER'S PAPER.

To the Editors.

Gentlemen,—I adopt the following plan:—Place the print, while wet, on a sheet of glass, face downwards; hold up to the light, and, as the picture will be quite transparent, the glass cutting shape may easily be fixed in the desired position. Mark round the edges of the guide lightly with a lead pencil, and afterwards remove the print and cut with scissors. I find it better to over-print the proofs a little.—I am, yours, &c., W. H. C.

Liverpool, May 17, 1869.

PRESERVING COLLODION NEGATIVES FROM CRACKING.

To the Editors.

Gentlemen,—Well aware of the importance of keeping the negatives free from moisture, I have for several years kept all my most valued negatives in plate boxes in the lid of which there is a recess for holding chloride of calcium. This is covered over with two thicknesses of calico. Although I used chloride of calcium at first, I have since used lime for the same purpose, and have never had a single crack or reticulation on one of my negatives. At the same time there can be no doubt that packing them in blotting-paper is a very efficient mode of protecting them.—I am, yours, &c., An Old Photo.

Brighton, May 18, 1869.

NEUTRALISING AN ACID BATH.

To the Editors.

Gentlemen,—My nitrate of silver bath having become extremely acid, turning the litmus paper *quite red*, I added a solution of about three grains of carbonate of soda, according to some printed instructions. Not finding any change in the bath I then, according to *another* printed instruction, added five drops of liquid ammonia to forty minims of water, but still without any change in the acidity of the bath. What am I now to do with it? The plates sensitised with this bath produce *no image* or outline of any description. I have filtered it well. The strength is about thirty grains to the ounce.—I am, yours, &c.,

Ascot, May 18, 1869. Ascot.

[There is no doubt whatever that the addition of either of the substances named will correct the acidity. It is probable that too little has been added. Add the carbonate until the liquid be very slightly milky, and then filter.—Eds.]

Miscellanea.

The "Spiritual" Photographs Case.—The examination of Wm. H. Mumler, the photographer who was arrested in New York to answer a charge of obtaining money on false pretences, in representing that the likenesses were those of the deceased friends or relatives of his customers, terminated on the 2nd instant in his acquittal. His counsel spoke for nearly two hours, claiming that his client was a sincere spiritualist, and that his pictures were produced by supernatural and not by mechanical agencies. The judge, in giving his decision, remarked that, however he might believe that trick and deception had been practised by the prisoner, yet, as he sat there in his capacity of magistrate, he was compelled to decide that he should not be justified in sending the defence to the grand jury, as, in his opinion, the prosecution had failed to prove the case.

Selling Obscene Photographs.—At Bow-street Police Court, on Saturday last, Sydney Powell was brought up for final examination, and committed for trial on the charge of selling obscene photographic slides, &c., under the statute known as "Lord Campbell's Act." Mr. Abrams, who appeared for the defence, contended that certain oil paintings, which were a part of the property seized, were not obscene in the meaning of the Act. They were valuable works of art, and were valuable only for their artistic merit, and if they had somewhat of a lewd tendency they did not in that respect differ from many which were preserved in the national collections. With regard to other articles of a more offensive character he should offer at the proper time a defence which would completely exonerate the defendant. Mr. Flowers, however, committed the prisoner for trial, but admitted him to bail in two sureties of £200 each, and his own recognizance of £400.

Collodion for Protecting Silver Wares.—The loss of silver which results from the impregnation of our atmosphere with sulphur compounds, especially where gas is burned, is very great. It has been said that many thousands of pounds' worth go down our sewers annually in the form of dirt from plate cleaning, and the loss of one large house on Cornhill from this source has been described to us as serious. Silversmiths may, then, thank one of their confraternity—Herr Strolberger, of Munich—for a happy thought. He seems to have tried various plans to save his silver, if possible. He covered his goods with a clear white varnish, but found that it soon turned yellow in the window, and spoilt the look of his wares. Then he tried water glass (solution of silicate of potash), but this did not answer. He tried some other solutions, to no purpose; but at last he hit upon the expedient of doing his goods over with a thin coating of collodion, which he finds to answer perfectly. No more loss of silver, and no longer incessant labour in keeping it clean. The plan he adopts is this:—He first warms the articles to be coated, and then pays them carefully over with a thinnish collodion diluted with alcohol, using a wide, soft brush for the purpose. Generally, he says, it is not advisable to do them over more than once. Silver goods, he tells us, protected in this way, have been exposed in his window more than a year, and are as bright as ever, while others unprotected have become perfectly black in a few months.—*Mechanics' Magazine.*

The Southport Shore: Important Decision.—A somewhat important decision was given at the Southport Petty Sessions on Monday last. From time "immemorial," people seem to have considered that they had a right to use the sands, and the consequence has been that numerous erections, some of them of a substantial and permanent character—photographic studios, in fact—have been constructed, much to the annoyance of artists in the town, who had to pay rent and taxes, while their rivals on the shore were exempt from both these burdens. The shore is claimed by two parties, the Duchy of Lancaster and the lords of the manor, neither of whom, however, have deemed it worth while to interfere with the intruders on their territorial rights. By the provisions of the Southport Improvement Act of 1865, the corporation has police power over the shore, and, in compliance with the repeated requests of the ratepayers, action has at length been taken to remove the erections which have given so much offence. On

Monday, Giles Ashworth, the owner of one of the photographic studios in question, appeared before the magistrates to answer a charge of having offended against the Improvement Act by erecting a house without having first sent in a notice and proper plans. He was also summoned, under another section of the Act, for using combustible material in the roof of his studio. Mr. Ashton, who appeared for the defendant, contended that his client's studio was not a "house" within the meaning of the Act, and this legal point was argued by him and Mr. H. Forshaw, who represented the Corporation. The bench, however, decided the first case proved, and fined the defendant 40s. and costs, and further ordered that he should pay 10s. per day from the 14th April, the date of the commencement of the action; but it was recommended that the latter part of the penalty should be remitted if the defendant removed his studio within seven days. The decision as to the second charge was postponed for a fortnight.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A fine-toned musical box, playing six tunes, large and powerful, would be exchanged for a *carte* lens by a good maker, with half or whole-plate bellows camera, in good condition. Cost of box £6, now equal to new.—Address, R. Jones, photographer, Kington, Herefordshire.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

James Thomson, Liverpool.—*Municipal Offices, Dale-street, Liverpool.*

E. Wormald, Leeds.—*St. Clement's Church (interior and exterior), Leeds.*

J. C. Lambert, Sleaford.—*Napoleon's House—Napoleon's Tomb, St. Helena.*

☞ *Correspondents should never write on both sides of the paper.*

Clericus.—The portrait will be highly prized.

S. M'Watters.—Received. We shall try the varnish and let you have our opinion next week.

T. N. (Bradford).—Good flatted crown glass is inferior to patent plate, but for your purpose it will answer quite as well.

A Tyro.—A minim is not exactly a grain, but in everyday practice it may be assumed to be such, and estimated as such.

F.R.S.—Your plan for a portable tent is complete and ingenious enough, but it will be nearly twice as bulky and heavy as the portable tents of London makers.

A. Z. (Blackfriar's-street, Lynn.)—A recent advertiser, who gave this address, is informed that letters have been returned by the post-office officials in consequence of insufficient address.

Plain Jock.—An ambrotype and a melainotype are one and the same thing, with this distinction—that the former is a collodion positive on glass, whereas the latter is a collodion positive on a black enamelled iron tablet.

James Dorn.—You have not rightly understood the author of the manual Iodine is soluble in pure water, but *very* sparingly so. Add to the water a little iodide of potassium, and you will then get an exceedingly strong solution.

Henry Brooks.—The package was received. Thanks. Where you have erred is in first focussing with a large aperture and then inserting the small stop. Invariably focus your picture wiih the same stop you employ when taking it.

A Discontented Purchaser.—The scrapings from the back of the card which you have forwarded consist of carbonate of lead, or, as it is commonly designated, "white lead." When you next enclose any sample of a similar kind, do not send it in such homœpathic doses.

F. Payne.—*Sel d'or* is made by pouring a solution of chloride of gold into hyposulphite of soda, also in solution. It was originally employed for fixing or "gilding" Daguerreotypes, and after that was impressed into the service of paper prints as a toning agent. It is now seldom used.

R. P. (Warrington)—You have failed in getting your bath rectified by sunning from the large amount of acid present in it. Neutralise the acid by means of carbonate of soda or ammonia, and place it again in the sun; you will then find a black precipitate rapidly accumulate at the bottom of the vessel or bottle.

Oxymel.—You have destroyed the collodion by adding too much castor oil. We have added to a small portion of the sample received from you an equal volume of plain collodion, and find that the oil is still in rather too great a proportion. If you will mix together one part of your castor oil collodion and two parts of an unoiled sample, you will then have an excellent transfer collodion.

Juvenis (Norwich).—It is quite impossible to say how long sensitive calotype paper will keep good. One general fact, however, holds good—the more sensitive it is made the shorter is the time it will keep. When this kind of paper was employed for negatives twelve hours was considered to be the longest time it could be kept after being excited. In its simply iodised condition it would keep for years.

T. O. (Leeds).—We have been requested by the Publisher to say that the advertisement and remittance referred to have not been received, consequently the advertisement has not been inserted.

L. N. D.—An "objective" is merely another name for an object-glass. A photographic lens, whether for portraits or landscapes, is an *objective*. So is the object-glass or glasses of a microscope or a telescope.

B. F. S.—The print is imperfectly fixed. You might have ascertained this for yourself by holding it up to the light and looking through it. From the length of time your prints are allowed to remain in the fixing solution, coupled with the fact now mentioned, we conclude that you use your hyposulphite solution much too weak.

Herman Stackheir (Hamburgh).—There is no professional photographer of the name you have given in London—none, at least, of that name can be found in the directory. It is probable that he may have assumed another name, and may have received work as an assistant. We are aware of several foreigners who are photographers in London, but none answering the description given. You ought to communicate with the police.

T. Lamprey.—Not having seen the reply by Mr. Sutton to which you refer, we are not in a position to offer any opinion on the merits of the case. We shall file your letter for future reference, if necessary. That the patent was a dubious one we were all along aware; for Mr. Tunny, of Edinburgh, prepared paper in the same manner and publicly announced the fact at a date anterior to that of the patent. We may refer to this matter again.

Alex. Allen.—We cannot give you the exact ratio in which rapidity of exposure is permitted by the use of an alkaline developer; but we have exposed two coffee plates on the same subject and within a few minutes of each other, one receiving an exposure nearly double that of the other. The latter was developed by pyrogallic acid and carbonate of ammonia, and was quite as good a picture, in respect of exposure, as the former, which was developed by the pyrogallic and citric solution in common use.

Fusbos.—1. Precipitation is much better than boiling down. Common salt, carbonate of soda, caustic potash, and pieces of metallic copper will precipitate the silver—the first as a chloride, the second as a carbonate, the third as the oxide, and the fourth as a metal in a finely-divided state.—2. By means of a thorough washing—first with plain and afterwards with acidulated water—the bath may become useful; but after washing it would be well to adopt the further precaution of giving the inside a thorough coating of varnish.

A Suburban Photo.—We believe that no photographer, whether amateur or professional, is permitted to use a camera within the grounds of the Crystal Palace; the exclusive right to photograph, either in the building or its grounds, belongs to Messrs. Negretti and Zambra, who pay a large sum annually for the privilege. Knowing this, you would do what is morally wrong by taking with you a satchel camera for the purpose of securing views in the grounds. We cannot offer any opinion as to the legality of the action; we have no doubt whatever as to its moral bearing.

An Old Vicar.—You have made rapid strides in the practice of the art since we last had the pleasure of hearing from you. The portraits are, without exception, artistically posed, and, in respect of manipulation, are faultless. The photograph of the church tower might, however, be greatly improved. It is quite sharp, brilliant, and well lighted; but it is distorted, in consequence of your having pointed the camera upwards when taking it. Try it again, and bear this rule in mind—that no matter how much you tilt up the camera or push up the lens by the sliding front, the ground glass *must* stand in the same vertical plane as the building, otherwise you will never get the tower to have parallel sides.

Received.—George Dawson, M.A.; "Smallshaw;" A. H. Kirkby (Leeds) "Reader" (Devonport). In our next.

Bristol Photographic Society.—The next meeting of this Society will take place on Thursday evening next, the 27th inst., at half-past seven o'clock.

LONDON GAZETTE, *May* 18.

Notice of Sitting for Last Examination.

W. W. Herbert, photographer. June 7, at Liverpool.

METEOROLOGICAL REPORT,

For the Week ending May 19th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

May 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
13	30·23	62	43	48	53	NNE	—	Fine
14	30·16	57	44	49	54	E	—	Fine
15	29 92	—	45	52	56	NE	0·03	Fine
17	29 66	66	45	50	53	ESE	0·02	Dull
18	29·56	63	48	55	58	S	0.24	Dull
19	29·49	67	49	52	54	SW	—	Dull

CONTENTS.

THE BRITISH
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WASHING PRINTS.

In his last communication, Mr. M. Carey Lea drew attention anew to the subject of washing prints. Though little that is novel could be said on this subject, Mr. Lea has touched on a particular view of the matter which served to connect in our mind the washing of photographic proofs on paper with a valuable article which we recently referred to on the washing of precipitates, by Professor Bunsen, of Heidelberg.

Precipitates are usually insoluble chemical compounds produced by the admixture of solutions capable of affording such bodies by double decomposition. These are substances which the analytical chemist is every day producing and washing, just as the photographer each day prepares and washes his prints on albumenised paper. The object the chemist has in view in washing his precipitates is the removal of all traces of soluble matters which would interfere with the accuracy of his analysis by increasing the apparent weight of his precipitate. The photographer, on the other hand, washes to get rid of all traces of his fixing agent, if possible, as the retention of even very small quantities of hyposulphite of soda, or of its compound with silver, in the texture of the paper, would prove fatal to the permanence of the print. We find, then, a certain analogy between the washing of photographic prints and of precipitates of chemical substances.

If we consider the matter theoretically, it would not be difficult to show that no tissue can be *absolutely* freed by washing from a soluble substance with which it has once been impregnated, however great the quantity of wash water employed for its removal may have been, and however long we may wash. This is a consequence of the practically infinite divisibility of matter; and, on this account, we would much prefer destroying by chemical means the injurious compound in a print—namely, hyposulphite of soda—to attempting to wash it out. But though we cannot absolutely free any tissue from hyposulphite of soda or any other soluble salt by washing, we can do so practically, or, rather, we can so far reduce the quantity of the objectionable substance by washing as to leave an extremely minute trace present, which trace is supposed to be incapable of doing any mischief.

Professor Bunsen, in his admirable paper already referred to, has shown that, in the case of a chemical precipitate, it is only necessary to wash it with about *twelve times* its volume of water, draining between each addition, in order to remove soluble matters so far from the precipitate that the amount left would be unable to affect the most sensitive chemical balance. A chemical precipitate, then, if in bulk measuring about one drachm, could be completely washed by twelve drachms of water, the latter being mixed with the precipitate in quantities of a drachm each, and the liquid allowed to drain between each addition of wash water.

Now, when the best chemical balance made is compared, as regards sensitiveness to presence of impurity, with the surface of a fixed photographic print, we see that the former is extremely insensitive as compared with the latter. In washing paper we must, therefore, go much further than in washing precipitates; but yet there must be a limit. Where are we to find it? We should unhesitatingly say that the limit to the washing of a photographic print would be the point at which the most delicate test for hyposulphite of soda ceases to afford any indication of the presence of that body. If this limit be granted we can then calculate the actual amount of water an ordinary sheet of albumenised paper would require for complete washing. Let us now endeavour to do this with a reasonable degree of accuracy.

It was long since proved, by a contributor to this Journal, that the most delicate mode of detecting hyposulphite of soda at present known is capable of indicating the presence of the $\frac{1}{300000}$th part of the hyposulphite, when this minute quantity is present in a solution. This, then, is the limit to our power of detecting our enemy; but, if it be present in still less proportion in a print, we may reasonably infer that it cannot do much mischief, as *one ounce* of hyposulphite of soda would then only be contained in something like *fourteen tons* of prints—assuredly a very homœopathic dose. If, then, we are satisfied to wash our prints until we are unable to detect hyposulphites in them by the most delicate chemical tests, and, therefore, to less than the $\frac{1}{300000}$th part, it follows, according to Professor Bunsen's calculations, that we must wash the paper with about sixty times its volume of water. Let us now take a case, and determine what this minimum quantity of wash water must be for a known amount of paper.

In order to determine the point approximately, we took a sheet of ordinary albumenised paper, 18 × 23 inches, and moderately thin: this we found to weigh 308 grains. The specific gravity of cellulose, or the material of the paper, we know to be about 1·5, taking water as unity; we also know that dried albumen is nearly of the same specific gravity. We then find that our sheet of paper is equal in volume to a little less than half an avoirdupois ounce, by measure, of water. But since the apparent volume may, for all practical purposes, be said to be doubled by immersiom of the sheet in water, the sheet of paper which we took must be considered as having a volume, when moist, equal to that of about one fluid ounce of water. If this paper be supposed to be saturated with the fixing solution, and that we wished to so far reduce the proportion of hyposulphite present that the prints would contain less than the $\frac{1}{300000}$th part of the salt, calculation enables us to state that the *minimum* quantity of water required to do this would be about three pints of twenty ounces each; and further, that the water should only be used in the proportion of one ounce at a time, and allowed to stand on the sheet for ten minutes or so and then drained off, its place being supplied by a fresh ounce, and so on until three pints had been used. The print would then be washed to the necessary extent.

No one is likely to go to such trouble as would be entailed in the performance of the foregoing operations; but we have gladly availed ourselves of the opportunity of showing what the least quantity of water is that can be used, even under the most favourable circumstances, to wash a sheet of paper after leaving the fixing bath, and to such an extent that the print will contain less than the $\frac{1}{300000}$th part of hyposulphite. Our result, of course, is but approximate, and this of necessity; but it serves to show that the time of washing prints, and the amount of water used, cannot be reduced beyond a certain point without injurious consequences. In practice we know

that the hyposulphites derived from the fixing bath can be effectually removed in three or four hours from the prints produced on a sheet of paper by soaking them in a gallon of water or so, taking care to change the latter at intervals of half-an-hour; and our own experience shows that, when treated in this way, prints are as well washed as if they were kept for twenty-four hours in a stream of running water.

PINHOLES.

Pinholes in Dry Plates—Explanation of their Production.

Although pinholes are not as common with dry plates as with wet, they not infrequently make their appearance, at least in some processes. As the same causes that lead to them on wet plates do not operate with the dry, the whole matter has led to much speculation and inquiry; in fact, as in almost all the dry processes in common use the bath solution is washed off the plate, there is no opportunity for the production of crystals of iodo-nitrate of silver. Whence, then, does the trouble come?

In the collodio-bromide processes which I have published I have never seen pinholes occur; but latterly, in a very wide series of experiments in which I have been engaged, I have occasionally seen them, and was thus led to study their cause, which I have made out without much difficulty. They are caused by crystallisation of the so-called preservative solution upon the plate.

Microscopic examination of these pinholes has shown me that they differ altogether with different preservatives, but with any one preservative the form is regular and characteristic. With one preservative, for example, the pinholes are elongated, and a microscope shows them to have the form of short prisms. In another case they will seem to be round. The microscope will, perhaps, show these to be in reality corresponding with the form of groups of small crystals. In some cases what appeared to the eye to be circular is found under the microscope to have numbers of small points around its circumference, proving that it was caused by a cluster of small crystals overlapping everywhere but at the circumference, where the crystals separated, and each exhibited its own characteristic termination.

These crystals, of course, were formed during the drying of the plate. The preservative did not all dry, as intended, in the body of the film, but a part outside of it. The crystals, of course, stopped the light precisely as in the case of iodo-nitrate crystals with wet plates, so that the fixing solution removed the silver from the film covered by the crystal, and a transparent spot was produced.

The remedy must be always to check the tendency to crystallisation, and this may be accomplished in three ways:—

1. By combining with the sensitiser substances that check crystallisation—honey with tannin, for example. Sugar has also a tendency to prevent crystallisation, and gum a very strong one.

2. By using less of the crystalline sensitiser. Tannin, for instance, is a highly crystalline substance; in the form in which it reaches the photographer it is a mass of delicate crystals. If pinholes show themselves with tannin the proportion used must be diminished. It does not by any means follow that because one operator uses a twenty-grain tannin solution without being troubled with pinholes another will have the same immunity; a great deal will depend upon the pyroxyline. The film and the crystalline substance represent two opposing forces; the latter strives to crystallise, which is opposed by the colloid character of the film. Which will obtain the mastery will depend, not only upon the quantity of the crystalline substance, but upon the cotton and the quantity of it present. A thin collodion will leave much less pyroxyline on the plate, and the tendency to crystallise will be proportionately greater.

3. Another mode of avoiding pinholes will be to avoid crystalline substances as preservatives. *Coffee*, for example, and *albumen* do not tend to crystalline, but dry up to what is technically called a *varnish*, that is, a colloid mass perfectly homogeneous. Such preservatives cannot produce pinholes; or, if pinholes show themselves with these preservatives, they must depend upon some sort or other of bad manipulation—most probably dust settling on them during drying.

I have before spoken of the favourable action of sugar in keeping open the pores of dry plates; its tendency to prevent pinholes must also be classed amongst its good qualities. Both of these are shared by gum—a substance which is destined, for many reasons, to be of the greatest value to the worker in dry plates.

Wet Plates.

The subject of pinholes in wet plates has been so much better studied than the foregoing that little need be said on the subject. *Want of filtration* is a not uncommon cause. The motes floating in the bath rest upon the film, shelter it from the light, are removed in washing, and the unexposed iodide and bromide of silver underneath are dissolved out in fixing, and leave a transparent spot in the light or half-tones. I do not know whether it has been before remarked in print, although every photographer must have observed, how much more apt these transparent spots are to come in the sky than elsewhere. The reason is not difficult to find. The part of the plate that receives the foreground is that which comes first out of the bath and remains uppermost in the draining, so that specks and motes naturally are carried by the descending fluid into the lower part of the plate which is to receive the image of the sky.

Just in the same way operates the iodo-nitrate of silver, except that these crystals may not only be deposited on, but may form in, the film. In this case the preference which these crystals also show for the sky admits of a different explanation.

The bath solution continues to settle down the plate after draining and whilst the plate is in the slide. As evaporation goes on simultaneously, the solution on the lower part of the plate will always be more strongly charged with silver salts, and if the delay be long the difference may be considerable. Of course, the opportunity for the formation of the iodo-nitrate crystals increases with the concentration of the fluid. M. Carey Lea.

NOTES ON PHOTO-ENAMELLING.

In such chapters as our recent one on photo-enamels [*ante* page 231] as well as in the present article, we seek not to present to our readers a definite process, complete in itself, but rather to bring together a mass of hints and formulæ connected with the subject, calculated to be useful both to those who have already entered this field of artistic labour, and those about to enter it.

On this occasion we intend to redeem our promise by giving hints connected with the composition of enamel pigments. These we have obtained from the best available sources, as well from those who are at the present time engaged in enamel colour making and porcelain painting as a profession as from those who have written on the subject—among the latter being Jamieson, Tomlinson, Ure, and others.

Enamel pigments are both opaque and transparent; and as the effects of these when applied to a ceramic photograph are analogous to those of transparent oil or water colours when applied to a photograph on paper, it is of importance that the nature of both be well understood, as well as the mode of preparing either, and of converting a transparent into an opaque colour.

Starting with transparent enamel or "frit," as a base for producing both opaque and nearly every kind of coloured enamel, we give five formulæ for its composition, four ingredients only being employed, viz., silica, minium, nitre, and borax. The first of these, *silica*, is also known as silex, silicic acid, and earth of flints; the second, *minium*, is the red oxide of lead, in common use as a red pigment; the third, *nitre*, is nitrate of potash; and the fourth, *borax*, is the biborate of soda. All of these are procurable at the shop of any drysalter or chemist.

Starting, then, with these substances, we have the following proportions* in which they may be mixed:—

Transparent Enamels.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Silica...	3 parts.	3 parts.	3 parts.	10 parts.	3 parts.
Minium	3 „	4 „	5 „	15 „	6 „
Nitre...	2½ „	2 „	1 part.	4 „	0 „
Borax..	0 „	1 part.	1 „	1 part.	1 part.

When these are fused together the result is a transparent glass, but by mixing oxide of tin with the oxide of lead (minium) in the composition (previous to making it) in the proportion of a tenth part of tin to the whole of the enamel, the result will be an opaque pure white. The proportion may, of course, be varied at pleasure.

We may state in general terms that the fusibility of the enamel is increased by the addition of calcined borax.

To obtain enamels in colour, it is only necessary to add certain oxides to one or other of the transparent (or opaque) enamels mentioned above. Thus, for *blue enamel*, add one part of oxide of cobalt to ten of the enamel. For *green*, one part of oxide of chromium to six; or one part of binoxide of copper to thirty of the enamel. *Violet* is obtained from one part of peroxide of manganese and thirty parts of enamel; *yellow* from chloride of silver one part, and enamel six parts; *purple*, one part of purple of cassius and ten parts of enamel; while *black* is obtained by mixing together in equal proportions the oxides of copper, cobalt, and manganese, and of these adding one part to five parts of enamel. These proportions may be varied con-

* Tomlinson.

siderably; the oxides may be increased, but the above will serve as a sound basis.

In addition to the transparent enamels to be found in the formulæ given above, the following may be added, as one which has proved to be excellent:—

Red lead	18 parts.
Borax	11 „
Flint glass	16 „

Place in a Hessian crucible, and expose to heat until fusion takes place.

Our experience in this department of art is still insufficient to warrant us in pronouncing as to the composition of the most fusible and *best* "flux," "frit," "paste," or transparent enamel; but this the experimentalist can readily ascertain for himself. Indeed, it is a subject on which no two persons will be found to agree, and is, in this respect, not unlike the composition of the iron developing solution, in connection with which nearly every photographer has his own pet formula. One caution may here be added—use borax with judgment and as sparingly as possible, for it is said to cause the enamel to effloresce and lose colour when in excess.

In looking back over the list of colours given above, we find that we have omitted the *red*. Protoxide of copper, when properly used, affords a rich and beautiful red; but it is very difficult to manage, on account of slight variations of temperature causing it to absorb more oxygen. The best way to prepare the oxide for this purpose is to boil a solution of acetate of copper and sugar (equal parts) in four parts of water. The sugar takes possession of a portion of the oxygen of the oxide, reducing it to protoxide, when it is precipitated as a bright red powder after two hours' moderate ebullition.

In our next article on this subject we shall have something to say concerning the construction and uses of muffles.

COLLODIO-BROMIDE OF SILVER: REMARKS THEREON.

No. I.

Believing Sayce and Bolton's collodio-bromide process to be the best-known basis on which to build our future structure of dry-plate photography, and being fully aware of the peculiar eccentricities connected with its uniformly successful working, which no one has yet been able to explain and altogether control, we cannot busy ourselves too much in collecting facts, comparing them, and discussing the subject in all its bearings. By doing so we are sure of being able, by-and-by, to come to a better understanding respecting the requirements of this beautiful process, and the principles upon which success or failure depends.

With this object in view, let us attack the intricate question in all directions, and, in a spirit of fairness to those who differ from us in opinion and modes of practice, endeavour to get to the bottom of the philosophy of the matter so completely that one can depend on manufacturing or possessing a collodio-bromide which shall satisfy all the requirements reasonably expected from it.

My own experience in the collodio-bromide process, up to this date, I have explained with considerable fulness on many occasions in the pages of another journal; but it would be a sign of weakness or, worse, of obstructive *stand-stillism*, on my part were I to acknowledge that I have always been consistent in my recommendations. Unless I feel sure of having already found out the best mode of working, I must modify, alter, and perhaps sometimes contradict my previous teachings and practice. As success grows by experience, I may even come at last to think we have been all working in a wrong groove. Already, by preparing my chemicals in a particular way, I have been able to attain considerably higher sensitiveness of my collodio-bromide films than, I believe, has hitherto been reached, and that without sacrificing anything in gradation, intensity, and clearness of image.

The broad inquiry which we have to answer is—What are the real sources of uncertainty and of divergence of opinion in the successful practice of this process?

The prime one, and the point of departure for all, is the pyroxyline from which the collodion is made. Pyroxyline, being one of the indefinite substitution series of compounds, and, in this instance, rendered still more indefinite in composition because the temperature at which it is made largely affects its photographic properties, is the true starting point of inquiry. And here we find ourselves much at a loss for a proper guide to direct us in our investigations. Chemical analysis has hitherto been unable to inform us why a pyroxyline which, according to that test, contains precisely the same amount of elements, differs widely in its photographic qualities when made in cold or hot acids and from different varieties of ligneous fibre. But we know, practically, there does exist a great difference, arising, in all probability, from a different physical arrangement of the same elements, which modifies in some way their structure and, consequently, the action of the ethereo-alcoholic solvent. Strong reasons might be adduced in favour of this view, but until some other theory is proposed I forbear to urge them.

The strength, purity, and temperature of nitric and sulphuric acids can be accurately measured by chemical and physical means. The exact nature of the original cotton or other cellulose is more difficult, indeed almost impossible, to estimate, and varies very considerably. Hence arises a great cause of uncertainty in preparing a pyroxyline perfectly suited for our purposes; and to this also we may trace the great variety of formulæ which have been laid down by different experimenters. So that, after all, in obtaining a suitable material we must be guided entirely by experiment, and that experiment must be repeated when we change the sample of cellulose on which we wish to operate.

Almost any specimen of collodion, when kept long enough, becomes somehow modified and altered in character so as to be well suited for the collodio-bromide process. This fact is well known and generally taken advantage of by those who have been most successful in working this method. But I have always insisted, and in my practice have proved, that an old collodion is by no means necessary. At least an equally efficient product can be made which requires no keeping, or *ripening*, as it is sometimes called, before it is fit for work. The real difficulty is the pyroxyline; and that difficulty I have overcome completely by using a formula for its manufacture which has been already published, although I believe not in these pages. Collodion made from such material is fit to be converted into collodio-bromide as soon as the sediment has settled, and is eminently suited for that purpose. In fact I use no other, nor would I recommend any other.

A better certificate of the quality of the pyroxyline made by my formula could not be given than that contained in the following interesting extract from a letter recently received from Brussels:—

"What does Mr. Carey Lea mean by *ripening* collodion for collodio-bromide? My last batch of plates was made from a sample of collodion which I prepared the same morning from our King's College pyroxyline, and they were the best and most sensitive I have yet made. Mr. Bolton, I see, recommends bromide of ammonium only, six grains to the ounce. I dissolved the bromide in the alcohol, put in five grains of cotton to the ounce, then added the ether, which precipitated about two grains per ounce of the bromide in a fine white powder. I shook this well up and, after a while, poured off three ounces, which I sensitised with an equivalent weight of nitrate of silver, and filtered through cotton wool. Thirteen plates were coated and taken with me to Waterloo; they all turned out excellent negatives."

I do not wish any one to fancy for a moment that I consider my own formula for pyroxyline to be the best that can be devised, or that there may not be others already in existence as good or, perhaps, better than mine. All I can vouch for is its adaptability for making a collodion which can at once be used, with excellent effect, in the collodio-bromide process. Indeed, from what I have recently observed, it is very probable a suitable pyroxyline can be prepared in cold acids, provided the cellulose submitted to their action be of the proper sort, and has undergone a previous disintegrating action. Dr. Liesegang's papyroxyline, which I examined and reported on in another journal about four months ago, first set me upon this train of inquiry. From the behaviour of the collodion film made from his material I at once concluded that the paper had been steeped in cold acids, and I published my opinion to that effect. In a letter received some time ago from Dr. Liesegang he says:—

"You are right—the paper is dipped into the cold mixture of acids; but I find it to give as much intensity as cotton prepared in hot acids. I attribute this to the more disintegrated state of the linen fibre. I succeed better with one kind of paper than others, so that I take in large quantities of suitable paper at a time, in order to supply a regular quality."

Collodion, when freshly made from Liesegang's papyroxyline, did not answer well for making collodio-bromide; but now, after four months' keeping, I find it is *nearly* all that could be desired. Two or three months more, I apprehend, would make it perfect, or nearly so. This is a very suggestive fact, inasmuch as cotton wool, if similarly prepared in cold or moderately hot acids, would probably take as many years, after being made into collodion, before it would be fit for our collodio-bromide purpose. Unquestionably, therefore, as Dr. Liesegang suggests, the physical state of the cellulose *before* immersion in the acids greatly modifies the character of the resulting product.

But how are we to know or determine beforehand this physical structure? There are no tests that I am aware of by which that point can be ascertained with any degree of accuracy. If we take paper, for instance, it may, for aught we know, be made of linen, cotton, and many other substances. It is an indefinite compound, to begin with—at least to us—although its constituents may be familiar enough to the manufacturer. If the paper be made from linen cellulose solely, it takes a different strength of acids and a different temperature to produce the same kind of pyroxyline as that prepared from a cotton-made paper. It is the same when the original fibres are used. In a general way, it may be said, linen pyroxyline gives a more limpid and porous collodion than cotton, and may be made in acids at a much lower temperature than is required for the other.

I have made a great many experiments—extending over many years—in papyroxyline, but I could never get an uniform raw material to work on, not excepting the famous Swedish filtering paper itself; and thus no formula of strength and temperature of acids could be relied on for giving a constant product. Sea Island and the long-fibred Egyptian cottons seem to be the most uniform in quality, and with these I have never found it necessary to depart from a rigid formula of acids. Probably Dr. Liesegang has really found an uniform paper wherewith to work successfully. At all events he has, on two occasions wide apart, sent me specimens which were exactly similar, and I purchased a third from an agent which was identical with the others, and all were excellent for general wet work; but, as I have said, the solution of it requires to be kept some months before it is fit for collodio-bromide.

Mr. M. Carey Lea, I am aware, has published in these pages, and in his book, kindly lent to me by one of the Editors for perusal, some extraordinary ideas about collodio-bromide. I must confess his views do not at all agree with mine. It is simply impossible, in my belief, to make an efficient sample of collodio-bromide, containing seven grains pyroxyline, fourteen and a-half grains bromide of cadmium and ammonium, and twenty-one and a-half grains nitrate of silver to the ounce of solvents. Such an emulsion becomes nearly as thick as treacle, unless the pyroxyline has been made at a very high temperature (over 160°), or the collodion has been kept until it has decomposed. The Liverpool Dry Plate Company's films are far from being *creamy*, and the collodion pellicle is very thin; yet these are good specimens of what collodio-bromide films should be—reasonably sensitive, very certain, and producing negatives of a fine, *blooming* appearance, without any reinforcement by nitrate of silver.

This article is already getting too long; but I cannot close it without cursorily referring to some remarks lately published by a photographer who visited and inspected the works of the Liverpool Dry Plate Company. The writer of that article says the collodion used by Mr. Mawdsley "is not of the powdery kind, as Mr. Carey Lea and others have asserted that it must be. It is a skinny collodion, and the film can be raised from the glass."

This is all very true so far as it goes, but the writer does not seem to have been aware of the curious fact, that if the same collodion, which was found so serviceable in the collodio-bromide process, had been excited in a strong nitrate bath, the film would not have been "skinny," nor could it "be raised from the glass." The *emulsion* of silver-bromide in the collodion makes all the difference—why or wherefore I cannot tell, but such is truly the case. And this seems to me to be the reason why it is found absolutely necessary to have a very "powdery" collodion—a porous and organic collodion I call it—to commence with before attempting to make a good collodio-emulsion of bromide of silver. The suspension of bromide or chloride of silver in collodion has, undoubtedly, the effect of rendering the film more "skinny."

I must reserve some practical remarks for next week.

George Dawson, M.A., Ph.D.

SPIRIT PHOTOGRAPHS.

In our last week's number we gave the first day's proceedings in this remarkable trial; and we further inserted a brief paragraph intimating the result of the trial, which was in Mr. Mumler's favour. We now subjoin some of the evidence adduced on the second day, as reported in the New York *Sun*:—

The trial was continued yesterday before Justice Dowling at the Tombs. The court-room, as on the previous day, was filled with an attentive audience, including several ladies and a host of reporters, and the proceedings were of unusual interest.

Mr. Townsend, for Mr. Mumler, called

David A. Hopkins, a gentleman of unmistakable New England birth, and as cute and wide-awake as such men are popularly supposed to be. Mr. Hopkins gave his testimony in a clear, straightforward manner, which impressed everybody with confidence in his honesty and sincerity, as well as intellectual ability. He stated that his business was that of manufacturing railroad machinery; that his first visit to Mr. Mumler's gallery was on the 10th of March last; saw Mr. Guay first; Guay did not warrant to get him a spirit likeness; went upstairs to the operating-room, and there saw Mumler, who also told him there was no certainty in the matter; on sitting in the usual way, there came on the plate, besides his own likeness, the likeness of a deceased person he had known in life; thought all the while Mumler was a cheat, and watched him sharply to see what his trick was, but discovered nothing uncommon, except that he put his hand on the camera; he did not move his hand nor his fingers all the while his hand was on the camera; did not give any name at the time of sitting, but took a number instead; the spirit likeness has been identified by his own family and neighbours, and by the children of the deceased.

Cross-examined.—Am not a skilled photographer, but learned the business twenty years ago; have employed a great many men, and have been in the habit of watching them to see that they did not cheat me or steal from me; have been sometimes deceived, but not often; believe in spiritualism as far as the Bible teaches it; have never had any such evidence of the existence of spirits as is narrated in the Bible; think that spirits taking a square substantial meal, as they did with Abraham and Lot, would be satisfactory evidence of their reality. [Good-humoured laugh among the audience.] Belong to no sect or denomination, but believe Jesus Christ to be a perfect example for human imitation, and believe in the existence of the Deity; the deceased person whose likeness came by the side of mine lived many years near me, in the same house with my wife's sister; have no photograph of her; have seen one since that of Mr. Mumler was taken; her children said, on seeing the latter, "It is mother." I simply asked them who it was.

William W. Silver was next called by the defence.—Am a photographer of six years' standing; my gallery last November was at 630, Broadway. Mr. Mumler came in that month and proposed to pay me for the use of it, and buy my materials to take spirit photographs with; was not a spiritualist, and did not believe in the spirit photographs; when Mumler came a second time I sat to him, as a sceptic, to see what he could do; he used my apparatus and materials, and there came on the plate a form which I recognised as that of my mother; Mumler had no chance to make any preparation; have since frequently watched his processes without detecting any trick; spirit pictures have been produced when I performed all the manipulations, except that Mumler removed the cloth from the camera; have seen them produced once when he did not touch the camera at all; we were trying some collodion, and he walked away from the camera after taking off the cloth; solemnly swear there was no collusion between us; I developed the plate myself and the spirit picture came.

Cross-examined.—I believe that these spirit photographs are produced by spirits by supernatural means; know Mrs. Mumler; she had charge of the reception room; when sitters came she told Mr. Mumler that a lady or a gentleman, as the case might be, was waiting; have seen her come and do this perhaps a hundred times, but never saw her give her husband any memorandum, or say anything to him, except that the sitter was ready; each sitter got a card with his or her name on it and a number, which was given to Mr. Mumler on sitting; have taken the slide of the camera to pieces; found nothing but what belonged there; Mumler always closed the slide himself; I never did; the glass plates were old ones which had been soaked off; I used potash and nitric acid to clean them; if an old glass is not properly cleaned it makes a dirty-looking picture, but I have never seen the old picture come out on it again.

Mrs. Luthera C. Reeves, of 699, Washington-street, called for the defence.—Went last January with my nephew to Mr. Mumler's gallery, to get a spirit photograph; my nephew sat, and there came on the plate the likeness of my little son, who died of spinal disease, looking as he did just before he died; went again a week after and sat myself; got a likeness of the same boy as he looked before he was taken sick; saw no difference in the process from what I have always seen in photographic galleries.

Cross-examined.—Mrs. Mumler was in the room at the time of taking the first photograph, and both she and Mr. Mumler put their hands on the camera; as she stood there, I heard raps on the floor; cannot say whether or not departed spirits revisit earth; had no such belief before I saw these photographs; have no doubt that the likenesses are likenesses of my son.

Samuel R. Fanshawe called for the defence.—Am a miniature and portrait painter; have been such for thirty-five years. Went to Mumler's gallery to investigate his spirit photographs; was entirely sceptical. A picture copied from a picture would not be blurred like those of Mr. Mumler's spirits, but distinct, though faint. Sat for my picture; watched Mumler's operations carefully; looked all round the room, but detected no machinery. On the plate there came, when the picture was developed, another form than my own. Recognised it as my mother, and my sisters have recognised it in the printed picture; she was sixty-five when she died. Have a portrait of her, painted by me subsequent to her death. The spirit picture is in a different position; it looks like

a portrait in the stage of dead colouring, when the likeness is sometimes more easy to detect than after the details have been filled in.

Cross-examined.—Am not a spiritualist; believe what the Bible teaches concerning spirits. Mumler took another picture, on which came a likeness of my son killed in the war, which I fully recognise, though it is not so plain as my mother's. My mother's portrait has hung in my studio ever since it was painted. Have tried to have it copied, without success. My mother died twenty-eight years ago.

William F. Kidney called for the defence.—Am assistant to Mr. Slee, the photographer, of Poughkeepsie. Was present when Mr. Mumler came there, and saw his operations, but could detect no trick. (Witness then described the chemicals used in photographing, and their uses.) Yellow light will not affect the sensitive coating employed in photographing.

Cross-examined.—Have no exact knowledge of the properties of light; know that pictures can be taken with blue, red, and green light, but not with yellow, but do not know why there is this difference.

Charles F. Livermore, Banker, of 227, Fifth-avenue, formerly of Livermore, Clews & Co., in Wall-street.—Went to Mumler's gallery early in March; was sceptical, and wanted to investigate; Mumler took two pictures, letting me see the whole process; took every precaution and watched him closely, but could see nothing unusual, except his putting his hand on the camera; on this occasion forms came by the side of mine which I did not recognise, and I was so dissatisfied that I would not pay Mumler; he said I might come again and try till I was satisfied; I took sun-proofs of the two pictures, and carried them to Dr. Gray, who recognised them; I then made an appointment with Mumler to sit on a Tuesday, but to disconcert him went on Monday, when he was not expecting me; got five pictures, on three of which came unmistakable likenesses of my deceased wife; in one, when Mumler was ready to take off the cloth, I suddenly changed my position so as to defeat any arrangement he might have made; in another I made him suddenly bring the camera three feet nearer to me and then instantly proceed to take my picture; I was on the look-out all the while, having been cautioned against Mumler by friends in Boston.

Cross-examined.—Paid Mumler $20 for his time and trouble, not for the pictures; am satisfied of the identity of the spirit faces with that of my wife; have portrait of her hanging in my parlour, which I see every day; the resemblance is perfect; believe in regard to spirits and spiritualism just what has been demonstrated to my senses, and no more; smelt no perfume when the likeness of my wife with the flowers was taken; believe that departed spirits can clothe themselves with matter temporarily, so as to be seen, touched, and heard; have experimented with Mr. C. F. Varley, the English electrician, in the presence of mediums, to determine what kind of force it was that spirits employed, but was unsuccessful; saw nothing when sitting to Mr. Mumler like what I saw when with Mr. Varley; felt no form near me at the time of sitting; express no opinion as to how Mumler produces his pictures.

Ann F. Ingalls called for the defence.—Went to Mumler's in December; saw Mrs. Mumler; she did not promise any certainty of obtaining spirit pictures; got picture with two indistinct figures, which I thought to be those of my father and my brother; went again, six weeks later, and got a distinct likeness of my son; saw no trick; Mumler did not touch the camera.

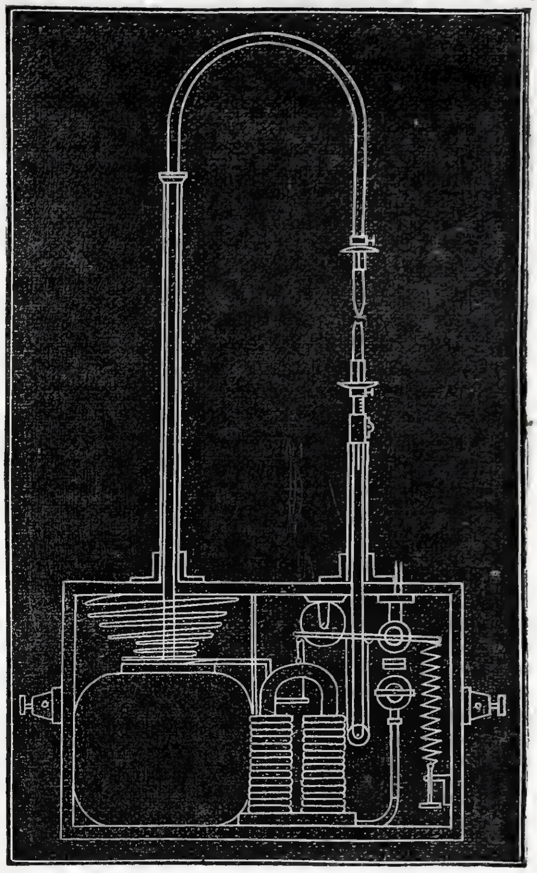
Cross-examined.—My son died in 1867; I identify him by his beard, hair, nose, and eyes, and my brother by his large ear.

The defence here rested; and as the prosecution were not ready with their rebutting witnesses, the case was adjourned till Monday, at 10 a.m.

PNEUMATIC REGULATOR FOR THE ELECTRIC LIGHT.

The electric light, from the trouble attending the fitting up and charging a number of battery cells which give off nitrous acid fumes, is seldom employed, excepting at institutions where an attendant is accustomed to the drudgery of this unpleasant operation; and even when Wilde's machine comes into more general use, from its cumbrous appliances this source of light can only be employed in fixed localities; nevertheless, it is *the* light of all others for optical experiments, for the lantern microscope, and photographic enlargements. The ordinary electric regulator provides for bringing a pair of carbon points in contact, and then separating them to a distance proportionate to the electric light employed, so as to produce what is called "the electric arc"—that is, an electric flame carrying incandescent and vaporised carbon from one pole to the other, and whenever the striking distance between the two poles becomes too great, it automatically brings them nearer, or "makes up," as we say; or if the distance has been overstepped by the breaking off of a piece of the carbon poles, &c., then it brings them in contact again, and repeats the operation so as to produce and keep up a constant point of light. On the precision of this action depends the value of the regulator. Usually fifty battery cells, arranged for "intensity," are employed —seldom less than twenty cells.

I have lately introduced an automatic electric regulator, an invention of Mr. Malden's, one of our most expert public lantern exhibitors, which is not only the most sympathetic self-adjusting regulator, giving a steady point of light, central with any optical arrangement, for as long a time as the source of electric power remains constant, but it is the simplest in construction and the cheapest I am acquainted with. In this arrangement, the rod that carries the upper carbon is weighted, and rests upon an air-ball placed in a cylindrical chamber; an exit pipe from the ball is closed by a stopcock, which can be opened or shut by the action of an electro-magnet placed in the circuit on a lever-arm fixed to



the stopcock, a counterpoise spring being attached to the other end of the lever-arm to adjust the action according to the amount of battery power employed. On the air-ball being filled by a little bellows the two poles of the regulator are separated, the carbon points inserted, and, on connection being made, the poles are allowed to fall together, the stopcock being open till such time as they touch, when a circuit is established, the armature of the electro-magnet is pulled down and closes the stopcock, but the poles at once separate to the striking distance of the battery power employed, and, as they burn away, the stopcock is slightly opened, so that a small quantity of air escapes, and thus allows the upper carbon gradually to descend, while, by a pulley arrangement, the lower carbon is simultaneously raised in the required ratio of the combustion of the upper to the lower carbon—viz., two to one—thus securing centrality with the optical apparatus employed. Should a portion of carbon break off, the striking distance being overstepped, the current is broken, and the stopcock is again opened, when the poles are rapidly brought into contact, again to start apart in automatic adjustment. By a rack-and-pinion adjustment in the lower pole the point of light can be accurately "centred" with any optical arrangement. This arrangement is also well suited for lighthouse purposes, as from its extreme simplicity of construction it could be readily kept in working order or repair by a man of ordinary intelligence, and this cannot be said of the beautiful, but complicated, regulators usually employed.

Samuel Highley, F.G.S., &c.

PHOTO-CHEMICAL JOTTINGS FROM FOREIGN JOURNALS.

ON THE EMPLOYMENT OF ALKALINE IODIDES AS REDUCING AGENTS.

I have made some fresh experiments in the employment of alkaline iodides as reducing agents. It was, in fact, by the employment of the iodide of potassium that I transformed the bromides of éthylène and propylène into corresponding iodides—a process of which I have made several trials, and which has recently been adapted to new applications. But the iodide of potassium does not conduce to reductions so varied and so complete as hydriodic acid in the conditions of the universal method of hydrogenation; it does not react at 270° upon monobromided benzine, nor upon crystallisable acetic acid even at 350°.

The iodide of ammonium employed in great excess will neither act so

as to fix the hydrogen on acetic acid nor upon phenol, even at 360°, although at that temperature the salt is in a state of partial decomposition. This fact proves that the stability of hydriodic acid is increased by the presence of a body such as ammonia, capable of forming with it a definite compound, either at the temperature of the experiment or a higher temperature.

The free iodine itself, heated with different organic compositions, determines certain reducing actions, such as I explain by the formation, in the first instance, of hydriodic acid at the expense of the hydrogen of a portion of the said organic compositions. M. BERTHELOT.

ACTION OF LIGHT ON THE BISULPHIDE OF CARBON.

THE pure bisulphide of carbon assumes a yellow colour under the influence of the solar rays when exposed to the sun in sealed tubes. It is formed by degrees into a brown insoluble substance, which adheres very firmly to the glass.

If water be inclosed in the tubes, the adhesion is not so great and the substance is more abundant. After some months, the tubes being opened, the water is slightly acid in consequence of the formation of formic acid:—

$$CS + 2H_2O = CH_2O_2 + H_2S + S.$$

The compound which is deposited contains sulphur. It is insoluble in water, alcohol, chloroform, ether, and bisulphide of carbon; but soluble, with decomposition, in boiling potash.

It is the sesquisulphide of carbon being decomposed, through distillation, into sulphur and carbon.

The sulphocarbonate of potassium in concentrated solution is scarcely affected by light; but lower sulphides are obtained by the action of an amalgam of sodium. M. O. LOEW.

PROFESSOR TYNDALL ON "LIGHT."

PROFESSOR TYNDALL has delivered three more lectures at the Royal Institution upon *Light* since my last notice, and the following are some of the most interesting of his statements:—

On Thursday, May 6th, he described the principles of spectrum analysis. He said that the radiation both of light and heat consists of the communication of motion to waves of ether from the vibrating atoms of the luminous body, and that the absorption of heat or light consists of the acceptance of motion from the ethereal waves. When a body is transparent to rays of heat or light, the waves of ether pass round the atoms without giving up much of their motion to the atoms, so come out on the other side of the transparent medium unbroken. When radiant heat or light is absorbed increased motion is given to the atoms of the substance, consequently the absorbing body is warmed. Thus it is possible for the air in the focus of a large mirror which concentrates the rays of the sun to be perfectly cold, because the absorption of heat by dry air is insensible; the air, therefore, takes up no motion from the waves of ether.

Upon the foregoing facts of radiation and absorption the phenomena of spectrum analysis depend. When a beam of white light issuing from a slit is decomposed, the spectrum really consists of a number of coloured images of the slit placed side by side. Professor Tyndall proved this by throwing a spectrum upon the screen by means of a slice of light from the electric lamp, a bisulphide of carbon prism, and a double convex lens. He then covered the luminous slit with a piece of glass which transmitted red rays only, and a red image of the slit was seen upon the screen, all the rest of the spectrum being cut off. Then he interposed a blue glass, and a blue image of the slit only was seen, but it fell to the left of the place which the red image had occupied. Lastly: he interposed a violet glass, and a violet image of the slit was seen, but still further to the left in position. So with a wide slit a spectrum is thrown consisting of images of the slit overlapping each other. To get a pure spectrum, therefore, the slit must be made very narrow to get rid of this overlapping, and when that is done the light from the sun is found not to give a perfectly continuous spectrum. The spectrum is cut by innumerable dark lines, first observed by Dr. Wollaston, and afterwards observed with great skill by Fraunhofer.

These missing rays or dark lines were long a puzzle to philosophers, till Kirchoff explained them upon the principle that every substance is specially opaque to such rays as it can itself emit when rendered incandescent. Thus the radiation from a carbonic oxide flame, which contains carbonic acid at a high temperature, is intercepted in an astonishing degree by carbonic acid. The rays from a sodium flame are intercepted vigorously by a second sodium flame, and the rays from incandescent thallium by thallium vapour. In the language of the undulatory theory, waves of ether are absorbed with special energy by atoms whose periods of vibration synchronise with the periods of the waves.

In illustration of this the lecturer threw a brilliant spectrum upon the screen, the electric light being produced by means of two carbon points which had been previously soaked in salt and water and dried. Dispersion was obtained by means of a pair of bisulphide of carbon prisms. The yellow band in this spectrum was rather more intense than usual. In the line of the rays from the lamp Professor Tyndall then interposed a brilliant sodium flame, made by burning metallic sodium in an iron spoon over a large flame emitted by four Bunsen's burners with their orifices close together. Whenever this yellow flame was interposed in front of the slit a dark band appeared in the yellow of the spectrum upon the screen, caused by the absorption of the yellow rays by the sodium vapour. All the other colours in the spectrum were unaltered.

Expanding in idea the electric light till it formed a globe equalling the sun in size, and wrapping round it an atmosphere of metallic vapours, it is evident that a spectrum obtained from such a luminous body would be intersected by dark lines. By mapping the lines it is easy to discover what substances form the vapours, and in this way many of the constituents in the atmosphere of the sun have been ascertained. By this method Kirchoff has established the presence of iron, calcium, magnesium, sodium, chromium, and other metals in the solar atmosphere.

Mr. William Huggins, F.R.S., has extended this method of research to other heavenly bodies. The light reflected by the moon and planets comes originally from the sun, and if unaffected by the planet's atmosphere should give the same lines as the solar spectrum. The light from the moon shows no fresh lines, so the moon probably has no atmosphere. The atmosphere of Jupiter contains gases and vapours, and feeble lines, much resembling those of Jupiter, are found in the light from Saturn. Mars gives a different spectrum from the foregoing two planets, for Mars absorbs most of the blue and chemical rays, which may be the cause of the red colour of this orb.

All the stars in the heavens, bright enough to be examined spectroscopically, give spectra with lines. The dark absorption lines are strongest in yellow and red stars and faintest in white stars. Aldebaran contains hydrogen, sodium, magnesium, calcium, iron, bismuth, tellurium, antimony, and mercury. Alpha Orionis contains sodium, calcium, magnesium, iron, and bismuth. Some of the nebulæ give bright bands, emanating from intensely-heated matter in the form of gas; others give continuous spectra.

Messrs. Lockyer and Janssen's recent researches on the red prominences of the sun show that these prominences consist, for the most part, of incandescent hydrogen, mixed with the vapours of sodium and magnesium. These prominences sometimes reach a height of 70,000 miles; but the whole body of the sun is surrounded by an ocean of flaming gas, having an average depth of about 5,000 miles.

In this lecture Professor Tyndall exhibited a very simple method of casting a spectrum upon a screen. It consisted of a magic lantern and oil lamp, with a wooden slide having a vertical slit in it—an image of this luminous slit being, therefore, thrown upon the screen by the object-glass. A bisulphide of carbon prism was then placed close in front of the object-glass at the angle of minimum deviation, thereby throwing a very fair spectrum, which the screen had to be shifted in position to receive.

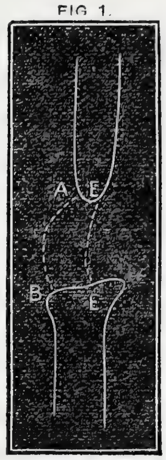
In explaining the philosophy of the rainbow, he said that the rainbow is in fact a spectrum, in which the drops of water play the part of prisms. Most of the solar rays on quitting a drop of water are divergent, but, at one particular angle, the rays, after being twice refracted and once reflected, are parallel. He said:—"Draw a line from the sun to the observer's eye, and prolong this line beyond the observer. Conceive another line drawn from the eye, enclosing an angle of 42° 30′ with the line drawn to the sun. The rain-drop struck by this second line will send to the eye a parallel beam of red light. Every other drop similarly situated—that is to say, every drop at an angular distance of 42° 30′ from the line drawn from the sun—will do the same. We thus obtain a circular band of red light, forming part of the base of a cone of which the eye of the observer is the apex. Because of the angular magnitude of the sun the width of this band will be half a degree." If, instead of the angle of 42° 30′, the angle of 40° 30′ be enclosed, the lines struck at this angle will mark the path of the violet beams from the rain-drops to the eye. The secondary bow is produced by rays which have undergone two reflections within the drop, as well as two refractions at its surface. The secondary bow is $3\frac{1}{2}$ degrees wide, and $7\frac{1}{2}$ degrees higher than the primary.

Professor Tyndall also exhibited a few experiments to show the phenomena of fluorescence and phosphorescence. Some crystals of fluor spar sprinkled in the dark theatre upon a plate of iron, heated nearly to redness, emitted an ethereal light of a pale green colour. A tall cylindrical glass jar, about eighteen inches high and six inches in diameter, and filled with pure water, was brilliantly illuminated with concentrated rays from the electric lamp; then the lecturer poured into the water a few drops of strong solution of sulphate of quinine in tartaric acid. Those who viewed the jar by reflected light saw the liquid descending slowly in the water as a very beautiful blue cloud, caused by the lowering of the refrangibility of the shorter chemical waves of light; whilst those who viewed the jar by transmitted light saw no cloud at all. He next explained that phosphorescence differs only from fluorescence in the fact that the molecular motion set up in the substance by light lasts a little time after the incident light is removed. To illustrate this, he exposed the image of a butterfly made of phosphorescent substances to the concentrated rays from the electric lamp; after the lapse of about two minutes the light was put out, and the butterfly was observed to glow in the dark, giving off many beautiful lambent colours.

The lecturer also showed that the long action of monochromatic light upon the retina tend to partially blind the eyes to other colours. He illuminated the screen with a bright red light, and, after a little time, let his own shadow fall upon the screen; the shadow had a decided green colour. In the course of his experiments he proved the curious fact that the ultra-violet rays of the spectrum of the electric light come prin-

cipally, not from the luminous carbon points, but from faintly luminous space between the points. When a magnified image of the points is thrown on a screen by a lens they present somewhat the shape shown in *fig.* 1, the ends of the points E E being intensely luminous, with a scarcely visible violet flame playing in a curve, as shown by the dotted lines A B between the points. The distance of the points from each other makes very little difference in the brilliancy of the visible part of the spectrum, but it makes a great difference in the intensity of invisible chemical rays; for when paper washed in sulphate of quinine is held where these fall, the further the points can be drawn apart the more fluorescent is the appearance of the paper.

FIG 1.

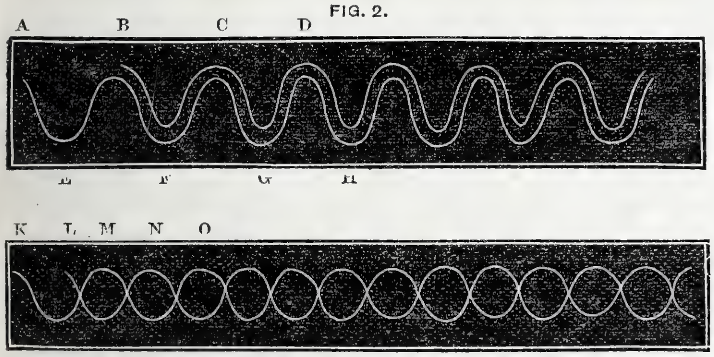


In his next lecture, of May 13, Professor Tyndall began the subject of the interference of light. Newton objected to the wave theory that if light travelled in waves opaque objects should not cast shadows, for the waves would spread round the object and set up ethereal agitation in its rear. Modern philosophers accept the objection, and allege that such disturbance and bending round of the rays do take place, but that many of the lateral rays destroy each other.

The lecturer said that, in considering the subject of wave motion, it is necessary to clearly separate in the mind the motion of the wave itself from the individual particles composing the wave. Thus in light, although the wave moves onwards, individual particles move only up and down, somewhat as a sea fowl rises and falls on the waves of the sea, but is not carried onwards. Therefore, when light from two different sources passes through the same ether, the waves must to some extent disturb each other. The same is the case when two stones are thrown into a pond at the same time, and set up circles of waves which interfere with each other.

In wave motion the upper part of a wave, A, *fig.* 2, is called its

FIG. 2.



"crest," and the lower portion, E, F, G, or H, the "sinus." The distance from crest to crest or from sinus to sinus is the "wave length." Now, suppose two waves to approach each other, and that when they first come into contact the crest of one wave coincides with the crest of the other, as at B; the two waves will then unite, add their forces together, and increase the height of the crests and depth of each sinus, so as to form larger and more powerful waves.

But if, when they first come in contact, one water wave is half a wave length in advance of the other, then where one wave tends to produce a crest the other tends to produce a sinus, and stillness is the result of the union of the two forces. This is shown in *fig.* 2, where the second wave begins at L instead of at K, M, or O. In sound, two waves may be made to destroy each other, and to produce silence, or what musicians call "beats." Professor Tyndall illustrated this by means of sounds from two properly-chosen tuning-forks. So in light, by causing the crest of one wave to coincide with the sinus of its neighbour it is possible to produce absolute darkness.

Among other experiments the lecturer placed two pieces of glass, each scratched with some thousands of parallel lines to the inch, in front of a fine slit in the electric lamp. A piece of red glass behind the slit rendered the light monochromatic, for the sake of simplicity. A series of rectangles was then seen upon the screen, each separated by intervals of darkness. When blue light was used the rectangles were closer together than in the former case, and with white light they were prismatic in colour.

He also obtained a line of red light by means of the same slit and red glass in the electric lamp, and then looked at the slit from a distance through another slit of variable aperture, and he said:—"With the eye placed in the straight line drawn through both slits from the incandescent carbon points of the electric lamp, an extraordinary appearance is observed. Firstly, the slit in front of the lamp is seen as a vivid rectangle of light; but right and left of it is a long series of rectangles, decreasing in vividness, and separated from each other by intervals of absolute darkness. The breadth of the bands varies with the width of the slit placed in front of the eye. If the slit be widened, the images become narrower, and crowd more closely together; if the slit be narrowed, the images widen and retreat from each other. It may be proved that the width of the bands is inversely proportional to the width of the slit held in front of the eye.

"Leaving everything else unchanged, let a blue glass, or a solution of ammonia-sulphate of copper, which gives a very pure blue, be placed in the path of the light. A series of blue bands is thus obtained, exactly like the former in all respects, save one—the blue rectangles are narrower, and they are closer together than the red ones. If we employ colours of intermediate refrangibilities between red and blue, which we may do by causing the different colours of a spectrum to shine through the slit, we should obtain bands of colour intermediate in width, and occupying intermediate positions between those of red and blue. Hence, when white light passes through the slit, the various colours are not superposed, and instead of a series of monochromatic bands, separated from each other by intervals of darkness, we have a series of coloured spectra placed side by side, the most refrangible colour of each spectrum being nearest to the slit. What is the meaning of this experiment, and how are the lateral images of the slit produced?"

Having thus arrived at one of the most interesting and difficult points in all the phenomena of optics, Professor Tyndall deferred the consideration of the facts until the next lecture; and, as so much space has already been taken up, it is now equally necessary to defer the publication thereof for a week. William H. Harrison.

PATENT SPECIFICATION.

Effecting the Separation of Gold and Silver from Other Metals.

A patent having been obtained by Mr. Richard Pearce, for a certain method of purifying the precious metals, the patentee describes his invention as follows:—

My said invention relates especially to the purification of silver which has been precipitated from any of its salts—such, for example, as sulphate, nitrate, or chloride, by copper, and in the separation of copper from compounds of copper and silver—but it is also applicable to the analogous treatment of gold and other metals. In this specification, however, the treatment of silver is hereinafter referred to, as the application of my said invention to gold and other metals, and for the separation of copper, iron, and other heavy impurities from tin ore, and also in the manufacture of sulphate of copper and in other analogous operations, will be well understood by persons conversant with metallurgical processes.

The impure silver, or compound of silver and copper, is placed on a perforated disc in a boiler. Water is added, together with a small quantity of sulphuric acid, the proportion of the latter necessarily varying with the amount of copper or other impurities present, as will be well understood. Steam with atmospheric air mingled therewith is then admitted by means of any suitable injecting apparatus; violent ebullition ensues, and the copper becomes oxidised and is dissolved by the sulphuric acid. Should the ebullition become too violent it may be checked by admitting less air. After being boiled in this way for about two hours the solution of sulphate of copper is drawn off, the silver stirred so as to make it a little more granular, a fresh supply of water which has been slightly acidulated with sulphuric acid is added, and the mixture is then boiled for about one hour. The solution is afterwards drawn off and the silver carefully washed with clean water. The silver when dry has only to be melted in crucibles for fine silver, refining in the usual way by means of lead being quite unnecessary. In the event of a little silver passing into solution towards the close of the operation of boiling, plates of copper may be introduced into the boiler for a few minutes and the air excluded. Any traces of silver that may have passed into solution will thus be precipitated.

Having thus described and ascertained the nature of my said invention, and the manner in which it is to be performed, I would observe, in conclusion, that what I consider novel and original, and therefore claim as constituting the invention secured to me by the said hereinbefore in part recited letters patent, are the processes effecting the purposes aforesaid, substantially as hereinbefore described and set forth, or any mere modifications thereof. Richard Pearce.

Contemporary Press.

MEANS OF PRESERVING THE QUALITIES OF SILVER BATHS.

[Moniteur.]

Photographers should always have two negative baths, so that one of them may be in a state of repose while the other is being worked. For my own part the following is the system I adopt:—

My negative bath is at seven per cent., and I keep it up to the mark by adding to it, after the operations of the day, a quantity of solution at nine per cent. sufficient to make up for the quantity absorbed in the course of the day.

The vessel is always carefully covered in order to keep out the dust, and every morning I pass a band of paper over the surface of the bath,

by way of filter, to remove any impurities that may have been formed during the night. In this way it is kept in proper condition and its strength preserved without the necessity of filtering it every day. If, however, the bath be very small, I recommend that it be filtered every evening after work.

My bath contains thirteen litres of solution, which serves me for three or four days, according to the number of plates I have to sensitise. I afterwards put it in the sun, to stand there until it is replaced by the second solution. I filter the first bath, and strengthen it, if necessary, before operating with it, until I perceive it to contain an excess of alcohol. In this condition, before exposing the bath to the sun, it is made to evaporate in a porcelain vase, so as to reduce it to half its volume. A sufficient quantity of distilled water is then added, and the sun is allowed to act upon it.

The baths should be allowed to stand at rest for as many days as they have been worked.

The developer I employ is exclusively that of iron and acetic acid. I have tried gelatine, albumen, and sugar candy; and although I have found them useful in certain cases, for reproductions, transparent positives, &c., I believe that for portraits nothing equals iron and acetic acid, without any other addition.

The strength of the developer always depends upon the result it is desired to obtain. My formula varies from 0·90c. to 3·60 to 30 grammes of water. In general I adopt a mean—say 1·80 for 30 grammes of water. But, when the portrait is that of a person with a delicate complexion, with light hair and eyebrows, a weak solution should be used; while, on the contrary, a clear complexion, with black hair and eyes, requires a strong developer. Experience is the sole guide in this; but photographers should vary the development according to the portrait to be executed.

G. FENNEMORE.

Our Editorial Table.

CYCLOPŒDIC SCIENCE SIMPLIFIED. By J. H. PEPPER.
London: FREDERICK WARNE & Co.

THIS volume is very handsomely got up, and will be sure to command a sale, as well from its general scope and style as from the name of its author, or rather editor. Light, Heat, Electricity, Magnetism, Pneumatics, Acoustics, and Chemistry are the varied headings or divisions of the work. Mr. Pepper's name is very intimately associated with that hall of applied popular science, the Royal Polytechnic Institution, and is, we doubt not, familiar to every reader of this Journal. The book, we have said, is well "got up;" this much of praise is due to the publishers; and if the illustrations be in some cases both old and inaccurate, they are in others very useful and interesting, and, in any case, they are profuse.

A cursory glance over the work leaves the impression that the author, in his view of the applied sciences, has not taken a very elevated standpoint, but has inspected them as a director (the managing director indeed) of the Royal Polytechnic Institution. To this fact we are bound to attribute the prominent positions awarded to those who have of late years contributed to the scientific amusements for which this institution is so famous. Mr. Pepper has done very much indeed to popularise science, and his name is such a tower of strength that, if he were to disconnect himself from the Polytechnic and start an antagonistic establishment, the dividends of the former would be seriously reduced.

But to allude more specially to the work before us. The author has compressed in this volume a great deal of useful reading in connection with science, and has given us several interesting extracts from the works both of living authors and from those recognised authorities in science who, "though dead, yet speak" We could have wished that Mr. Pepper had given us more of his own ideas on the subjects treated in his volume, and less matter quoted from other authors. This, however, may have been inexpedient. One thing we notice with some pleasure: we do not find in the book the same eulogies of Sir David Brewster in which the author, as a lecturer, indulged during the lifetime of the departed *savant*, and which were considered by many to have bordered on toadyism. Spoken words, however, are but as air, but *scripta litera manet*, and the balance will be in favour of the latter.

The first division of the general subject in the volume is Light. This, of course, includes optical science; and, after some remarks on the supposed nature and the sources of light, the author describes a number of effects proceeding from applied optics. Now, of all men living at the present time, Mr. Pepper has had most extensive opportunities for studying and applying such subjects; and, accordingly, we look to him with greater expectations than we should to many others. And again we express our disappointment that the avocations of the author have not afforded him time to discuss these matters in the spirit of original research, but to have utilised in his book so much matter already familiar to the student of natural philosophy. Not that the reader loses anything by the reproduction of such excellent articles by Faraday, Arago, Brewster, and others as are here to be found; for, in a sense, these enhance the value of the work, which, after all, is a cyclopœdia.

In a brief sketch of the magic lantern we have an engraving of a "common magic lantern," contrasted with one of a "section of a *superior* magic lantern;" a glance at the latter of which immediately explains to us the cause of the grave imperfections in the lantern exhibition in the Polytechnic Institution—imperfections which have repeatedly been noticed by us, and which have provoked the undisguised contempt of all who are acquainted with the capabilities of a well-constructed lantern. If the section of the "superior lantern," given by Mr. Pepper at page 59 of his new work, really represents those to which we have referred, then it follows that the objective is composed of two very deeply-curved non-achromatic plano-convex lenses, the flat sides of which are placed next to the picture, and a stop outside of all. It is no wonder that with an optical arrangement of this kind the margins of the pictures on the screen are ill-defined and present "all the colours of the rainbow." We need scarcely remark that the sooner the directors of this place of popular entertainment invest a few shillings in properly-constructed achromatic lenses for their lanterns the sooner will a standing disgrace be removed.

In passing, we may observe that Mr. Pepper, when treating of the "ghost," appears to have omitted all mention of the name of Mr. Henry Dircks, C.E., to whom must be credited, as his of right, the paternity of this once popular illusion. The omission, we presume, is due to inadvertency, and not to intentional slight. We only mention it because the author has, in most other instances, given honour to whom honour was due in connection with the introduction of apparatus, &c.

We might also have directed attention to the great degree of "shoppiness" found in the work; but our readers will, we suspect, too readily discover this for themselves.

Notwithstanding what we have written, the book is one which contains a great deal of most useful information for the reader who desires to obtain a *general* insight into science. Mr. Pepper possesses the faculty of being able to convey his knowledge to either his hearers or readers in such a manner as to carry them easily along with him. This faculty is exercised quite as much in this his latest work as in the *Playbook of Science*, one of his earliest; and this is saying not a little in its favour.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 2nd	North London	Myddelton Hall, Islington.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 13th inst.,—W. T. Mabley, Esq., Vice-President, in the chair.

The minutes of the former meeting were read and confirmed.

The committee appointed to carry out the arrangements for the summer outdoor meetings announced, through Mr. Atherton, that they had decided upon Alderley Edge for the first trip, to take place on Saturday, the 5th June, by train from London-road Station, at 12.55 p.m.

Mr. HEBERT said he wished to direct the attention of the members to a recent article by Mr. Winstanley, on Mr. Kershaw's "cloud stop," published in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 23rd April last. If he understood Mr. Winstanley's meaning to be that the members had not given the stop any attention, he must say that he thought Mr. Winstanley could hardly be in a position to form an opinion. He could only say for himself that he had made two such stops shortly after the meeting at which the stop was exhibited. He thought there was no justification for the tone of Mr. Winstanley's remarks.

Mr. HEYWOOD said he was present at the meeting in question, and Mr. Kershaw had then stated that he had not had an opportunity of trying the stop in practice.

The SECRETARY stated that the meeting to which Mr. Winstanley had referred was held under very adverse circumstances. The rooms of the Society were undergoing a complete renovation, and, further, the 9th of April, 1869, when the meeting was held, happened to be the day before Good Friday. The meeting was scantily attended. Many members had already gone to the country, and several of the few present were anxious to get home, so as to complete their preparations for the following day. Mr. Kershaw could not have selected a more inopportune time for showing his stop.

After some more conversation on the same subject, the meeting closed with the usual vote of thanks to the Chairman.

Correspondence.

Foreign.

Paris, May 24, 1869.

I THINK I will set myself to reply to my Dunfermline correspondent respecting his tour in Switzerland, as the best season is just commencing. The railway companies have published their ticket arrangements, and

the new editions of the many guide-books are ready. Hachette's guide-books are good and reliable works; that about Switzerland is on my table, and I will use it for your readers. My correspondent asks me "which is the best route from Paris to Switzerland?" Well, I must ask another question before I can give a satisfactory reply, and it is this —"Which part of Switzerland do you want to visit?" I am told, however, that he wishes to return by the Rhine, and to visit North Italy. It will be best to go from Paris to Geneva first, and this can be accomplished either by the Chemin de Fer de l'Est or the Chemin de Fer de Paris à Lyon; return tickets, to go by the one line and return by the other, are also issued. I would advise commencing with the Paris and Lyons Railway. The ordinary tickets cost—First class, 60s. 3d.; second class, 42s. 2d.; and third class, about 31s. The express trains accomplish the journey in fifteen hours, and the others require nineteen hours for the same distance. The excursion monthly tickets referred to above cost—first class, £4 11s.; and second class, £3 8s. Personal luggage weighing 60 lbs. is allowed gratis. At Geneva the tourist can branch off to North Italy, and return through the Grisons to the Rhine by Zurich and Bâle, then on to Strasbourg, and back to Paris. Unless the traveller wishes to see the city of Lyons, it will be better to change trains at Mâcon, as one hour is saved by the express trains and two and a-half hours by the ordinary trains. The Mâcon route is also a little cheaper. Arrived at Geneva, tourists must find a good hotel, and should provide themselves with a complete guide to all the means of locomotion in Switzerland. The best guide is one sold at the post-offices, and published under the auspices of the postal department. It costs 80 centimes, and is entitled—"*Indicateur des Services Suisses de Diligences, Chemins de Fer et Bateaux à Vapeur.* For hotels, take the Hotel d' Angleterre or Hotel Victoria for the first day or so, and if not content with the charges find another more suitable. Those intending to make a "walking tour," should not carry more than sixteen pounds of luggage at the most. Dress in wool rather than linen, to avoid the effects of chills when moist with perspiration. Do not make too long walks during the first few days, says Joanne, and always follow the advice of the guides, country people, &c. Give yourself up to your horse or mule, and do not try to guide them. Do not drink cold water or cold milk whilst hot. Grease the feet with suet, or put them in a mixture of tepid water and brandy or wine in the evening if fatigued. Pierce blisters with a gold pin rather than cut them. To prevent them, soap the interior of the boots before starting afresh; and to cure them rub the soles of the feet with suet and brandy. Broken skin or bruises should be tied up with rag dipped in weak tincture of arnica. Germans pay less than Frenchmen in Switzerland, and Frenchmen less than English. Beds cost about two to three francs a night in the larger towns, and from one to one and a-half franc in the smaller. English and French money will pass anywhere. The *best* tourists' map of Switzerland is one called *La Carte Routière*, published by Leuthold, at Zurich. The French guide says that the daily expenses of young men travelling in company should not exceed eight to ten shillings per day each.

My correspondent also asks me what subjects in Paris he might spend six or eight dry plates upon. This is also a difficult question, for I do not know what style of picture he requires; but if for use in the lantern afterwards I think architectural subjects will be the best. I would suggest the following as affording good and new subjects:—The New Opera, although not finished; the Madeleine; the Rue Royale and Place de la Concorde, with fountains playing, taken from the Madeleine; the Church of St. Augustin; the Church of the Trinity, at the top of the Rue de la Chauneé d'Antin—rather difficult to take, I fancy; the new Theatre Vaudeville and the American Restaurant and portion of the Boulevards near, looking towards the Madeleine, and a portion of the Louvre; also one of the "Pavilions." These places are not far from each other, and a preliminary walk round would teach which should be taken first, and the best hours for each.

I was at the Photographic Exhibition again the other day, and was struck with the few silver print photographs shown in comparison with the carbon, printing ink, engraving, lithographic, and kindred pictures. This effect has been produced by design; for, as an official remarked to me, we wished to get something together which the public could not see everyday, and if they had looked out for or invited ordinary photographs which can be seen for nothing at every street corner or in any shop window the visitors would have a right to be disappointed. The Emperor visited the collection late on Friday, and was so pleased that he returned on Saturday with the Empress.

M. Braun has a large and fine collection of his carbon reproductions of the pictures from the continental galleries, and I learn from a daily paper that the commercial success of his enterprise in this direction is wonderful. "Subscriptions to the collections come in from all countries and from all *ateliers* and schools, so that this establishment at Dornach has become the *repertoire* of the galleries of Europe—the classic and universal typography of great art."

Soulier's collection of photographs of *all* kinds—silver prints and carbon prints on paper and glass—is, perhaps, the next finest. The lovely instantaneous marine views by this artist, taken on dry plates, will attract attention.

A number of prints, in printing ink, &c., by M. Pinel Peschardiere, are exhibited, but no process has ever been published by this gentleman. He states that bichromate of potash, perchloride of iron, gelatine, and albumen are unknown in his process. What is the use of telling us this, and keeping us in the dark? Better say nothing about it.

Tessie du Mothay's process is well shown by many works, and specimens from MM. Arosa & Co., who are working it in France.

M. Durand has a fine collection of photo-engravings, and I was interested in a copy of an inscription upon a metallic plate from Nineveh, upon which the metallic lustre is given. I do not think that M. Placet exhibits this time.

Amongst photographs proper, the fine collection of M. Reutlinger must take a high place; and much interest will be taken in some from Signor Carlos Relvas, as the various lenses with which the pictures have been taken are named upon the pictures.

The chief English makers are represented, and placed side by side with the production of Herr Steinheil's instruments.

A number of photographs upon shellac paper, by M. Taylor, of Marseilles, are shown, and are very effective and artistic. The negatives are paper, and the prints are produced upon Whatman's paper.

Everyone will stop and admire M. Salomon's studies. There is a portrait of a lady in a white gauze dress, with white satin ribbons. The whole is splendidly rendered—no patchiness. Some portraits of children by the same artist are very fine indeed. I think this collection is superior, on the whole, to that of 1867.

Visitors should not omit seeing the exhibition of sculpture down stairs in the nave of the Palais de l'Industrie, and there they will notice two portraits in marble, or fine busts, by the same artist—No. 3211, of Alexander Bixio, and 3212, of Serres, of the Academy of Sciences.

In the collection of paintings there is a full-length portrait, interesting to photographers, of the late patron of our art, the Duc de Luynes, No. 547.

The exhibition of painting and sculpture closes on the 20th of June.

Lovers of enamel portraits will find all descriptions at the exhibition, and Geymet and Alker are large exhibitors of their various processes.

Close to their show are a few of Mr. Sarony's crayon photographs. Some coloured portraits have been allowed to be exhibited, evidently produced by the "superposition" process, and I was amused at the inscription attached to them, and intended for British comprehension. It runs thus:—"For heving a Helio Miniature it is sufficient to gives one's photography." More can be learnt, I hope, from the artist, Zadova, 64, Rue Richelieu, Paris.

With two applications of the magic lantern I must conclude this letter. The first is for showing machinery in motion. M. Bourbouze photographs the pieces to be represented in motion on separate pieces of glass, the stationary parts on another piece, and the whole are combined and "worked" after the manner of "lever" slides, chromotropes, and other moving subjects for the lantern. This application is ingenious and useful. The next is ingenious and profitable. Upon the balcony of a house in front of some of the most frequented *cafés* of the Boulevards is fastened a transparent screen, and on it, every fine night, are to be seen bright and large "projections" announcing the advantage of all sorts of commodities. The colours and shapes of these "projection advertisements" are varied, and now and then a revolving chromotropic picture attracts the eye, which is, I expect, charged extra, in consequence, to the advertiser.

R. J. Fowler.

Home.

THE RELATIVE MERITS OF CERTAIN DRY PROCESSES.

To the Editors.

Gentlemen,—Preparatory to my selecting a dry process which I can practice under such disadvantageous circumstances as are concomitant with a residence of a few months in Algiers, I request the favour of a little advice before I finally decide.

I have read the description and practised the manipulations of all the dry processes described in your Almanac for 1869, and I may further say that I have mastered their details. It is not, therefore, with me a question of which process is the easiest or the best, but which is the most convenient to adopt during a residence of a few months in a locality where there are no photographic chemists and journalists to whom to apply in the hour of trouble.

Assuming that I shall have to take with me the minimum amount of luggage, and that it is of consequence that the process I adopt shall be such as can be worked with bath and chemicals which shall give fair results without my having to be very nice as to their constitution and health—that, in short, they will have to be of a hardy nature, and work, like myself, under almost any circumstances—the question then arises—Which process will best secure this?

I thought at first of the collodio-bromide, because it gets rid of a grievous evil at the very commencement, viz., the employment of a nitrate of silver bath. It appears to me, however, that the drawbacks to its use are in excess of its advantages. For example: it accords with my own experience, as well as that of others, that the collodio-bromide should not, as a rule, be kept long after its preparation. There are said to be exceptional cases in which it may work for several weeks after being prepared, but I myself have always failed when thus trying it. Again: although the silver bath is dispensed with, yet a bath of tannin

must be had recourse to, in addition to the water bath which precedes the application of the tannin sensitiser and preservative. Thus, then, I am at once put in for as many dishes and baths with this apparently simple process as I would be with many others apparently more complex; add to which I must prepare my new collodion every time I wish to prepare a few plates.

Then, again, there are other processes of which the tannin or the coffee are a type. In either of these two a silver bath is required; but the collodion is always ready for use, and requires no storing away from the light. Either of these preservatives will keep when properly made, or can be prepared at a few moments' notice. At first sight, then, it would seem as if one of these last-named processes, with a nitrate bath, will prove in reality simpler and more generally convenient than the process without the bath. And it is to have your advice on this subject that I have written at some length. Possibly some of your readers may have at their fingers' ends some experience such as that which I crave, and may be induced to part with it for the benefit of a brother in perplexity. To anticipate one bit of advice which some will offer—namely, to prepare all my plates at once, before starting on my visit to Algeria—I may state that it is simply impossible. The size of my plates is 15 × 12, and I cannot find any accomodation for more than six; whereas I may have to take several dozens of pictures. I purpose transferring the negative films from the glass by a process which, in my own hands at least, has never failed; and thus I can, with the six plates, secure an indefinite number of negatives.

Apologising for occupying so much of your time,—I am, yours, &c.,
May 25, 1869. F. H. Chadwick.

PINHOLES—CRACKING OF THE FILM—COATING LARGE PLATES—STANDARD NEGATIVES.

To the Editors.

Gentlemen,—Pinholes in negatives is, I think, allowed on all hands to be the greatest annoyance to which photographers are subject. They utterly spoil otherwise good work, and are difficult to be got rid of. The bath may be doctored and strengthened, but they soon appear again with a regularity which shows that they are a definite product of chemical decomposition.

I have long suspected that pinholes were caused by the use of iodides and bromides having a metallic base, and recent experiments have confirmed me in that opinion. I have also lately learned from an experienced and intelligent Belgian operator that, by avoiding the use of metallic iodides, and using in their place sodium, ammonium, &c., perfect immunity from pinholes may be secured. I have, for many years, used a collodion iodised with iodide of ammonium five grains, bromide of ammonium one and a-half grain to the ounce. A very good plan is to dissolve the iodide and bromide in half the quantity of alcohol intended to be used for the iodising solution, filter through paper, then add the remaining half.

One word about cracked films: let those who have lost good negatives in this way try a varnish containing a large proportion of gum benzoin, and a collodion containing as much alcohol as ether, and more, if it will bear it. In the last ten years I have taken many hundreds of experimental negatives, and have not lost one by cracking of the film.

A few days since I was shown a very simple plan of coating large plates; in fact, so simple that it may seem scarcely worth recording. When a plate exceeds a certain size—say 16 × 12—coating it nicely and evenly becomes rather a ticklish job, even with a good holder; but once let the legs be called in to assist the hands, and a 30 × 20 plate may be coated with the greatest ease. Place the left foot on a chair or anything that will bring the knee about three inches above the level of the hip; hold the plate in the left hand with its centre resting on the knee, which forms a pivot and support; pour on the collodion with the right hand, and the rest will come naturally. Fenton, Bedford, and others who were in the habit of using very large plates, used a tripod support with ball-and-socket motion, which, while it added to the baggage, might occasionally be left behind or mislaid, which could not well occur with one's left leg.

Judging from communications which I often receive from beginners, I am inclined to think that the greatest bar to the progress of the tyro in the art of photography is the want of good negatives to work up to. Unlike painting, sculpture, and other branches of art of which good examples can easily be inspected, it often happens that a would-be photographer is quite without the means of comparing his productions with those of others who are more advanced, and thus goes on groping in the dark, and frequently gives up in disgust for want of a few good examples to assist his progress. Certainly photographers might do a great deal to help each other in this way, either in lending or giving to their less experienced brethren such negatives as, although good, are no longer considered valuable. I have several hundred by me, either taken by myself or by my direction for the purpose of testing instruments; they may not profess much artistic excellence, but, technically, they are mostly perfect. If the loan of a few can be of service to any of your readers I shall be happy to forward them; when done with, they can either be passed on to others or returned to me. A small box to contain them would cost only two or three pence, which could easily be arranged. When my stock of negatives became exhausted, I know several amateurs who would undertake to keep up the supply, and thus assist to promote and maintain a feeling of mutual fellowship that must greatly assist in advancing the useful and beautiful art of photography.—I am, yours, &c., Gordon Ramsay.
177, *High Holborn, W.C.*, *May* 25, 1869.

[The idea to which expression has been given in the last paragraph of the above communication—that of lending negatives to beginners as standards to which to aspire—is an excellent one.—Eds.]

COAGULATED ALBUMEN FOR PROTECTING PRINTS.

To the Editors.

Gentlemen,—I observe in your last issue a copy of Mr. Hart's specification for protecting printed surfaces by a coating of coagulated albumen. Four or five years ago I treated maps, chromolithographs, and type-printed surfaces in a manner exactly similar to that described in Mr. Hart's specification, and exhibited them to several of the largest publishing firms in London. I also prepared plain and tinted papers, and coagulated the albumen by steam, precisely in the manner described in Mr. Hart's specification, and these latter were subsequently printed upon from type by a well-known firm, with a view to the paper being used for a special purpose.

I write this in no unfriendly spirit to Mr. Hart. On the contrary, having myself once been bitten to the tune of some hundreds of pounds by a sham patent, I hope the information I now give may be in time to prevent him throwing away any more money.—I am, yours, &c.,
83, *Gaisford-street*, *May* 24, 1869. T. Lampray.

IN RE PYROXYLINE.

To the Editors.

Gentlemen,—We should have contented ourselves with being silent when Mr. M. Carey Lea accused Mr. Hardwich of having given a misleading formula for the manufacture of pyroxyline, and that no good collodion maker would use it; but when his cry is re-echoed in this country by collodion manufacturers, it behoves us, in justice to ourselves (who manufacture collodion by Mr. Hardwich's formula), to assert most positively that they are all mistaken.

We profess to make, and have made, the pyroxyline for our collodion for the last nine years by adhering most rigorously to the temperature (150°) laid down by Mr. Hardwich. No other temperature suits so well for a good normal collodion; at least, that is the result of our great practical experience extending over many years.

We are vain enough to suppose that our collodion is, at least, not inferior to the best in the English market. The names of such distinguished photographers as Bedford, Williams, England, Mudd, Watkins, Hills and Saunders, Brothers, Cundall and Fleming, &c., &c., who habitually use it, are a sufficient refutation of Mr. Lea's unfounded statement. But we shall go further, if it be necessary, to set ourselves right with the public, by challenging any collodion-maker to produce a more sensitive, or in any respect a better, collodion than ours from pyroxyline made in *cold* or *moderately warm* acids.—We are, yours, &c.,
180, *Strand, W.C.*, *May* 25, 1869. W. W. Rouch & Co.

To the Editors.

Gentlemen,—I must recal to Mr. Carey Lea's memory a very curious and suggestive fact—and I hope he will not call me "discourteous" for doing so—namely, *that he recommends in his new book the same temperature of mixed acids for making pyroxyline which Mr. Hardwich and I have established as the best for an ordinary normal collodion.* Let there be no mistake about the matter. In his recent work Mr. Lea says the acids for making the best pyroxyline should be "kept at a temperature of 147° to 150° Fah., which must be kept up during the operation." Farther on he again remarks more emphatically—"During the whole operation the temperature must remain over 147° or the pyroxyline is of inferior quality; and if over 160° the cotton is partly dissolved, becomes shorter in fibre, and does not adhere [I presume Mr. Lea means the collodion does not adhere] so well to the glass."

What can be more explicit than these statements? Why, then, should Mr. Lea now find it convenient to ignore his own recently-published words, and attack my book instead of his own?

Mr. Lea will have seen by this time that I have thrown down the gauntlet to him and all comers in defence of his own book and mine, *in re* photographic pyroxyline made in hot acids *versus* that made in cold acids. I trust Mr. Lea will not consider me "discourteous" in defending himself against himself.

As to Mr. Blanchard's statements, to which I have on a previous occasion referred, and as to Mr. Fry's letter in your last number, the less said the better. Both these gentlemen, I believe, make collodion commercially, but I am told they do not manufacture their own pyroxyline. If that be the case, their authority has no value, scientifically or practically, in such a matter. But I cannot allow a

statement in Mr. Fry's letter to pass without severe comment and unqualified contradiction; and, for confirmation of what I am about to say, I appeal, with the utmost confidence, to any of the best masters of our art, and to chemists who have known Mr. Hardwich personally and what he has practically accomplished.

The paragraph in Mr. Fry's letter, to which I allude, reads thus:—

"Mr. Hardwich was unfortunately not gifted with personal dexterity in taking pictures, and much of his writing consisted of profound theoretical studies of occult points of chemistry, having little bearing on the real matter. Less learned but more practical men have superseded the formulæ given by Mr. Hardwich, with palpable advantage to the photographic world."

A more erroneous estimate of Mr. Hardwich's scientific character and photographic capabilities could not, by any possibility, have been made. He was, in truth, a thoroughly practical man—that was the essence of his character—and gifted with, at least, as great manipulative dexterity as any practical photographer I know, otherwise he could not have filled with great acceptance and high success the important position of Demonstrator of Chemistry at King's College. Combined with this qualification he possessed a highly-cultivated and inquiring mind, great perseverance and a desire for progress, which led him on, in spite of weak health, to trace, if possible, every effect to its legitimate cause.

It is true Mr. Hardwich was not in the habit of taking sensational photographs and blazoning them abroad, or rushing with them to exhibitions. His character was of an entirely different stamp from that. What he knew and discovered he communicated to the public, frankly, freely, and fully. This reward was the only one he desired—the internal solace of leaving the photographic world wiser than when he entered it. Greatly would it serve the interests of our art-science at the present day were a larger amount of learning and theoretical knowledge more widely spread among a few of its votaries whom I have in my mind's eye. Talk of Hardwich not being a practical man! Why, I have now at King's College several large-sized negatives (15 × 12 inches) taken by him twelve or more years ago; and these might serve as models for our best photographers of the present day, both for clean and delicate manipulation and dexterous treatment.

Mr. Fry is, of course, entitled to differ from me entirely in my views about pyroxyline. Let him and all others—the more the merrier—differ as often and long as they please. But it is of no use dogmatically iterating "yes," "no"—"yes," no," and so on, for ever. Truth can never be attained by that sort of process. In this case it lies not deeper than the bottom of a porcelain pot, but experiment only can reach it.

In conclusion and in repetition: I am prepared to substantiate, by the practical method, or the *experimentum crucis* (the porcelain pot), Mr. Hardwich's, Mr. Sutton's, and my own position, *in re* pyroxyline, against all who may choose to contest the standpoint which we have taken up.—I am, yours, &c., George Dawson.

King's College, May 24, 1869.

[Without expressing any opinion as to the merits of Mr. Hardwich's manipulative dexterity, we believe that the opinion quoted above is similar to that entertained by several metropolitan photographers, many of whom have been unfortunate in never having seen any of Mr. Hardwich's productions. Respecting Mr. Blanchard, we have reason to believe that Mr. Dawson has been misinformed.—Eds.]

SUBSTRATUM FOR DRIED PLATES.

To the Editors.

Gentlemen,—Having worked the collodio-albumen process successfully for a good number of years, I am very loath to exchange it for any other; but the time occupied in the preparation of the plates, and the length of time required to develope them properly, has induced me to try various other dry processes.

The tannin answers best in my hands. It is simple, certain, and gives beautiful results. I only find one drawback, viz., the film is liable to loosen at times, and, when the edges of the plate are varnished, the film is liable to crease more or less.

I am very anxious to have a solution of gutta-percha in benzole, and coat the whole plate with it before pouring on the collodion. I have obtained a solution, called "gutta-percha in benzole," from half-a-dozen photographic chemists, but the solution thus obtained has not answered. I have purchased the best benzole at several places, and have got various samples of both gutta-percha and India-rubber, made the solution, and it has been useless.

Now for the mode in which it fails. When the plate is coated with the solution, and the surplus returned to the bottle, I hold the plate before a hot fire to drive off the spirit. It ought then to have a surface as clear and smooth as the bare glass; but not so, there are all sorts of curtain-like marks or ridges, waves, &c. I had thought to send you a coated plate. Will you, in next week's Journal, inform me how to proceed in order to either make or purchase a solution to answer the purpose?—I am, yours, &c., Smallshaw.

Waterloo, May 19, 1869.

[The substratum used is apparently too thick. In our own practice we use albumen very much diluted. One part of albumen to twenty of water answers well.—Eds.]

"THE HOLLOW ART OF PUFFING."

To the Editors.

Gentlemen,—Pray allow me space for a line in reply to the latter part of a letter appearing in your impression of the 14th instant, signed "John Beattie."

"The hollow art of puffing" therein mentioned in connection with my recent exhibition in Clifton of the "adaptations of photography," consisted (1) of an announcement that on the presentation of a visiting card *any* person could be admitted; (2) of a series of advertisements in the daily papers; and (3), of three articles (one of them occupying a column and a quarter) written by the accredited reporters of our daily papers, all of them *perfect strangers* to myself.

This "hollow art of puffing" resulted in a total attendance during the week of upwards of four thousand persons, and to myself in a manner so satisfactory as to make me wish that my *confrères* in the profession may deem it worth their while to adopt a similar course.

With respect to no "sentence being really true," I can only say I am sorry; at the same time I do not hold myself responsible for what mistakes a non-professional reporter may have made. Doubtless, if these untruths were pointed out, they would be met in the same spirit which has pervaded the whole matter, viz., that of candour.—I am, yours, &c.,

Clifton, May 22, 1869. C. Voss Bark.

Miscellanea.

New Changing Box.—Mr. C. D. Smith has sent us a photograph of a changing box which he has introduced. It consists of a chamber the top and bottom of which are formed of wood, and the sides of black cloth, with sleeves. It is kept in position by flat metallic rods, the removal of which permits the approach of the top and bottom, the cloth folding inside. It now assumes the form of a flat box, of sufficient capacity, however, to be employed for storing away the camera and other things, which are introduced through a sliding shutter in the lid. A square of yellow glass on the top enables the operator to see the plate-box and dark slide with sufficient distinctness to permit of the transfer being effected without risk of failure. It is portable, and will prove very useful.

Photographic Tell-Tale.—A correspondent of the *Builder* says:—I perceive in the *Builder* a suggestion for a photographic "tell-tale." In anticipations of the "smiles" which will greet its advent, let me state that I have often, in earnest fun, told, at the dinner-table, to the alarm of many present, that a contrivance was in embryo by which the whole of the proceedings of an interior might be made as plain as an illustrated book; that this would be done by a roll of sensitive paper released by clockwork, and set in some concealed spot commanding the fullest view of room or chamber, and so adjusted as to photograph every two minutes if necessary; and that, when the master returned, he could thus spread out before him all the transactions of the past time. I claim nothing for the notion, having already been mischievously rewarded for the consternation I have occasioned, and the cries of "Shame" from some, and "What next?" from others most seriously ejaculated.

Selling Indecent Pictures.—At the Middlesex Sessions, on Tuesday last, before Mr. Payne, Assistant-Judge, Sydney Powell, photographer, was indicted for selling and uttering to Thomas Parker a certain lewd and obscene print and paper picture. He, at first, pleaded not guilty, but afterwards, on a consultation with his counsel, withdrew his plea and pleaded guilty. Mr. Poland (instructed by Mr. Collette) prosecuted on behalf of the Society for the Suppression of Vice; Mr. Montagu Williams defended the prisoner. Inspecter Parker, of the E division, on the 10th of May went to the prisoner's shop in Chandos-street, where the prisoner showed him some paintings, and he wanted 100 guineas for them. They were also shown a lot of obscene photographs, and two of them were purchased for 1s. 6d. each. He said he dealt extensively in them, and sent 150 of them to Brighton to a gentleman there for him to select from. He said he wished to dispose of the pictures, and asked the inspector if he could find him a customer. He said he would try, and would call again the following day; and he did so, being accompanied by William Chamberlain, 168 E. He was asked to show some of the prints, when he said they had all been sent away, as the police were getting very sharp, and there was danger in keeping them at his shop. He was then told that they were police-officers, and Inspector Parker produced a warrant for his apprehension. The place was searched and a number of indecent pictures were found, which with two oil paintings were brought away, and the prisoner was taken into custody. Mr. Montagu Williams said that, as regarded the oil paintings, they did not belong to the prisoner, but were the property of a person in a much higher station in life, and they had been brought to him to be framed and cleaned. This person they were desired to summon as a witness to prove that fact; but as he (Mr. Williams) could not resist a conviction in respect to the pictures, he had advised prisoner to plead guilty. Mr. Poland said the prisoner never stated that the pictures did not belong to him, but, on the contrary, he offered them for sale, and said that he would not take less than 100 guineas

for them. Mr. Montagu Williams said that Mr. Poland knew as well as he did that the paintings did not belong to the prisoner. The Assistant-Judge said there was no doubt that the prisoner had dealt extensively in these articles, and he saw no reason why he should make any difference between his sentence and that of another case that had recently come before him. The sentence upon him was imprisonment and hard labour for eighteen months.

EXCHANGE COLUMN.

Wanted to exchange, a powerful electrical machine (cylindrical) and two large Leyden jars for same, for a whole-plate camera and dark slide complete, in good condition.—Address, F. C. H., 3, High-street, Old Brompton, Kent.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

A Fulham Subscriber.—We shall look over the articles and attend to your request shortly.

G. L. (Edinburgh.)—We shall obtain the requisite information in time for our next publication.

S. M'Watters.—The varnish is very good indeed. Redeem your promise by informing us how it is made.

E. Dill.—The person named is presumed to be in New York, but we have no precise information as to his whereabouts.

H. B. Medcalf.—Send both pictures, or, rather, both halves of the complete picture. A single registration will include both.

A. B. C.—You have not added sufficient acetic acid to the exciting solution, and from this omission arises the darkening or fogging of the lights.

An Interested Photographer (Liverpool).—When we next send to the Registration Office we shall submit your letter and publish the reply—probably in our next.

T. Warren.—Try tripoli and water. If this mixture do not aid you in cleaning the glass, immerse the plates in diluted sulphuric acid containing a little bichromate of potash.

A. H. K.—Respecting the application of the alkaline developer mentioned, we are at present making some experiments, which we shall publish. The two persons you name are *different* individuals.

A Curious Inquirer.—The Mr. Moens who played such a conspicuous part in the incident of brigand life to which you refer is the same who is, or rather was, a member of the North London Photographic Association.

A Self-taught Photo.—The minute spots in the negative arise from your having neglected to filter the coffee preservative. We once obtained precisely the same kind of spots when, with the view of ascertaining all the conditions of success with the coffee process, we prepared some plates with a decanted but unfiltered infusion.

The British Association.—T. B.—The local committee of this Association, which is to meet this year, in Exeter, on the 18th of August, are actively engaged in making every arrangement which will ensure the success of the meeting. Arrangements have been made with the railway companies to enable visitors to travel at a reduced rate.

St. Alban's.—The thermometric indication to which you have alluded is given by a *centigrade* not a *Fahrenheit* scale. You may easily convert the centigrade into the Fahrenheit reading by multiplying by 9, dividing by 5, and then adding 32 to the remainder. Copy this and suspend it on the wall of your studio, or let it be thoroughly impressed on your mind.

Lux.—This correspondent, referring to an article, by Mr. Winstanley, on Mr. Kershaw's cloud stop, wishes to know if any reader can offer him a suggestion relative to the application of this stop to "doublet lenses," so that he may adopt such a form as will prevent him having to unscrew any of the lenses when the stop requires to be adjusted or when a new stop is to be inserted.

S. McWilliam.—1. A piece of blotting-paper placed in the dark slide would have absorbed all the drainings from your plate and have given you a clean picture.—2. It is better that the apparatus should be all tried thoroughly here than allow the examination to be deferred till your arrival in Melbourne, when defects might be discovered which would be difficult, if not impossible, then to rectify.

George Falshaw.—We have never made any experiments to determine definitely the difference between the actinic power of the light in the forenoon and the afternoon; but it is generally considered that at any given time before midday the actinism is greater than it is at the same time after twelve. The subject of atmospheric refraction and its influence upon oblique solar light is undoubtedly interesting, but we could not enter upon its discussion in this column.

"Old Harry."—Of course aluminium will prove much lighter than brass, and as you say that price is no object in your case, we say by all means have the lens mountings and all the other metallic work made of that metal. But if you instruct the optician to use very hard and thin brass there will not be so very much difference in the weight as you anticipate, while there will be an immense pecuniary saving of cash—sufficient to purchase a complete camera of the description you mention and are desirous of possessing.

"Tattoo" (Wanganui, New Zealand).—The pictures are very good, with one exception. There is rather too great a predominance of front light, and that is so strong as to cause the eyes of the sitters in some cases to be "fishy" in appearance. By means of blinds reduce the amount of front light, keeping the side light as strong as formerly, and then give a longer exposure. At present the exposure is right, but with the alteration suggested it will require to be prolonged. This will give better pictures, but will not materially interfere with the comfort of the sitter, for in this country much longer exposures are given.

Lux.—The patent albumenised paper was prepared by first coating the plain paper with a solution of India-rubber in benzole and applying the albumen on this substratum. What was sought to be obtained was an increased degree of brilliancy, arising from the fact that the albumen could not penetrate and sink into the paper when varnished in the manner described.

Reader.—1. You may print on talc in a similar manner as on opal or other glass, viz., by any good dry collodion process with subsequent development, or by means of collodio-chloride.—2. The work in the old studio is decidedly better than that in the new; the latter are hard and under-exposed. A large mirror placed on the dark side would effect a decided improvement; also use a less intense collodion, and give a longer exposure.

George Harvey.—Unless we knew precisely what kind of subjects you intended to photograph we could not properly advise you; but from what we can glean of your wants from your letter, we think that a pair of six-inch single or landscape lenses will be the most generally useful. In our own camera we have two pairs of lenses of different focal lengths which screw into the same mounts. This we find to be very convenient.

Benj. Levi.—You are quite right. Gallic acid may have its developing powers stimulated in several ways. The first that was suggested was heat; the next was the addition of acetate of lead; following these was the addition of alkaline bodies, such as carbonate of soda. We are, at present, unable to speak with accuracy concerning the persons who suggested these additions; but Mr. Fox Talbot was, if we mistake not, the first who directed that the developer should be heated.

Edinburgh.—You have omitted your name or initials. We know that such a lens as that referred to is in existence, but beyond this we know nothing concerning it; hence to write to us respecting its No. 1 or 2 stop is useless. We know something about the capabilities of the lenses manufactured in this country, and what we are not acquainted with we can readily ascertain from the respective makers; but when you proceed to interrogate us concerning an article of foreign manufacture we must avow our limited knowledge of the matter.

E. H. H.—We are quite unable to give what you wish, viz., instructions how to colour a *carte* portrait. Even if we were able to do so, it would occupy several pages to give you the necessary directions, which you can easily obtain, in the form of a manual, and at an outlay of a shilling, such being, if we remember aright, the price of a very good manual sold by Newman, Soho-square. Better still, consult our advertising pages, and you will find the names and addresses of competent teachers, such as Mr. Dunmore, who will give you practical instructions.

Subaltern (Deesa).—As our own camera is similar to yours, and is made by the same maker, we can readily answer your question. In taking a high building make use of the sliding front to raise the lens as far as possible, and then tilt the camera until you get the building properly depicted on the ground glass. Now utilise the swing-back and make it stand in a vertical position, or in the same vertical plane as the building. Respecting the subject of your second letter the Publisher says that any ordinary bookbinder should know how to take out the pages of index and still leave the number of the Journal complete. The Publisher has all the annual volumes bound up without any difficulty being experienced.

Henry Taylor (Birmingham).—1. It will conduce to your comfort if you obtain a camera for the special purpose named. Under some circumstances it may be well to have instruments of the *multum in parvo* class, but it will be found to be best to have special apparatus for special work. We do not, for instance, say that a portrait lens cannot be procured the front lens of which will take really excellent views; but, while this may be the case, you will probably consult your own gratification by having an independent lens and camera for that purpose. It is, however, a question which each person must decide for himself.—2. Judging from the print, we think that you may manage to obtain a good enlargement from the negative. It appears sufficiently sharp to stand enlarging to 12 × 10.

Received.—George Dawson, A.M.; M. H. Phillips; W. H. Harrison; and communications from several other correspondents. In our next.

LONDON GAZETTE, *May* 21.

Bankrupt.

F. Simpson, Nottingham, photographic artist. June 13, at Nottingham.

METEOROLOGICAL REPORT,

For the Week ending May 26th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

May 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
20	29·72	60	40	47	52	W	0·03	Fine
21	29·76	60	40	49	54	ESE	—	Dull
22	29 99	64	47	49	53	NE	0·07	Dull
24	29 98	70	45	50	54	SW	0·02	Fine
25	29·81	68	52	55	59	E	0.07	Dull
26	29·56	70	51	56	58	E	—	Dull

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 474. Vol. XVI.—JUNE 4, 1869.

EXPERIMENTS WITH THE ZIRCONIA LIGHT.

The more we think of the efforts that are being made to improve our sources of artificial illumination, and examine, as we are permitted to do, many of the various means now being rapidly brought to completion for perfecting the same, the more are we satisfied that the present year will see improvements effected in this important branch which, at the close of the year, will leave it in a state, not merely higher in the sum total, but higher in the ratio than any previous year. What with the immediate prospect of magnesium reduced in price by nine-tenths, and oxygen to be had at a cost determinable only by the cost of the apparatus and the labour of making it, we seem to have arrived at a point from whence we may look forward somewhat hopefully.

The use of zirconia in connection with what we must still designate the *lime* light has, of late, caused a good deal of interest in the scientific world. Lime, hitherto an essential requisite in connection with illumination by means of the oxyhydrogen light and its congeners, has a drawback—it does *not* last long. Many times has the question been put—Is there no other substance which will, when acted on by an intense flame, yield a similar amount of illuminating power to the lime *minus* its comet-like existence, a "flash and away?" The answer has come from France, and it asserts the value of zirconia.

Now what is zirconia, and in what respect is it superior to lime for illuminating purposes? To these questions we shall endeavour to give a short reply. Zirconia is an oxide of zirconium—an elementary body discovered by Berzelius in 1824. Zirconia was first discovered by Klaproth, in 1789, in the mineral jargon or zircon of Ceylon. It is insoluble in water, and has neither taste nor odour. It forms salts with the acids. This is the substance which, in the opinion of some, is to revolutionise our system of lighting, and there is much plausibility in the assertion; for, while it has been alleged that it is not inferior to lime in its light-giving properties, it is also claimed for it that it is, practically, more or less perpetual.

No person who is acquainted with the lime light needs to be reminded that its great drawback is the short period that even one of the best specimens will last. Some kinds of this earth are much better than others; and we have had samples obtained from Glasgow which lasted six or eight times as long as the specimens obtained in London through the usual commercial channels.

Shortly after the discovery of the property of zirconia referred to, M. Tessie du Mothay obtained, both in this country and the leading continental states, patents for its preparation, and compression into such cylinders as would be adapted for using with the oxyhydrogen light. In his specification he says:—

"Zirconia, or oxide of zirconium, in whatever manner it may be extracted from its ores, can be agglomerated by compression, for example, into sticks, discs, cylinders, or other forms suitable for being exposed to the flame of mixtures of oxygen and hydrogen, without undergoing fusion or other alteration. Of all the known terrous oxides it is the only one which remains entirely unaltered when submitted to the action of a blowpipe fed by oxygen and hydrogen, or mixtures of oxygen with gaseous or liquid carbonated hydrogens. Zirconia is also of all the terrous oxides that which, when introduced into an oxyhydrogen flame, developes the most intense and the most fixed light.

"To obtain zirconia in a commercial state I extract it from its native ores, by transforming, by the action of chlorine, in the presence of coal or charcoal, the silicate of zirconium into double chloride of zirconium and of silicium. The chloride of silicium, which is more volatile than the chloride of zirconium, is separated from the latter by the action of heat; the chloride of zirconium remaining is afterwards converted to the state of oxide by any of the methods now used in chemistry. The zirconia thus obtained is first calcined, then moistened, and submitted in moulds to the action of a press, with or without the intervention of agglutinant substances, such as borax, boracic acid, or clay. The sticks, cylinders, discs, or other forms thus agglomerated are brought to a high temperature, and thus receive a kind of tempering or preparing, the effect of which is to increase their density and molecular compactness.

"I can also compress in moulds shaped for the purpose a small quantity of zirconium capable of forming a cylinder or piece of little thickness, which may be united by compression in the same mould to other refractory earths, such as magnesia and clay. In this manner I obtain sticks or pieces of which only the part exposed to the action of the flame is of pure zirconia, while the remaining portion which serves as a support to it is composed of a cheap material.

"The property possessed by zirconia of being at once the most infusible, the most unalterable, and the most luminous of all the chemical substances at present known when it is exposed to the action of an oxyhydrogen flame, has never before been discovered, nor has its property of being capable of agglomeration and moulding either separately or mixed with a small portion of an agglutinant substance."

The description of the lamps of the Oxyhydrogen Gas Company, given by Mr. Fowler in his letter to this Journal [*ante* page 248], has had, we know, the effect of arousing much interest in the subject of lighting by the methods there described; and it affords us much satisfaction to be able to record the result of some trials with the lamp there described, for the use of which for this purpose we have to tender our acknowledgments to Messrs. Harvey, Reynolds and Co., Leeds.

The lamp is so constructed as to be adapted for burning a mixture of oxygen and common gas directed by a single jet on to a cylinder of zirconia. In addition to this there is a supplementary burner of four jets, by which a cylinder of magnesia is ignited all round. These four jets are formed of very thin brass tubing, like bell wire, which stand up like fingers and encircle the magnesia crayon or cylinder which is supported from above. This cylinder is about an inch and a-half long, and is of the thickness of the barrel of a goose quill or the stem of a common clay tobacco pipe, to which, indeed, it bears a marked resemblance.

The zirconia cylinder is of the same diameter as that described, but is only about a quarter of an inch in length. We ought to say that a third burner may be adapted for burning common gas. It is similar to one of the ordinary argand gas burners; but, by means of a row of holes immediately inside those through which the gas emanates, a supply of oxygen may be made to impinge on the flame, in addition to the atmospheric air which passes up in the centre. With the latter application we have nothing to do at present, but shall dismiss it with the single remark that when the gas was lighted and the oxygen admitted the purity of the light was very greatly increased.

In order that the trial of the zirconia should be made as fairly as possible, we had present not only the French lamp, but also two of

the oxyhydrogen burners in common use in this country, one of them being the "safety" burner, the other that in which the gases are mixed previous to their issuing from the orifice. We had also present the various hard and soft limes in common use.

It was at once obvious that the bit of zirconia was too small, for the face on which the flame impinged was only the eighth of an inch from the brass tube in which it was inserted as a holder, and without great care in directing the flame there was some danger of the melting of the tube. Besides, the flat face of a circular pencil of zirconia of a quarter of an inch in diameter is very small, even when the light is intense. With the same amount of gas required to produce the best effect a much larger area of the oxide might have been illuminated, the result in all probability being that the light emitted would have been quadrupled.

When the best effect had been obtained and the result noted, the holder containing the zirconia was suddenly removed and a cylinder of lime inserted in its stead. From the larger surface of the lime the quantity of light was much greater than in the case of the zirconia; and, in addition, it was considered that the quality of the light was rather better, that of the zirconia being of a redder hue than that of the lime. In order, however, to a fair test being made, recourse was had to a piece of lime of the same size as the zirconia, and the results could then be more easily noted. The zirconia emitted a good light, but that from the lime was both more intense and purer—that is to say, the lime light was of a pearly whiteness while the zirconia light was of a warmer, *i.e.*, a redder, tint. Both hard and soft old and new limes were tried; but in every instance with the same result. The various English burners commonly used for magic lanterns were tried, as well as the French burner, and every kind of pressure was put upon the gas bags, from one-half to twice as much as is required in ordinary working.

The magnesia cylinder yielded a good light; but, like the zirconia, it was not quite equal to lime. It, too, was tested under a variety of circumstances, with various degrees of pressure in the bags, and with various burners. That the several trials were made in a thorough manner may be inferred from the fact that the contents of two bags of oxygen (small ones, it is true) were exhausted by these experiments.

We are indebted to Mr. W. H. Harrison for his aid on this occasion, as well as to Messrs. Darker, who kindly placed at our disposal every facility for having a careful trial made of the famed zirconia light, and rendered us efficient service by their assistance and experienced suggestions.

What conclusions, then, do we arrive at respecting this matter? Simply the following:—First, the quality of the zirconia light is not equal to that of the lime. Secondly, the volume of light from the sample in question is much less than it would be with the same consumption of gas if a larger piece were manufactured. Thirdly—and here we may be charged with inconsistency—zirconia is a most valuable addition to the oxyhydrogen lamp; for, although the quality of the light is inferior to the lime, the zirconia which we tried is at this moment as hard, pure, and free from pits as it was when we first received it. It is, indeed, sufficiently hard to resist any attempt to cut it with a sharp knife. Of the magnesia cylinder the same may be said; therefore, we welcome these additions to our resources, and we shall not fail to employ them largely as soon as they become articles of commerce. We strongly advise the makers not to issue pieces of such paltry size as those now before us, but to make them at least four times the diameter. The expense of the zirconia may render its economical employment desirable, but we do not see that the same applies to the magnesia. Both are excellent, and will, we believe, "take" well in this country as soon as they can be procured.

We have referred to the fact of oxygen being produced at an exceedingly cheap rate on the continent. The process employed, if we are rightly informed, equally with the zirconia cylinders, owes its existence to the fertile imagination of M. Tessie du Mothay, and will be readily understood from the following specification of a patent granted to him in this country. If we are wrong in assuming this to be the method at present in use, our friend Mr. Fowler will, perhaps, supplement it with information which he has the means of obtaining direct from the makers:—

"Starting with the idea that atmospheric air is the richest and most natural source of oxygen gas, a process for the production of this gas has already been described in the specification of a patent granted on the 10th January, 1866, for an invention also communicated by the present inventors. In this preceding process oxygen was absorbed from the atmosphere by particular chemical compounds, and there were produced combinations not very stable, which have the property of readily giving off their oxygen at a greater or less temperature in presence of a current of steam.

"The new process is founded on the same principle, and oxygen is taken from the atmosphere by means of the decomposition and recomposition of sulphuric acid. The principal feature of this process lies in the employment of oxide of magnesium, which as yet has not been used for this purpose; this oxide alternately absorbs and reabsorbs sulphurous acid, and thus permits, although indirectly, of taking from the atmosphere a part of the oxygen which it contains.

"All the oxides or silicates of metals, such as the oxides of aluminium, iron, and zinc, and the silicates of alumina, for example, which at a dull or bright red heat cease to unite with sulphuric acid, decompose this acid into sulphurous acid and oxygen. The oxygen and the sulphurous acid thus generated are collected in vessels containing oxide or carbonate of magnesia. The sulphurous acid is thus transformed into sulphite of magnesia, while the oxygen set free is collected in a gas-holder. The sulphite of magnesia produced by this reaction is heated in a retort and decomposed therein. The regenerated sulphurous acid is conducted into a leaden vessel or into any other apparatus for producing sulphuric acid. In contact with air, steam, and nitrous gases the sulphurous acid is transformed into sulphuric acid, while the magnesia set free is again ready for use in the next following operations. The regenerated sulphuric acid on issuing from the leaden chamber is again decomposed into sulphurous acid and oxygen, and the operation may be continued as long as required.

"The applications of the oxygen thus economically obtained are very numerous. It may be employed in metallurgical operations for the fusion of metals at a high temperature; in chemical operations it will naturally serve as a very powerful agent of oxidation. This oxygen will also be of great utility for lighting by carburetting it with gases, oils, hydrocarburets, or other combustible fluids. In this case I can employ with advantage a solid body introduced into the flame; for example, a crayon formed of a terrous oxide, such as magnesia, lime, or strontian, and an agglutinant matter, such as coal, resin, or other animal or vegetable combustible matter.

"And having now described the nature of the said invention, and in what manner the same is to be performed, I declare that I claim as the 'improved means of producing oxygen'—

"1st. The employment of oxides of aluminium and of zinc to decompose sulphuric acid into its two component parts—that is to say, sulphurous acid and oxygen.

"2nd. The employment of oxide of magnesium to absorb and reabsorb sulphurous acid, and allow the oxygen set free from the said sulphurous acid to be collected in the state of purity in a receiver."

Our fellow-labourer, Dr. J. Emerson Reynolds, having received direct from Paris a piece of zirconia, has also instituted a series of experiments with a special view to the utilising, photographically, of the new light, and in the following article he expresses his opinion on the use of zirconia as a means of artificial lighting for photographic purposes:—

Some months ago we promised our readers that we would take an early opportunity of contrasting the zirconia light, about which we have lately heard so much from our Gallic neighbours, with some of the other artificial lights with which we are familiar. Within the last few days we have had the opportunity of making the comparison, and now hasten to lay the result before our readers.

Our attention was, of course, chiefly directed to the determination of the photographic power of the new light, and we pitted the zirconia against the ordinary lime cylinder and magnesium; and, in doing so, we necessarily had the opportunity of contrasting their relative brilliancy.

The apparatus we employed with the zirconia and the lime cylinders is precisely the same as that stated to be used in Paris. The burner is a compound one, consisting of one upright tube, through which the current of oxygen is delivered, and round this central tube are grouped five other small jets for the hydrogen or coal gas. These little tubes are so inclined towards the central oxygen jet that the currents of hydrogen, delivered by the former, intersect the vertical stream of oxygen and each other nearly in the same point. By means of a little platinum holder the small cylinder of lime or magnesia, or of the latter tipped with zirconia, can be lowered with great nicety into the point at which the several streams of gas intersect; and

so the infusible cylinder is exposed to the most intense heat which the oxyhydrogen jet is capable of producing, while the incandescent lime or zirconia sends forth its light in every direction, except either directly or above the cylinder or below the jet. This is probably the best arrangement that could be adopted when it is desired to obtain as much lateral illumination as possible and to waste as little light as is practicable.

In order to test the photographic power of zirconia, we should have preferred to have as much of the light as could reasonably be obtained concentrated in a given direction; but we were anxious to try the new cylinder with its special burner, and, therefore, employed the latter alone in our experiments, taking care to use the lime and magnesia cylinders with the same burner. The oxygen and the hydrogen used in our experiments were kept in separate bags, and the pressure adjusted so that the best light could be obtained; but once the pressure was determined for the zirconia, no alteration was made when the plain lime cylinder and that of magnesia were used with the jet, so that our results may fairly be considered as directly comparable.

Our experiments were made at night and in a large lecture theatre attached to our laboratory, where we had the assistance of some friends who were anxious to ascertain the actinic power of the new light. The lens used for convenience was a slow quarter-plate portrait combination, and the object a very suitably-coloured one, being a beautiful and interesting model of the great Melbourne telescope recently constructed for the Australian Government by Messrs. Grubb and Son, of Dublin.

Having seen that our collodion, bromo-iodised bath, &c., were in good working order we exposed two or three plates, in order to get a fair idea of the time required with the lime light. Having done this we commenced operations in earnest, and obtained a fair negative of the telescope model in twenty-five seconds with the magnesium light, burning only one small rib of the metal, without a reflector, and at a distance of about four yards from the model. This negative served as a standard.

Our next experiment was with the zirconia light, arranged with its burner, but without a reflector, as already described, and placed at a distance of about two yards from the model. As the amount of light falling on a given area is inversely as the square of the distance from the luminous body, the chances were, therefore, four to one in favour of the zirconia. After some trials, a very feeble negative was obtained by an exposure of *four minutes*. A less exposure gave no image at all. We may, therefore, state that, under the conditions specified, the light emitted by a single zirconia cylinder possessed approximately only one-fortieth the actinic power of that of a small ribbon of burning magnesium.

Having established this relation between the magnesium and zirconia lights, we now compared the latter with the plain cylinder of good hard lime of the same size, ignited in the same jet and placed at a similar distance from the model. An exposure of three minutes gave but a very faint trace of a picture, but on increasing the time to four minutes we obtained as good a negative as we could expect to get under the circumstances, and one which contrasted most favourably with the very feeble trace of an image obtained in the same time when the ignited zirconia cylinder was the source of light.

We are, therefore, forced to the conclusion that the light remitted by the incandescent zirconia has greatly less chemical intensity than that obtained from common lime under similar conditions. We have been thus careful to state the details of our experiments, as our results are the opposite of those we were led to expect from accounts we have from time to time seen published relative to the performances of the zirconia light. If we have been disappointed in the photographic qualities of the new light, we have been equally dissatisfied with its luminous intensity. On comparing the brilliancy of the light emitted by the new earth, the prepared magnesia cylinder, and good plain lime respectively under similar conditions, we were forced to the conclusion that the ignited zirconia gave the least intense light, the magnesia cylinder was better, while with lime the intensity of the light was unmistakably greater.

It has been claimed as one of the great advantages of zirconia over lime or magnesia, that it does not fuse or "honeycomb" under the prolonged influence of the intensely hot oxyhydrogen jet. Our experience does not enable us to corroborate this statement, since the zirconia layer which we operated upon certainly became glazed or semi-fused when heated for some time. On continued use, however, this vitrifaction did not appear to increase.

Having said so much of the performance of the zirconia light and our disappointment at the results obtained with it, we are bound to add that we much prefer to believe that the specimen cylinders we have operated with were defective in some respect, than that the claims put forward for the new light are without sufficient foundation in fact. We are fully alive to the difficulty of preparing perfectly pure zirconia on any considerable scale, and we have, as yet, no means of ascertaining how far the presence of even minute quantities of impurities in the earth may affect its behaviour at the high temperature to which it is subjected in the oxyhydrogen jet. In the absence of conclusive evidence we must give zirconia the benefit of the doubt, and our readers will, therefore, probably withhold their judgment for the present.

ON A NEW METHOD OF PREPARING ANY KIND OF PAPER FOR PHOTOGRAPHIC PRINTING.*

The Edinburgh Photographic Society seems to have set itself, during the last few meetings, to the task of considering, in a succession of papers, the different modes and media with which and on which silver prints could be impressed, and this resuscitation of a nearly forgotten idea must be put down to a desire to keep up the same train of thought, and to prompt experimenters in this and similar directions to increased energy and perseverance.

Some dozen or more years ago, when considerable difficulty was felt by most amateurs, and also by many professionals, in the manipulation of albumenised paper, and the greater difficulties which that class of paper caused in toning, fixing, and washing, I conceived the system of preparing plain paper on which I propose to treat this evening; but at that time there was no Edinburgh Society, where these little things could be ventilated and discussed, and it had fallen asleep again until now. In re-directing my attention to this unpublished idea, I find that it has an importance, and the results it produces a power, which warrants its present publication, but which, at the moment of its first discovery, did not appear.

Ideas which are useful, new, and good are said to be fair patentable commodities; but as I entertain decided objections to all patents whatever, and especially to those granted in connection with photography, I must begin as Mr. M'Craw did at the last meeting—by protesting against any person, authorised or unauthorised, taking possession of this little scrap of useful knowledge, and attempting to prevent everybody from making use of it if everybody chooses to do so. That there is need for this you may judge when I state that only last week I noticed another of those unjustifiable claims for patent protection for an idea which I know was not the property or invention of the person claiming it, and which many of you, gentlemen, will recollect was embodied and fully detailed in a paper I read before this Society four or five years ago. I allude to the coagulation of a film of albumen on paper by a jet of steam, the invention, I believe, of my friend Mr. Wood, of this city; and, painful as it is, I may tell you that this is the second application for a patent for the very same idea.

As the method I am about to describe will enable professional photographers to do without the cumbrous, costly, and inartistic method of putting a glass positive above a piece of crayon paper with a few hatched lines on it, and produce as fine results, at least—certainly more artistic and at less cost—you will perceive I have need to preface it with a few words against appropriating ideas and patenting them.

At present, when enlargements are the order of the day, and when the best methods for producing them are sought for in practice, this may prove of considerable help and assistance. No other method of preparing papers that I know of (and I have tried most of the published and many unpublished methods) will keep the image so well on the surface, especially if the papers are of the rough and porous kinds used for crayon drawing, or even the harder and rough drawing-papers for bold sketching and water-colour painting. And when I tell you that several of the prints before you are printed on common wrapping and packing papers, on house-painters' cartridge paper for covering walls, some of them made from tarry ropes and other photographic abominations, as well as others on printing and blotting-paper, on crayon and drawing papers, you will have an idea of the power which this method gives in securing purity of delineation on such impure and uncongenial surfaces.

One of the examples, you will notice, is printed on one of Sarony's lithographed sheets of crayon paper, the greasy ink of which, you will observe, offers no obstruction to the attachment of the photographic image, and, in fact, before a serious scientific and artistic body like this a joke is not a proper thing to pass; but, without joking, here is a photograph printed on the back of an ordinary posting-bill, and, except that it would have been too funny, I would have brought one printed on the face of the printed oily ink

* Read at a meeting of the Edinburgh Photographic Society, May 19, 1869.

surface. This print, you see, is perfectly clean, sharp, and spotless, although the greasy ink has come through the back of the paper.

This method seems to secure perfect immunity from many of the little accidents and stains that occasionally mar an otherwise good impression—not, of course, from the action of spots of metal, or the like, enclosed in the body of the paper; but it seems to prevent damage or spots from almost any other cause—such as dirty fingers, or anything else. If it do not, then I must have been singularly fortunate in getting good samples of paper from so many unpromising sources, and of so many different colours and qualities.

My method of preparing the surface—for I believe it will do for many other surfaces than paper—is the following for direct printing:—Take from four to six grains of gelatine, soak it in an ounce of water for an hour, then melt it gently over a fire, hot plate, or water bath, using a clean earthen pipkin. When fully dissolved, add to it, while yet warm, and stirring it gently during the mixing, from four to six drachms of a solution of white lac in methylated spirit, if for white or pale surfaces; but orange lac will do if the surface be of a darker colour. This is made in the proportion of six ounces of spirit to one ounce of lac, and digesting it till fully dissolved. The mixture of the gelatine and gum lac in spirits produces a creamy-looking emulsion, to which is added four grains of chloride of sodium, or a like equivalent of chlorides of ammonium or barium, and, when fully dissolved, filter through fine muslin into a clean pipkin, and it is ready for use.

I generally apply the solution warm with a flat camel's-hair brush, crossing it till it lies evenly. When dry it is ready for sensitising, which may be either done by flotation on the ordinary printing bath, or by brushing on the silver solution. I prefer to use the ammonia-nitrate solution brushed on; but there are specimens by both methods before you. I use forty grains of silver to the ounce of water. Some of the ammonia-nitrate prints contain also a large proportion of citrate of silver in addition to the usual ammonia-nitrate.

As you will see, the tones of many of the untoned prints are quite as fine in colour as are those toned with gold, and I attribute this entirely to the variations in the salting and in the strength of the size and lac solution, and to the minute variation of the silver bath by the addition of various salts in the course of sensitising.

The question will probably be asked—Will this method allow of printing by development? I can only say that I believe it will. There is nothing in the materials to prevent it; but I have not had time to go into that branch of the matter, as the large number of examples before you may prove, but I will endeavour, before next meeting, to get some done in that way. From the fact that the process is a very sensitive one in ordinary contact printing, I have no doubt it will also be so in printing by development.

W. H. Davies.

ON EXPOSURE.*

In the absence of a paper on exposure by one who has had much practical experience of it in connection with the collodio-bromide process, I have penned a few observations which may interest our members and, perhaps, draw the attention of some to a branch of our art-science to which little attention has been given by our Association.

In the first place, I propose to consider what we mean by exposure, next, what is the effect produced by the light, and then consider the reasons there are for believing that exposure may be almost indefinitely shortened.

What we mean by exposure is allowing the actinism of light to have access to the chemicals in the prepared film; and this leads us to inquire—What is actinism, which produces the wonderful changes with the effects of which we are so familiar? How is the change produced, and what is the nature of the change? Actinism is a term generally used to express that peculiar property the rays of light have for producing chemical changes; but I would give it a wider meaning, and consider it to be the property which light has of producing physical as well as chemical changes.

In the prepared film we have certain chemical compounds consisting of atoms or molecules held together by their inherent attractive force. After the film has been exposed to light for the usual time in the camera no chemical change can be detected to have taken place in the chemicals; all the silver is still found to be in combination with the other elements as before exposure. What, then, is the nature of the change, if it be not chemical? I am disposed to think the change in the film consists of a kind of polarisation of the molecular elements forming the chemicals. I think this change is brought about by the impact of the actinic waves of light which produce the power called repulsion, the effect being to cause polarisation and consequent vibration of the molecules, which weakens, but does not liberate, the attractive force existing among the atoms of the chemicals. The molecules of the chemicals in the developer are then enabled by their inherent attractive force to form new compounds, which, otherwise, they would not be able to effect.

These ideas will be better understood if I condense from Winslow's admirable work on *Force and Nature*, the effect of a blow of a hammer upon a rod of iron or hard steel held in the line of the magnetic dip. The impact communicates the force existing in the falling body to the body struck, which, propagating itself from molecule to molecule, is counteracted in turn by the repulsive force of the same molecules. Thus vibrations—that is, molecular motions—ensue, and the iron becomes magnetised, one end being positive, the other negative. If the iron be allowed to rest it gradually loses its magnetic power and returns to its normal condition.

I do not say that the change which takes place in the chemicals is magnetic; but I think the same force—that is, repulsive force—which, acting in the iron, produces the effect called magnetism, may be generated in the chemicals by actinism and cause vibration of the molecules, and so counteract or lessen to some extent, the attractive force by which they exist.

It is a law in nature for all things to return to their normal condition after being disturbed, and, consequently, we find, after exposure, the film gradually loses the latent image; or, in other words, the molecules of the chemicals lose their newly-acquired power, and, like the molecules of the iron, slowly, but certainly, return to their normal state. Some chemicals may, and doubtless do, retain the effect of actinism longer than others, and some preservatives by their presence assist the chemicals in retaining the effects of light longer than others. The reasons why these chemicals possess these varying properties possess much interest and deserve the closest investigation.

The certain tendency which the exposed chemicals have to return to their original condition, explains the reason there is for prolonging the exposure of the plates if we wish them to retain the latent picture for a long time before being developed, and also the necessity of developing immediately if we desire to reduce the exposure to a minimum; and I may add that, if at any time you should make a tour with dry plates, and returning home find, on developing one or two, that they are much over-exposed, if you keep the others a few weeks before applying the developer you will get better results than you otherwise would.

It may be interesting here to inquire—Why do certain of the rays of the spectrum produce actinic effect on the iodide of silver? Why do other rays, in addition to these, have an effect on the bromide of silver? And why do other rays of the spectrum produce no effect on either? At first sight these questions seem difficult to answer, but I think we may get a little insight into the cause, if we study the action of the waves of sound, which, in some respects behave like the waves of light. Professor Tyndall states, in his beautiful description of singing flames, that if a silent flame of gas be burning in a glass tube, and sounds be produced upon a syren, ascending gradually from the lowest note of the instrument, at the moment the sound reaches the pitch of the tube surrounding the flame the latter stretches itself and commences to sing, and will continue to do so indefinitely after the syren has ceased to sound. By varying the length of the tube we vary the note produced, but the voice or sound must be modified accordingly. A difference of half-a-tone between two tuning forks is sufficient to cause one of these to set the flame singing, while the other is powerless to produce this effect.

Now, if we look at the various waves of the spectrum, consisting, as they do, of many varying waves of light, the waves of different colours being different—red, the largest, numbering 40,000 to the inch, the yellow, green, blue, indigo, and violet gradually decreasing until of the smallest, *i.e.*, the violet, there are 60,000 in a lineal inch—and then consider that the molecules of the chemical elements against which, by exposure, we bring them to act must be of various sizes and, probably, of various shapes, it will not seem surprising that some only of the waves of light should cause the molecules of some chemicals to vibrate, and that the molecules of other chemicals only vibrate to other waves; and, still further, it will not be surprising that the chemicals which we have been in the habit of using for the smaller waves should be insensitive to the large waves emanating from the other extreme of the spectrum. If by investigation we can find chemicals in the molecules of which repulsion can be quickly brought into action by the waves emanating from a greater portion of the spectrum, we shall probably gain rapidity, shorten exposure,

* Read at a meeting of the Liverpool Amateur Photographic Association, May 25, 1869.

and produce more truthful pictures. I consider the bromide of silver to be more sensitive than the iodide, in consequence of more of the rays of the spectrum acting on the former than on the latter.

Let us now consider whether theory gives us further reasons to hope that films may be made more sensitive and exposure abbreviated. For many years beautiful photographs, called "instantaneous," have been produced under favourable conditions of light; but no progress has been made of late in this direction, the cause of which I think is that scientific gentlemen who have the ability, means, and leisure, are not now applying themselves with that ardour to the subject which they did when photography possessed the charms of infancy. This is much to be regretted; for, when we look at some of the beautiful little instantaneous productions of Wilson and others, we feel a longing to produce large photographs possessing the same qualities, and experience regret that our present knowledge does not enable us to do so with facility. We cannot avoid experiencing the same feeling when we look at a rapidly-executed miniature portrait. Light travels at the rate of 198,000 miles in a second, and, as I have explained before, there are from 40,000 to 60,000 waves in every inch; and when we think of the rapidity with which objects are pictured on the brain, and compare it with the time of exposure required to take an ordinary photograph, it will be seen that the impact of fewer waves are required to cause the molecules of matter forming the brain and nerves to vibrate than are required to give a similar impulse to the molecules in the prepared film. Every wave, doubtless, is capable of doing a certain amount of work, and it follows that, if we can get chemicals in which the molecules have less mutual attraction, we shall be able to do with fewer waves, as less repulsive force will be required; and it is possible we may gain rapidity if we can find chemicals to act as sensitisers which possess greater power in overcoming the inherent attraction of the salts in the film than those hitherto employed for that purpose.

I can see no reason why photographs should not be taken in ordinary light with the rapidity of sight or thought, as these senses are due to the action of the same forces; and depend upon it that Dame Nature will bestow upon her scientific children the family receipt if they will but persevere in importuning her sufficiently.

I think I have now said sufficient to encourage the experimentalist; so, with a few practical remarks on exposure in the field, I will bring the subject for the present to a close.

No definite rule as regards time can be laid down for exposure. I advise every person to adopt some ideal standard of sensitiveness. Most persons who have worked with wet plates adopt the exposure required for them as the standard. If it be wished to try the relative rapidity of plates differently prepared, I think it is better done by using a carrier in a large camera, so that the plates can be placed side by side. If the camera be then pointed at a subject equally illuminated, you will be certain they will receive the same exposure, and can judge of the relative merits of the plates accordingly. It was in this way that I became convinced of the rapidity of the collodio-bromide plates, which, if developed within a week, require about three times the length of exposure I should give for wet plates; but, if I thought of keeping them a month or six weeks, I should expose for at least double the time, and so on for a longer period.

It is extremely difficult to judge of the exact amount of light reflected from a landscape—say, on two similar cloudless days at the same hour—so much depends upon the amount of invisible aqueous vapour in the atmosphere, which reflects the light into the shadows. I think the best plan is to notice the amount of illumination in the shadows of the picture on the ground glass, and judge of the exposure required accordingly. I find the eye is better able to form a correct judgment in this way than by looking at the landscape direct. If you wish to avoid having dark patches in your pictures, take care of the shadows and leave the lights to take care of themselves till you use the developer. Err on the side of over-exposure rather than on the opposite. You may, to a certain extent, correct the former by after treatment, but no skill will compensate for insufficient exposure.

O. R. Green.

PRINTING IN PIGMENTS.

At a time when it seems to be the fashion in some quarters to cripple photographic progress by trammelling it with patents,* most of which are undoubtedly worthless and invalid, it is refreshing to find one bright flower blooming in the great desert of obstructiveness.

Mr. Blair, who has done more than any one, except, perhaps, Poitevin, to elucidate the principles of printing in pigments, and who has always communicated his discoveries freely to the public, is about to issue [see advertisement in this Journal, 21st ult.], to subscribers only, a little treatise on some novel and, I am convinced, useful features of this department of photography. But as there is a likelihood of some portions of his plans oozing out before the publication of his book, and as these portions were indicated by him publicly in the course of last year, he gives me permission to state more fully the particular novelty which, possibly, may be, and, I have some reason to fear, is, the subject of a sealed patent by a photographer who seems to have borrowed his idea from Mr. Blair.

About twelve months ago I was made aware of the principle, but not the details, of the process to which I allude; but I was not at liberty to say publicly anything more than Mr. Blair had already published. Now that all restriction is removed, I will allow Mr. Blair to speak for himself, omitting some portions of his letter:—

"My book is now in the press, and, therefore, I have no reason to be secretive about it. I believe it will be found to contain fully more than has been promised, as I did not wish to excite hopes and then disappoint them. The pictures I sent you last year, and which you noticed favourably as being produced by a process *without transfer*, were effected by an application of turpentine or other volatile hydrocarbon to thin paper. After exposure the turpentine, which was used to render the paper temporarily translucent, was allowed to evaporate, and, after development, no trace of the volatile oil could be seen in the paper. This was the process which in the spring of last year I intended to communicate to Mr. Sutton, but which he was generous enough to bid me keep to myself and try to gain some advantage from it.

"Although this application of turpentine, &c., is the backbone of that method, the proper working of the process depends on a variety of small manipulative details which I am giving fully in my pamphlet. The system opens up the way to a number of important modifications in the management of different layers of colour, all of which I enter fully into. I have made no secret of this among my friends here.

"In addition to the above, I detail a variety of applications of my translucent or varnished paper, and also a method of obtaining pictures in white and black pigments from collodion *positives*. Ordinary tissue may be used or not in these processes.

"But what I consider the crowning thing of the whole (and this I have never referred to in any of the journals) is a new kind of tissue and a new process applicable to it, by which first-class pictures can be got from ordinary negatives by direct printing and without transfer. This has hitherto been thought impossible without violating the correct principle, which I discovered, of sunning on one side and washing away on the other; but I have already proved, experimentally, that this is not an impossibility; on the contrary, it is an easy process—at least for ordinary-sized pictures. In my book you will find full details."

Such is Mr. Blair's most interesting syllabus of matter. I would advise those of your readers who take an interest in pigment printing to subscribe at once for the book, as only a number limited by the names of subscribers will be printed. The work cannot be had through a bookseller except at an enhanced price, and then only when an order has been given previous to printing off the copies.

George Dawson, M.A., Ph.D.

* Mr. Dawson is apparently not aware that *fewer* patents in connection with photography have been applied for during the past twelve months than during the same length of time in recent years.—Eds.

REFLECTIONS.*

There seems to be a general impression among many operators that one who can get clean pictures (I mean chemical effects) is a good artist. This name is only rightly given to him who uses extraneous means to present Nature in her most pleasing and effective moods. Those who use brush and pencil can idealise their subject; but we, who practice photography, are obliged to take the crude subject and manipulate nature as a fact. Facts are stubborn things, and when we get hold of one with a crooked face, badly formed, and worse dressed, it is not to be wondered at if we don't please. In view of these facts and their frequency, it would be well to know how to handle them to produce the best results. Some try to overcome them by a profusion of accessories—mountains, steamboats, sailing vessels, balustrades, stands, and vases surrounding the unfortunate fact in idiotic confusion, looking like nothing else than the production of some bedlamite. This pleases hugely the uneducated—those who want reconstructing; that is, the "public who want educating," as some put it. Now the true method I conceive would be to educate the operator, make him to know the fixed laws and principles which make agreeable pictures certainties. To particularise: contrast

* This paper, by Mr. Hay, a Toronto photographer, was read at the last meeting of the Toronto Photographic Society.

between light and shade is agreeable to the eye, whether educated or uneducated; *per contra*, uniformity of light and shade displeasing. By an attentively-arranged contrast of light and shade a stereoscopic effect is imparted to pictures which characterise them as the work of an artist. Reversely, wanting this they are flat and unsatisfactory; and when the contrast is exaggerated, the lights very bright, the shadows very deep, the transition abrupt, and the line of demarcation almost visible, your picture is a distortion—a caricature. Attention to the light of the room in which one works will teach him, if observant; and without this attention the whole performance is purely mechanical. A single light cannot produce artistic productions. Proof:—If an object be placed so that the light from one direction falls perpendicularly upon it, the effect will be flat and disagreeable; if the light falls obliquely, even uglier, because the shadows are lengthened and distinctly marked from the lights. The stronger this single light it is the more unmanageable, and renders impossible the softness so necessary in a good photograph. There must, of course, be a dominant or principal light, for if two lights of equal illumination were used the effect would be cross lights, and the result worthless. So screens and reflectors are made to do the work of a second light; and, if used understandingly, produce all that is necessary for a pleasing picture. If more attention were paid to the arrangement of light we would have less complaint of bad pictures, for we would be on the way to eradicate them. It would take a volume to exhaust the subject, and one more competent than myself to write it; but I have ventured to hint in this brief paper where I think the principal deficiency lies, and to hope by drawing attention to it get it partly, if not thoroughly, understood.

He is on the road to excellence who is aware of his deficiencies, and tries to overcome them by persistent efforts; but how many do work and send it out who could do better, and perhaps would if they had not just at that time had others waiting, and present gain was too tempting to be resisted! I think it is Emerson who says—"A landscape with which we are perfectly familiar, if looked at from between our legs presents totally new features." Now I would impress the idea on your memory without insisting too literally on the formula. Who does not know scores of galleries where the head-rest and camera remain in the same place from year to year (or are at best moved but a few inches)—where everyone is *done* from the same standpoint, without regard to age, condition, or colour? And were it not for the marvellous individuality stamped on us by nature there would be some difficulty in distributing the right picture to the one who sat for it. Such productions are no credit—cannot make a reputation. If intended as specimens of the grotesque, made for amusement or gratuitous distribution, it might be pardonable; but to take money for some of these pictures seems but one degree removed from petty larceny. Let each and all pay their best attention to unravel the mysteries of the glass room, and photography may yet prove to be that for which the poet Burns sang:—

"Oh wad some power the giftie gie us,
To see oursels as ithers see us!"

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

While I settle down to commence these gossipping remarks I hear the boom of "Big Ben," of Westminster, who, in striking the midnight hour, reminds me that it is no longer May, but that June having entered summer has commenced; although why the almanac is thus systematically set at defiance in fixing the advent of summer baffles my comprehension. May has gone! Were it not that I still retain a sneaking regard for the old Latin proverb, *Nil nisi bonum, de mortuis*—which, when *very* freely translated, may read: "Don't say anything hard of May now that June has come in"—I should, undoubtedly, have a tale to tell concerning its rains, cold blasts, and general imitation of March.

About three weeks ago I spent an evening with a talented American amateur photographer, who, because I ventured to express a surmise as to the probability of the weather in the vicinity of Boston being similar to that in this country, was almost offended, and took occasion to lecture me upon the atmospheric differences between our own unfortunate United Kingdom and the United States of America. By all accounts, as well as that of my friend, it appears that whether the climate of America be or be not superior to that of Great Britain, its atmosphere is very much clearer and its sun very much brighter than ours. To this fact is probably due some slight discrepancy between the results of experiments, in respect of times of exposure, conducted in America and in this country. Many details in connection with the comparative clearness of the respective atmospheres of these countries were given to me, from which I conclude that, in brilliance of solar light and absence of atmospheric fog, the advantage is in favour of photographers on the other side of the Atlantic.

Concerning the doings of the societies during the past month not very much can be said. At the meeting of the London Photographic Society a paper on carbon printing, and a complaint on cracking of the collodion film formed the subjects of comment. The former, in the absence of the author (Mr. Johnson) and of the expected illustrations, seemed to fall somewhat flat, and evoked no discussion whatever; but when Mrs. Cameron made her plaint respecting the cracking of her negatives, the members came forward in a gallant manner to the rescue of their self-possessed sister. To compress the matter in a nutshell: damp air causes cracking of the film, therefore pack the negatives in paper, so as to prevent the action of the atmosphere. If this advice come too late, and the cracking has already commenced, rub some lampblack over the surface by means of a pad of cotton wool. Thus will the cracks be made to disappear.

What is becoming of the North London Photographic Association? Month after month passes away, and still it scarcely makes a sign. Who is responsible for this? It is said that there were only five members present at the last meeting. I trust this is incorrect.

The South London Photographic Society appears to have had rather a full meeting. It was, however, mainly devoted to an inspection of the works of its members and their friends, and was, in short, a sort of exhibition meeting. It appears, however, to have been a great success.

Printing on ivory were the principal subjects brought forward at the meeting of the Edinburgh Photographic Society on the 5th ult. For the sake of myself and brethren, I wish Mr. M'Craw had given closer formulæ for printing on ivory than he appears to have done.

The Amateur Photographic Association certainly goes in very heavily for silver jugs and other prizes. I observe that this body has just awarded twenty prizes to its members, of which no fewer than eleven belong to the order "goblet." When a boy, I once attended a school at which a prize was awarded to every boy and girl who attended it. A capital system that, I used to think.

Who is the cleverest man of the day? It is Mr. Mumler, the spirit photographer, of New York. Either his claims are true, or they are not true. If true, no other person, whether spiritualist or materialist, seems to be gifted in a similar degree. If not true, and he has perpetrated a hoax, the clever Americans who in cuteness are said to "lick creation," must henceforth confess to their having been "done." If Mr. Mumler is a sensible man, and knows how to take advantage of the tide which has so strongly set in on his behalf, he will make a fortune in less time than any of his brethren of the camera. I trust that it will not lead to the recal of the American Ambassador if I say that had the Mumler trial been conducted in London the photographic experts here would have left the matter in a much more decided condition than that in which it now reposes.

I note the complicated arrangement of lantern stand employed by Mr. Highley, figured on page 246 of your Journal, and advise him to try, instead, the ordinary camera stand. Such a tripod as that suitable for a 12 by 10 camera answers admirably for a pair of lanterns. They are very portable and quite rigid. I confess to having failed to see the advantage to be derived from his proposed method of placing the spirit lamp in the bottom of the lantern over the old-fashioned manner of placing it behind. It *may* be an advantage to be able to pour in the spirit "even when the lamp is burning," but all well-constructed lamps hold sufficient spirit to last for an exhibition without requiring to be replenished; and, even were replenishing necessary, the old form admits of its being effected without opening the door of the lantern, which, by the proposed "new" method, cannot be done.

I observe that some disputatious writing is going on respecting the temperature at which pyroxyline should be made. Like the knights who fought to decide whether a certain shield was gold or silver, but who viewed it from opposite sides, both parties *in re* pyroxyline may be right if all the conditions were accurately known. One condition of uniformity—the nature of the cotton employed—seems to have been ignored, and yet no person who has carefully examined the various kinds of cotton now imported will venture to say that they are similar.

I saw yesterday a neat method of washing pictures, which I daresay may be known to some of the older readers, who seem to know everything possible to be invented. Two pieces of flat board were hinged together at one side, and opposite to these hinges were two

pieces of wood projecting very similar to a pair of common hand-bellows. The upper of the two boards had several thicknesses of a very open spongy kind of felt, those next to the wood being made of hair, nailed to the inside so as to form a soft pad. There was a hole through the centre of this board through which entered the end of a piece of small India-rubber pipe connected with a vessel of water placed on a higher level. The prints to be washed having been placed on the bottom board of the two, the water was turned on and immediately oozed through the pores of the cover of the pad in the upper board. By operating with the upper board in the manner of a pair of bellows, the prints were washed free from hyposulphite of soda in a very brief period of time. The instrument described is neither costly nor difficult to make, the operation is very easy, and the result is highly satisfactory.

ADVANTAGES OF FUMING WITH AMMONIA IN PRINTING, AND HOW TO CONDUCT THE OPERATION.

As it appears that very erroneous notions are afloat respecting fuming with ammonia, and that many British photographers have been disappointed in the results they have obtained by this process, I deem it necessary to say a few words on the subject, as I have long been practically conversant with its advantages.

That there is no valid reason why any one should be disappointed in the results obtained by fuming albumenised paper, however it may have been previously sensitised, is fully proved by the process having been in operation for several years in the establishments of professional photographers in extensive practice. However, if any person conducts the process in an improper manner, and thus ensures failure, he has himself alone to thank for it.

It unfortunately happens, for the advancement of truth, that many persons form erroneous notions upon a subject that they really know nothing whatever about; and when induced to experiment upon it, they do so in a manner that is certain to produce bad results, and then bring forward their crude experiments as proofs that their opinions on the subject are backed by what they have the conceit to imagine are "undeniable facts," for thus they designate their monstrous fallacies.

We have heard much lately of fuming with an ammoniacal pad during the process of printing (in connection with the carbonate of silver paper), but this method of fuming is decidedly a very great mistake, and I must candidly acknowledge my inability to produce as good results, even with this paper, when using a fumed pad of bibulous paper, or any other material, as I can when I fume the paper itself before printing; and, in my hands, this paper has invariably printed quicker when fumed than it has when backed by a pad saturated with ammoniacal gas.

Now the printing upon a sensitised albumenised paper which is backed by an ammoniacal pad is, most assuredly, a very different thing from printing upon a sensitised albumenised paper that has been previously fumed; and it does not require much exercise of thought to become convinced that there is no warranty for assuming these different methods will produce the same results.

In one case, that of fuming, the sensitised albumenised paper is placed in a closed box, and every care taken to prevent the escape of the ammonia fumes. These fumes, in all their full power, have free access to both sides of the paper, but more especially to its sensitised surface; and thus, before the paper is placed in the pressure-frame, whatever may be the nature of the compound or compounds formed by the act of sensitising, it is changed by the fumes of the ammonia, and we print upon a paper which is sensitively surfaced with what I will here merely designate an ammoniated-chloride and an ammoniated-albumenate of silver (or upon an ammoniated-chlor-albumenate of that metal, as the case may be), and also upon an ammoniated-free-nitrate of silver.

In the other case we print upon a sensitised albumenised paper that is merely backed by a pad of blotting-paper saturated with ammoniacal gas, and therefore the power of the fumes of ammonia to act upon the paper is much diminished by their reaching it only at second hand, emanating, as they do, from the blotting-paper, which alone has received them in full force. And, moreover, these fumes, diminished as they thus are in power, are presented only to the back of the paper, and therefore have to penetrate it before they can take effect upon its sensitised surface.

It should be borne in mind that in printing upon two pieces of sensitised albumenised paper, one of which has been fumed and the other simply backed by a pad saturated with ammoniacal gas, the conditions are not the same, and it is a well-known axiom that altered conditions will not produce like results. In one case the fuming, in all its powers, has taken place before printing; in the other case the fuming, but with diminished power, takes place simultaneously with the printing.

In the former case we print upon a definite compound that has been previously formed; but in the latter we print upon an *in*definite compound. I say "indefinite," because the compound is only forming during the act of printing. So that, in one case, the extra sensitiveness which the ammonia produces has been fully effected before the printing is commenced, whilst, in the other case, this extra sensitiveness is only being gradually accomplished as the printing is going on—two totally different matters. Therefore, I think, we are justified in coming to the conclusion, even upon theoretical grounds alone, that using a pad saturated with ammoniacal gas instead of fuming is a decided mistake, and my own practical experience confirms this theoretical deduction.

It so happens that such pads are not new things to me, for, some years ago, I experimented extensively upon albumenised paper, salted with various chlorides, and sensitised upon baths of nitrate of silver, in conjunction with every procurable nitrate, not only singly, but in various combinations; and I fumed all these papers with ammonia. I also used pads saturated with ammoniacal gas and pads steeped in liquid ammonia; these last pads I prevented from wetting the sensitised paper by interposing an impervious material. Therefore I could fill page after page of this Journal with what I should myself consider to be interesting facts, not only respecting the effects produced by ammoniacal vapours upon these variously-chlorided and sensitised papers, but also respecting the effects produced by these different methods of applying ammonia, which facts might very possibly be found hereafter to be of importance.

In order to fume the paper properly and effectually, a box about eighteen inches deep should be well papered inside, so as to prevent the ammonia fumes from escaping at the joints. A strip of wood should be nailed round the inside, a few inches below the top, so as to form a ledge. A frame should be made to fit easily in the box, and rest upon the ledge. Upon this frame should be fastened a piece of netting with wide meshes, or thin twine may be stretched across it instead. The lid of the box should also be papered and have a rim, so as to shut down over the box. To prevent the possibility of the ammonia fumes escaping under the lid it is a good plan to nail a strip of list or felt inside the edge of the box, bringing it over and nailing it down on the outside; and also to nail a strip inside the lid, so that when the box is closed the strip may rest on that which is nailed over the edge of the box.

Strong liquid ammonia is to be poured into a saucer or dish and placed in the centre of the bottom of the box, the frame put on the ledge, and the sensitised paper which is required to be fumed placed upon the netting, with its albumenised side downwards, and the lid closed securely. Care should be taken that the paper, when submitted to the process of fuming, should be *perfectly dry*. Correctly timing the fuming is of much greater consequence than many persons seem to be aware of; in fact, the success of the operation is entirely dependent upon it, as failure is the inevitable result of both under and over-fuming, but more especially of the latter. Now, it unfortunately happens that we can only ascertain by experiment the time any particular paper will require to be perfectly fumed, as it appears to be dependent upon circumstances of which we have no knowledge. Some papers will be sufficiently fumed in a minute and a-half or two minutes, whilst others will require twenty minutes, or even more. It may, however, be accepted as a general rule, that a thick and highly-albumenised paper will require longer time to fume than one that is the reverse.

The ammonia should not be the common ammonia of the shops, but that having a specific gravity of about 0·880; the stronger it is the better, and, of course, the less time will the paper require to be submitted to its action. The maximum sensibility is better obtained by using strong ammonia and fuming a short time, than by using weak ammonia and fuming longer. The fumed paper should not be placed immediately in the pressure-frame, but should be allowed a few minutes to get rid of the ammonia fumes which cling to it. If the paper has been properly fumed the prints, when taken from the pressure-frame, will be of a fine rich purple colour; but when insufficiently fumed they will be of a reddish-brown colour. If the fuming have been too long a thin film sometimes appears on the surface of the paper; the prints will tone to a disagreeable grey colour, and they will have no brilliancy. There can be very little doubt, I think, that the non-observance of those particulars, and the conducting the fuming in an improper manner, is the reason why "so many British photographers have been disappointed with the results they have obtained by the fumigating process."

When the fuming of ordinary sensitised albumenised paper has been correctly timed and properly conducted, the paper will have received an extraordinary increase of sensitiveness, and therefore will print much quicker than that which has not been fumed. Prints upon fumed paper tone easier, and do not require so much gold as those upon unfumed paper. Moreover, a weaker sensitising bath may be used when fuming is resorted to than when it is not; and from long practical acquaintance with its beneficial effects, I strongly recommend this process to every one who uses a weak sensitising bath, or a mixed one, of the nitrates of silver and soda, or the nitrates of silver and potass.

With respect to the assertion made at the Photographic Society of France that fumed paper acted injuriously upon the varnish of the negatives, I think I may venture to say it can only do so when the fuming is improperly conducted. I have known a gross of prints to be taken right off from a negative, and several dozens more after the lapse of a few weeks, and yet no injury whatever to the negative has resulted from this continuous printing; in fact, I have never myself

met with a single instance of any injury to a negative that has resulted from the employment of fuming, nor can I hear of such a thing ever happening in the establishments of professional friends in extensive practice, who have used the process for several years. I think, therefore, we may safely consider the statement to be a fallacy.

I have always found that fuming imparted extra sensitiveness, no matter what may have been the previous salting and sensitising of the paper, and that it is a certain cure for at least one of the ills which some samples of albumenised paper seem to be heir to, viz., mealiness; but I have hitherto been unable to satisfy myself as to the manner in which the fumes of ammonia act in imparting extra sensitiveness to ordinary sensitised albumenised paper, and therefore must candidly confess my inability to throw any light upon the subject.

George Price.

Contemporary Press.

ON FRECKLES.*

[Ewing's Photographic Circular.

How best to photograph a freckly face was discussed for some time, and various opinions stated. It was concluded, however, that the best effect was produced by using plenty of light, casting no strong shadows, long exposures, and a collodion without much contrast. The small pinholes in the negative, representing the freckles on the face, to be stopped out after varnishing by using the point of a fine blacklead pencil, or touching them out with Indian ink and a fine brush. By taking care in the retouching a very fine face can be printed from what was originally a very spotty negative. If it is at all suitable for a profile, it is best to make a freckly face in that way. The harm they do is very much diminished. Above all, carry the development well on, and keep the sitter as far from the camera as possible. The larger the face the greater the difficulty.

In many galleries there is only top light, and the shadows under the chin and nose are very heavy. It was stated that if a wash of Indian ink were put on the wrong side of the negative, covering the shadow under the chin and nose, the bad effect would be very much diminished. If this is done the negative must be printed under tissue paper. Some of the photographers present who had tried this method stated it was extremely valuable.

All must have felt the difficulty there is in making a truthful portrait of a person with a fair face and light red hair and whiskers. The change in appearance that the photograph makes is sometimes something alarming. "My hair is not black!" "That is not the least like me!" are common exclamations.

The following means were suggested to overcome this difficulty:—With a very finely-ground powder of a straw colour dust gently the hair and whiskers, and give good long exposures. You will get the hair at least moderately fair by this means, and the face not too intensely white. Care must be exercised not to put the powder on too heavy, otherwise it shows. A good plan is to put it on lightly with a pounce ball, to be had at any druggist's, and then, with a camel's-hair duster, to work it gently smooth. It was stated that a pale yellow powder worked better than white.

When you have a sitter with deep-set eyes and strongly-marked features avoid the use of top light, place the sitter far back, so that the light comes well in front, and more side than top. Long exposure again will very much soften an otherwise rugged face. We hope our notes are not getting tiresome to our readers; we listened to the discussion with much pleasure and, we hope, profit.

To continue. Every one who has seen them must have much admired Salomon's pictures — their roundness, brilliancy, relief, and delicate modelling have charmed all hearts.

In order to produce such effects, great care in the lighting is necessary. Too much light tends to flatness. A rather small light coming from one general direction produces the best effect. It will be surprising to many accustomed to work a large light how much finer an effect can be produced in the same room by simply reducing the light; nor is the exposure so much lengthened as might be expected. Have every part of the room as dark as possible but where your sitter is to be placed, and so arrange the light by curtains that one dominant light only will reach the sitter. Generally what may be called a high side light will produce the best effect, to arrange which use the upper portion of the side and the lowest part of the top light. If the shadows are thought to be too deep, a white reflector is of great value; but it must not be used too strongly or it will produce cross lighting. Of course, with a very small light, slightly-prolonged exposure will be necessary, and plenty of exposure will always help to soften the result.

In talking of dipping collodionised plates into the bath, it was agreed that it is best to dip *last* the end where the overplus was poured off. A plate, to give an even film, should be evenly dry when dipped; but, generally, the portion farthest from the overflow corner is the driest. This mode of dipping will have two advantages then:—

1. The soft end of the plate, being last dipped, will have longer to dry, thus helping to make both ends even; and

2. The vapour of ether is heavier than air, and, consequently, falls down, so that when the plate is reversed to dip into the bath, the ether vapour, rising rapidly from the soft upper end, flows down the plate, tending to soften the lower end, and thus equalise the dryness of the film.

A dodge worth knowing:—When the collodion is rather thin and does not give a creamy film, flow twice. When you want an extra sensitive plate, flow twice. To do this properly allow the first flowing to be just as dry as would fit it for dipping in the bath, and flow again. This is said to be a decided improvement when very short exposures are necessarily given, as in taking babies, &c.

We will give one more note and stop:—

In developing two modes may be pursued, producing opposite effects:—*(a)* Moving the developer on the plate continuously; *(b)* moving it as little as possible. Very different results follow these different modes of developing.

a. When the developer is kept continuously moving on the plate the free nitrate of silver is mixed with the developer, and in passing and repassing the face and other highly-lighted portions, the greater part of the silver is attracted and drawn down; and, on the contrary *(b)*, when the developer is kept motionless, then the free nitrate of silver is precipitated nearly equally all over the plate. This knowledge may be very useful to the photographer.

When the face comes up quickly and the dress slowly, indicating either hardness or great intensity, keep the developer perfectly still, to equalise the precipitate, soften the face, and strengthen the drapery. On the other hand, when all flashes up at once, indicating over-exposure and too much softness, keep the developer well in motion, in order to strengthen the face at the expense of the drapery. Photographers are often at a loss with soft dark woollen draperies—they are too dead and black in the photograph. Keep the developer quite still to give them more strength and force, as Mr. Bruce aptly expressed it—give backbone to the negative.

* Condensed from a paper read by Mr. Hay, at a meeting of the Toronto Photographic Society, April 6, 1869.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 10th	South London (Ann. Meet.) ..	City of London College.

EDINBURGH PHOTOGRAPHIC SOCIETY.

A meeting of this Society took place in the Hall, 5, St. Andrew-square, on the evening of Wednesday, the 26th ult.,—Mr. J. G. Tunny, V.P., in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. A. Barry was balloted for and admitted a member.

A paper was then read by the Hon. Sec., Mr. W. H. Davies, *On a New Method of Preparing Any Kind of Paper for Photographic Printing*. [See page 265.] The paper was illustrated by a large number of examples on a great variety of papers.

The Chairman congratulated the meeting on the thoroughly practical character of the paper, which he described as one likely to be of great use to professional photographers, especially for enlargements, which could be afterwards finished as crayons. He stated that no fear need now be entertained as to the perfect success by which any kind of paper could be printed on, as the very large number of examples shown amply proved. He thought that the method, so far as he was aware, was quite new although old, as no one seemed to have thought of the combination of those two substances before, although each had been used separately. He would be glad to hear the opinions of members on the subject.

Mr. M'Craw wished to know the proper formula. He had hardly followed Mr. Davies in his paper, and would be obliged if he would repeat it.

Mr. Davies said that, practically, it was a mixture of French polish and size or gelatine, which he had been in the daily habit of using for sizing gilding for the last twenty years. The polish sold in the shops only required dilution with about one-half its bulk of methylated spirits of wine, and this was added to a weak solution of gelatine, to which was added the ordinary salting materials. The gelatine should not be more than from five to eight grains per ounce of water, and the solution, when mixed, should be very creamy, and have a good deal of shellac in it; but it was not confined to lac, as any other gum resin which could be dissolved in spirits acted in the same way, and he had used many of them.

Mr. Ross said that professional photographers would be under a deep debt of gratitude to Mr. Davies, were it only for showing the way to set at nought a late patent for a thing which the walls of his studio had shown examples of for, he supposed, a dozen years past; and he was sure no one could doubt the keeping of the rich, velvetty blacks of the prints on the surface of the paper. One thing only was wanted, and that was to be certain that it would work as cleanly and perfectly under development as it had been shown to do under direct printing.

Mr. Low, in remarking on the difference between solar prints and those exhibited, wished to know whether the process was sensitive enough to use with the solar camera; because if it was, with a fine, thin, small negative no enlarged negative would be necessary.

Mr. Davies (in reply to Mr. Low) said the process was sufficiently sensitive to use with the solar camera.

A few other gentlemen having expressed their opinions on the process,

The Chairman, in proposing a vote of thanks, suggested the propriety of trying a weak solution on canvas, as he felt certain it would answer on that material.

Mr. Davies, in reply, stated that he was much obliged by the flattering manner in which they had received the paper; but he was afraid that he must undo what he and it had done, as he had now to show them four prints taken on a special sample of paper without the slightest preparation, either of salt, size, or shellac. He was sorry he could not give particulars further than that the paper was made by one of the members of the Society, and could be had in any quantity and at a fabulously low price—say about fivepence a pound wholesale. The prints, as they would see, would bear comparison for depth of colour and keeping on the surface with any he had shown, or indeed with any print whatever. As it was possible the process by which the paper was made might be patented he could not give any information as to the mode of manufacture, but he might state that it could be obtained uniformly the same and of any size.

Mr. Nicol then proceeded to read a paper *On the Velocipede as an Adjunct to Landscape Photography*. This paper will appear next week.

A few observations on the subject were made by Mr. Slight (who, for photographic purposes, preferred three wheels), Mr. Davies (who preferred none), Mr. Muir, Mr. M'Glashon, Mr. Low, Mr. Pringle, and other gentlemen.

The meeting proceeded to examine some very fine enamels by Mr. A. L. Henderson, of London, which elicited great commendations from those present.

A number of coloured pictures by Mr. Warlich, of London, were also shown, many of which were much admired.

Thanks were voted to the gentlemen who had contributed to the success of the evening, and the meeting was shortly after adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held on Tuesday, the 25th ult., at the Free Public Library, William Brown-street,—the President, Mr. O. R. Green, in the chair.

After the minutes of the former meeting had been read and passed,

The Secretary read a letter from the Philadelphia Photographic Society offering to exchange specimens, which some members present expressed a willingness to do.

The photographic excursion to Gresford on the 12th ultimo was remarked upon by several members. The day was fine, the results were, on the whole, successful, and a number of prints taken from the negatives were shown—Messrs. Henderson, Wilson, Phipps, Forrest, and others being the principal exhibitors.

There were on the table, in addition, a number of leaf prints, by Mr. Murray.

A photoscope, an invention intended to exhibit microscopic objects magnified 1,200 times, was shown by Mr. Forrest, who thought it might be applied to photographic purposes.

The following question, taken from the box, was replied to by Mr. Forrest:—For a medium-sized negative is plate glass preferable to polished crown?

Mr. Forrest said that up to the size of 9 × 7 polished crown glass was the best; beyond that size the irregularities of surface made it objectionable, otherwise its natural and non-absorbent surface gave it the advantage. For large sizes patent plate glass was the best.

Mr. Green then read a paper *On Exposure* [see page 266], and alluded to his experience with collodio-bromide plates. A vote of thanks was given to Mr. Green on the motion of Mr. Wilson, seconded by Mr. Forrest.

Mr. Mawdsley exhibited the results of varied exposures of collodio-bromide plates—one plate having received one and a-half minute, a second five minutes, and a third twenty-one minutes. In each case the result was good, the proportion of developer being somewhat altered to suit the requirements of each.

Mr. Wilson called attention to the toning solution of the double salt of chloride of gold and potassium, recommended by MM. Barreswil and Davanne. He had had two years' experience with it, and for economy, range of tone, and simplicity it possessed peculiar advantages. The formula is as follows:—

Double chloride of gold and potassium	15 grains.
Water	40 ounces.
Chalk or whiting	60 to 75 grains.

It is ready the following day and keeps well. Each whole sheet toned will require half-a-grain of the gold salt, and this may be conveniently added by using two drachms of a stock solution of fifteen grains in seven and a-half ounces of water.

Mr. Henderson again called the attention of members to the value of gum as a preservative, as mentioned in his paper of the previous month. His remarks were confirmed generally by Mr. Phipps.

Two photographic excursions were resolved upon — one to Hartford on the 9th June, and one to the Valley of the Weaver on a date to be arranged. For the latter trip Mr. Higgin kindly promised the use of a steamer to convey the party to Northwich.

Mr. Henderson gave notice that he should at the next meeting, propose an excursion to Bettws-y-Coed in July.

The meeting was shortly afterwards adjourned.

BRISTOL PHOTOGRAPHIC SOCIETY.

This Society met at the Philosophic Institution on Thursday, the 27th ult.,—Mr. Ennel in the chair.

The minutes of the last meeting having been read by the Hon. Secretary and confirmed,

The Chairman announced the acceptance, by his Lordship the Bishop of the Diocese, of the presidency of the Society—"titular, not co-operative," as Dr. Ellicot expressed himself—which announcement was received with acclamation.

The following gentlemen were then duly elected members of the Society:—Mr. Gillo (of Bridgewater), Mr. Henry Husband, Mr. John Hill Morgan, Dr. Augustin Pritchard, and the Rev. Robert Whiting.

Mr. Dunmore, of Chepstow, exhibited, by the oxycalcium light, a great number of dissolving views, mostly photographic transparencies of local and general interest. Many were very fine, and duly appreciated.

Many ladies having graced the meeting with their presence, Mr. Dunmore, carried away by their frequent applause, caused the exhibition to be almost entirely an entertainment, and no time was left for observations in connection with lantern experiments.

Beside Mr. Dunmore's own slides, several others were lent for the occasion by the Secretary; also by Mr. Allis (an excellent amateur); and by Messrs. Husband and Clark, opticians, Bristol. The light, as well as the lantern—the latter W. W. Rouch & Co.'s make—worked throughout without a hitch.

The Chairman, in thanking Mr. Dunmore in the name of the Society for his exertions, alluded to the great sacrifice of time and labour requisite in the mere preparations for exhibitions of that kind, but particularly in Mr. Dunmore's case, who came from a distance.

The vote of thanks to Mr. Dunmore was heartily confirmed.

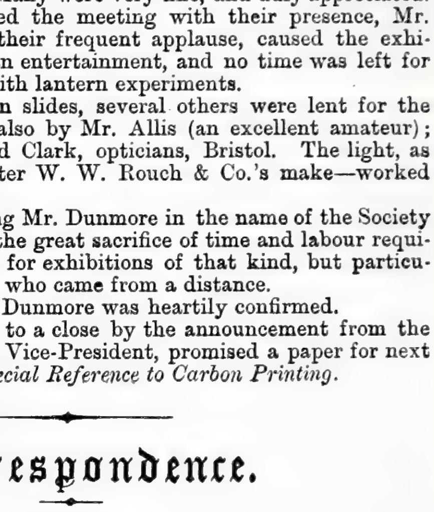
The meeting was brought to a close by the announcement from the chair that Mr. John Beattie, Vice-President, promised a paper for next month, *On Printing, with Special Reference to Carbon Printing*.

Correspondence.

Foreign.

Paris, May 29, 1869.

Although the *planchette photographique* of the late M. A. Chevallier has been several times written about in your pages, I think it may not be space misused if I refer to it again in connection with a report upon its merits, which was recently presented to the Academy of Sciences by MM. Regnault and Fizeau. I do this the more willingly as I have become possessed of a block, representing the instrument as now constructed by M. Duboscq, the philosophical instrument maker of this city. I think this figure will be new to many of your readers, and may enable former as well as the present accounts of the *planchette photographique* to be better understood.



This instrument is composed of a circular camera with a vertical axis, which can be made to revolve continually upon it when it is put in connection with a piece of clockwork, the rapidity of which is regulated as usual by a little winged governor. The whole is supported upon a strong tripod, and is capable of being made perfectly level and horizontal. A sensitised plate covers the base of the camera, and an opening in the upper part of the dark chamber, between the centre and circumference, receives the vertical optical photographic part of the instrument. This is provided with a repeating prism, so arranged that the image of the exterior objects shall be thrown upon the horizontal surface of the sensitised plate. When put in motion, the optical axis of the objective traverses the whole of the horizon, and all the objects are impressed upon the plate in a "deformed" convergent form, and, unless the field of the instru-

ment be reduced by a narrow slip placed in the vertical plane formed by the axis of rotation and the vertical axis of the optical combination, the images of these objects will be "mixed up" and confused. Thanks, however, to this arrangement, an anamorphosis of the entire panorama is obtained, in which the horizontal angles, or the vertical angles of heights, are exactly rendered by proportionate lengths, which are calculated *from* the circle representing on the prepared plate the horizon of the centre of the objective.

Many of your readers have, probably, seen extraordinary-looking lithographed scrawls upon sheets of paper, which they could make neither "head nor tail" of till they were shown them in a conical tube or some arrangement of the sort, which resolved these strange scrawls oftimes into heads and tails and many other equally reasonable objects. These are anamorphic drawings, of the same nature as the photographs obtained by the *planchette photographique,* and may, perhaps, serve to make the character and utility of these angular photographs more apparent. A series of these photographs, taken at different stations, give everything required to construct a perfect plan and survey of the ground or work. The sliding-frame shown in the engraving as coming out of the circular dark box, is a contrivance for introducing and removing the plate without exposure to light. There are many details of manipulation and directions for reducing the photographs to plan and to scale, the arrangement of apparatus for giving the angles of heights instead of the horizontal angles, &c., which need not be entered into here. The report of the French Academy of Sciences, after having described this instrument and its many advantages, concludes by proposing to honour it by an unanimous vote of high approbation, and this was agreed to without dissent.

A little pamphlet has just been published by M. Marion, entitled *Colours in Photography: Solution of the Problem,* by Louis Ducos du Hauron. I have alluded to this subject before; but this book of fifty to sixty pages compels me to refer to it again. The author begins by saying that the first problem proposed by the early photographers was to obtain a *positive* picture *direct* upon the prepared surface, and that subsequent researches have shown that modifications of this idea give better results, so that now, when we wish to obtain a positive, we never think of taking it *direct,* but through the intervention of a *negative.* The problem proposed by all those who have worked in the beautiful section of photography called heliochromography has been to produce coloured photographs direct from nature by one operation; or, in other words, the finding of a certain substance endowed with the property of becoming red when exposed to the red rays of light, blue in the blue rays, &c. M. du Hauron, struck with the difficulties of this question, asked himself whether it could not be resolved in a similar manner to that in which the first photographic problem had been, namely, by an indirect method. For example:—

"Instead of confiding to the sun the care of producing the colours, could we not simply charge it with the duty of distributing them? Instead of trying to find out a preparation which will absorb, so to speak, and preserve at each point of its surface the colours of the rays which strike it, could we not submit to the action of light a multiple and many-coloured preparation, or at any rate one containing all the possible shades of colour which are already known and can be met with in commerce? Could not this be spread uniformly over all the points of a photographic surface in such a way that, under each of the simple or compound rays which acted upon it, would be fixed the simple or compound colour of the pigment?"

This is the problem proposed in this little book, and I have already tried to explain to your readers how it is to be resolved. A negative is taken of the blues of a picture, of the reds, and the greens; these are combined, and the resulting positive should represent the original from which it is taken. Thus, having the three negatives, we obtain positives in this manner:—Take three sheets of mica, or some transparent pellicle, which are covered with films of bichromated gelatine; the first sheet is prepared with some red colouring matter, the second with a yellow, and the third with a blue substance, all of which must be insoluble in water. Each of these sheets is exposed under its corresponding negative, the non-exposed side being nearest the negative. They are then plunged in warm water, and the parts unacted upon by light are dissolved away, as is well known. Thus are three monochromatic positives obtained. If these are placed upon a white background, one being slid over the other so that every part shall correspond precisely, a picture is produced, as if by enchantment, in which the colours of the original are strikingly rendered. These three pellicles can be fastened together by means of a transparent medium, and preserved under glass. To make transparent pictures, it is simply necessary to fasten the three-coloured pictures together without a background, so that they may be viewed by transmitted light. To obtain the negatives it is best to use a *bromised* collodion,

The coloured glasses must not be too deep in shade or they will intercept a great deal of light. The green glass, for instance, should be of such a shade that the images of yellow, green, and blue objects under its influence should print equally well on the bromide of silver. The blue glass should be of a violet-blue—not too violet. The blue glass found in commerce answers well. The orange glass should be more red than yellow. M. du Hauron has generally obtained his negatives upon *paper* prepared with bromide of silver, and finds that the exposure in the camera under the yellow glass requires about two hours in the sun. To prepare the red bichromated gelatine for the positives, a solution of carmine in ammonia is made, and to this is added bichromate of potash and gelatine; the whole is rendered fluid by heat, and spread upon the sheet of mica or other thin transparent substance. For the yellow gelatine the pure solution of gelatine is spread on the mica, and when "set" is immersed in a cold and very weak solution of acetate of lead, or is simply floated upon it. This is drained and immersed in the bichromate solution, when a film of chromate of lead is formed upon the sheet. The blue is produced by mixing good cake Prussian blue with warm solution of gelatine, or it may be made by double decomposition, as in the case of the yellow colour. In mounting these three-coloured pictures it is best to put the yellow nearest the white paper, as it is the least transparent. The quantities of colouring matter introduced into the gelatine may be varied according to the intensity of the negatives and the requirements of the picture. There is so much more to be said upon this subject, which I hope will be taken up by your readers, and tried practically, and discussed in your columns, that I must leave it till next letter. I may say that the patent for this process was taken out in November, 1868, and all who practise it for profit must be licensed. R. J. FOWLER.

Home.

NEGATIVE VARNISH.

To the EDITORS.

GENTLEMEN,—Concerning the varnish I sent to you, and about which you expressed yourselves favourably in last number, I at one time asked—How is it that the varnish on carriages does not crack? The reply was that it was made of copal.

Now, if you mix an equal part of copal with the other ingredients which go to make negative varnish, you have the constituents of the sample which I sent to you.

To assist in melting the copal add to the alcohol a little oil of lavender or rosemary, or a small bit of camphor. The copal should be powdered, and the alcohol should be made slightly warm. Methylated spirit answers quite well.

By placing the bottle in the window, exposed to the sun's rays, the varnish will rapidly become clear and bright, when it may be decanted into another bottle through fine muslin. Should it at any time become cloudy from the addition of more alcohol, a short exposure in the sun will clarify it again.

To preserve my negatives I have envelopes made of brown paper of close texture and well pasted all round, in which I place them. With the varnish I have described and these envelopes I have never seen a negative crack in my establishment.—I am, yours, &c.,

Grahamstown, Falkirk, May 31, 1869. S. M'WATTERS.

IN RE PYROXYLINE.

To the EDITORS.

GENTLEMEN,—I think I do Mr. Dawson no injustice in assuming from his last that his arguments are exhausted, and I will, therefore, in final reply, only beg a very small space.

It is entertaining to remark with what refreshing coolness Mr. Dawson concludes that those who differ from him have arrived by anything but scientific observation at their results, whilst he himself has alone given learned and disinterested study to the matter. In my first letter I was careful to indicate that it was by prolonged personal investigation that I had arrived at my present convictions, and I have the satisfaction to know that the majority of skilled authorities agree with me in my conclusions.

It will probably not alter Mr. Dawson's opinions when I inform him that in my experiments I was careful to obtain samples of pyroxyline unquestionably made by Mr. Hardwich's formula, and I also made some myself subsequently, thus ensuring the correct article beyond question. I again repeat that collodion made with such cotton is not up to the standard of 1869. The observations of two independent careful persons of most judicial impartiality on the matter gave me the final assurance on the matter. I had no desire but to ascertain the truth, and if that pyroxyline were the best would gladly have employed it.

I apprehend no advantage of any kind can ensue from continuing this matter. Thanking you for affording me space,—I am, yours, &c.,

SAMUEL FRY.

To the EDITORS.

GENTLEMEN,—Please not to allow any of your correspondents to write down what the Rev. T. F. Hardwich taught us as to the manufacture of pyroxyline when the subject was far less known than at present, because there may be more ways than one of producing a good material. My theory is that by using a temperature of from 150° to 160°, equal parts by measure of nitric and sulphuric acids, and a given weight of wool, you may produce any sort of pyroxyline you require by only varying the amount of water added to the acids so as to make them weaker or stronger, and altering the length of time of submersion

a little. All this very likely can be done by using a lower temperature, especially with paper. Then the time of submersion would be longer, and a difference in the strength of the acids used, so as to produce the same result.

This does not make Hardwich wrong, and you must allow for the very many clever fellows that make what they call *modifications*, with but little difference. I believe Hardwich produced his length of fibre by altering the strength of the acids, and generally used the same temperature, viz., 150°.—I am, yours, &c.,

May 29, 1869. A RATHER HOT MANUFACTURER.

DRY PLATES *VERSUS* CUSTOM HOUSE OFFICERS.

To the EDITORS.

GENTLEMEN,—Am I likely to experience any difficulty arising from the Custom House officers requiring to examine the contents of boxes containing *dry plates?* I want to take a few dozens with me on a tour to France and Switzerland.—I am, yours, &c., CHARLES DRAKE.

Uppingham, June 2, 1869.

[Will any reader who has had experience in this direction kindly reply?—EDS.]

A PHOTOGRAPHIC VELOCIPEDE.

To the EDITORS.

GENTLEMEN,—Having seen in your Journal a letter from a gentleman at Harrow on the subject of velocipedes as applied to photographic uses, I beg leave to describe a small model of mine, which, though somewhat late in the evening, I exhibited at the April meeting of the Photographic Society.

I must preface my description of it by a few words as to the evil which it was designed to remove. When engaged in landscape work beyond the reach of cabs, porters, and other civilised auxiliaries, it is extremely laborious to bear a box of chemicals upon the shoulders, and keep it steady with the right, while the left hand finds enough to do in dangling a large camera. To carry these forward for a distance of half-a-mile, set them down carefully, and leave them to the tender mercies of lunatic oxen or inebriated swine, while you return to the original starting-point, shoulder the camera stand, dangle the tent, and after walking with them a total distance of one mile and a-half, set them down beside the camera and chemicals, is somewhat oppressive to human frailty on a hot day, and produces soliloquies which principally consist of unparliamentary epithets. Not infrequently is the photographic beast of burden constrained to sit down upon his box, being much too tired to unpack it or re-erect his camera and tent to take the view which has lured him onward. So he sits there mopping his forehead, deploring his fate, and muttering, like Falstaff, "Eight yards of uneven ground are three score and ten miles afoot with me." Again: when the days were bright, and yet no sitters were expected, how often have brother photographers ardently longed to purify themselves and disinfect their frowzy apparatus—not by Condy's fluid, but by the uncombined oxygen which flows as a river in the winding glades of Epping, or spreads itself as a lake in Richmond Park! How often have they been deterred by the anticipated expense of cab hire outside the radius, superadded to a more than possible failure in obtaining perfect or popular pictures to reimburse them for the expense incurred!

Now, as nothing militates so much against success as over-anxiety to obtain it, in order to cover the necessary outlay, it seems to me that whatever tends to lessen extra expense, and conduces to the photographer's peace of mind, must influence beneficially both the quantity and quality of his productions. Whether wisely or not, therefore, my velocipede was designed, in the first place, to reduce labour, and, in the second, expense. Constructed upon a proper scale, I believe it would enable us to take the load from our backs, and so tread it, its cares and its expenses, beneath our feet, that we could often take out our paraphernalia for 15 × 12 plates to a distance of twenty miles, remove the camera from the inside of the permanent tent to its stand, or back again to the tent, and return to our homes at night with little more personal fatigue than if, unencumbered by luggage, we had walked but half the distance afoot. When in the stable, doing nothing, it could not eat its head off, as they say horses do, since a flask of oil at most would be its yearly provender.

The model velocipede which I exhibited is that of an ordinary three-wheeler, but modified a good deal, so as to suit two theories of my own. No. 1 is that, with guiding wheel in front, no three-wheeler can turn a corner rapidly without some risk of turning over, because while the acquired impetus is straight forward, the line of support which is between the two driving wheels and the aforesaid guiding wheel will be suddenly diverted to an angle of 45 degrees; but, by reversing this usual plan, and driving the base of the triangle foremost, no such result could occur, because the impetus would be gradually diverted to right or left by the outer driving wheel, in obedience to the guiding wheel, which would then act as the helm of a ship. No. 2 is that the driving wheels could be much more easily urged up an incline or restrained in descending one, if the presiding genius were to bring the whole weight of his body to bear upon the pedals by standing erect and using "mark-time" action, rather than that of a scissors grinder, as hitherto adopted; for, erroneously or not, I believe that less fatigue would be endured by a walking position and action than by any other. So far as my experience goes, in using an ordinary velocipede the fatigue to the muscles of the knees and those situated in the small of the back is very considerable.

The tent, which is fastened by thumbscrews over the rear or guiding wheel of the tricyle, and can be readily removed, is the reproduction of an old cloth tent which I have had for many years, and closed by long curtains. It is made of light wood three-eighths of an inch thick, and will contain bath for plates 15 × 12, camera, and chemicals. It is painted black within and white outside, to resist solar heat. For the tent a travelling trunk or a lady may be substituted, when "on pleasure bent," and by removing either of them and one of the driving wheels to a place of safety, the vehicle will be secure from marauders.—I am, yours, &c., M. H. PHILLIPS.

1, *High-Row, Kensington, May* 27, 1869.

PINHOLES.

To the EDITORS.

GENTLEMEN,—If Mr. M. Carey Lea will reconsider the subject of pinholes in negatives, I think he will agree with me in upholding that the identical same causes (save one) which cause pinholes in the wet process operate still more powerfully in the dry.

The exceptional case to which I refer is the possibility of the formation of crystals of nitrate of silver on the film when a sensitive wet plate has been long kept.

Secondly: he will agree with me in the fact that crystals of iodo or bromo-nitrate of silver in or on the film are invariably formed while the collodionised plate is being sensitised, and never after it has been removed from the nitrate bath. If they are not produced at the time of sensitising, it is simply impossible to generate them afterwards by drying the film, or by any other method that I know. Concentration of nitrate of silver on the film by evaporation is powerless in forming them, and, for reasons which it would be superfluous to explain to Mr. Lea, acts in a totally opposite direction. Neither do crystals of iodo or bromo-nitrate of silver cause pinholes by sheltering the sensitive film from the light. They act differently, by becoming insensitive nuclei within the collodion film, and when they subsequently come in contact with water they are decomposed into iodide or bromide and nitrate of silver—still, however, preserving the skeleton of their original form, they are dissolved out by the fixing solution, and leave a pinhole or spot corresponding to their original shape and size.

Thirdly: I do not deny that pinholes in dry-plate negatives may occasionally be produced by the crystallisation of some kinds of preservatives on the film; but I am almost sure they are never caused by the crystallisation of tannin. No tannic acid that I have ever met with —good, bad, or indifferent—will crystallise when allowed to dry spontaneously on a clean glass plate; far less does it exhibit any such tendency when applied to a collodion film. The solution dries more like a varnish or colloid body than anything else, and if it crystallise at all (which I have never seen), it must be from the presence of some other salt different from tannin.

Many of the causes of spots in dry-plate negatives have been well ascertained; but the origin of others is still very obscure, and deserves very close investigation.—I am, yours, &c., GEORGE DAWSON.

King's College, June 1, 1869.

DESTRUCTION OF A STUDIO BY FIRE.—We regret to learn that, on Wednesday, the 26th ult., the photographic studio of Mr. Sylvester Parry, Preston, was entirely destroyed by fire, which broke out about ten minutes past ten o'clock. The interior of the building had lately been painted and refurnished for the ensuing summer season, and the studio was one of the largest in the town. So rapid was the progress of the flames that in less than half-an-hour the entire structure, which was built principally of wood, was burned to the ground. The alarm was given as soon as the fire was perceived, the fire bell was rung, and a number of firemen were quickly upon the spot. They succeeded in extinguishing the flames, but not before the building had been entirely consumed. The fire while it lasted could be seen from all parts of the town, and fears were at one time entertained for the safety of the adjoining property. Sparks and large pieces of burning material were carried by the wind, which was very high, over the houses and into the surrounding streets as far as Cannon-street. The heat was so great that it was afterwards found the brasswork of the lenses and the glass used for the negatives had been completely fused into one mass. The damage done is very considerable, being estimated at £390, and the building and its contents were insured for £250 in the General Fire Office. The apparatus, consisting of a valuable stock of lenses and cameras, together with upwards of 480 portrait and landscape negatives, have been completely destroyed. It is supposed that the fire originated from the young lady assistant going into the studio with a lamp, and that a spark dropped into one of the curtains. She left the studio at ten o'clock, locking the door, and in about ten minutes afterwards the interior was one sheet of flame.

EXCHANGE COLUMN.

A first-rate treble-bodied mahogany camera, twenty inches square, good as new, will be exchanged for a good 12 × 10 camera, a triplet, or a wide-angle lens. —Address, E. T. Gibbs, Stroud, Gloucestershire.

A tripod dark tent, nearly new, for plates up to 10 × 8, will be exchanged for a small portrait lens, a whole-plate view lens, or a lens suitable for copying.—Address, W. Slater, Sorter, Inland Office, General Post Office.

Six volumes of The British Journal of Photography and four volumes of *Photographic News*, all unbound, will be exchanged for a quarter-plate lens, microscope, or anything useful.—Address, H. Sutherland, Ashwood, Longton, Staffordshire.

A small steam engine (by Chadburn, of Liverpool), having a flywheel of 3¼ in. in diameter, with cylinder 1⅝in. in length, in good condition, will be exchanged for a portrait combination lens, unmounted.—Address, W. Jackson, Slight-street, Skipton.

I will exchange a bellows camera 4½ × 7½, two dark slides and sliding fronts, and a good fancy background in oils, or a 1-1 plate camera, for a good view lens by any well-known maker to cover plates up to 8 × 10 or 10 × 12.—Address, Zerpur, 2, Crescent-place, Plymouth.

A portrait lens, by Burr, five inches in diameter, takes capital pictures on plates 20 × 16, with Waterhouse diaphragms, will be exchanged for photographic apparatus, a sewing-machine, or a good gun.—Address, Chemist, 9, Prince of Wales's Road, Kentish Town, N.W.

A photographic rolling-press, by Bury Brothers, Manchester, for pictures 18 × 12, in good condition, cost £5 5s.; also a full-plate bellows camera and dark slide, will be given in exchange for a thoroughly good bicycle velopede. Any difference adjusted.—Address, Abel Lewis, Douglas, Isle of Man.

ANSWERS TO CORRESPONDENTS.

Photograph Registered During the Past Week.—
P. P. Skeolan, Harrogate.—*Rev. W. Slater.*

☞ *Correspondents should never write on both sides of the paper.*

W. M'C.—Received.

D. S.—We have placed your note in the hands of an importer of foreign goods and requested him to reply to you.

F. F. B.—Avoid toning your prints in such a strong light. To that alone must be attributed the faults discernible in the prints.

A Brighton Amateur.—The best lime-toning formula having been given in our Almanac, which you say you possess, we need not here repeat it, but rather refer you to it.

John Harvey.—Although a bladder will answer for carrying water in connection with your out-of-door operations, you will consult your own comfort and convenience by employing a receptacle made of vulcanised India-rubber.

J. C. (Northallerton).—From your letter we infer that the white spots on the print only appear after mounting. Please give us more details concerning their appearance, and there will then be little difficulty in tracing them to their source.

Philo-Photo.—The hydrometer or argentometer will be quite useless for determining the strength of your silver solution, containing, as it does, so large a proportion of nitrate of soda. You must test it by means of the volumetric apparatus, to which method we have repeatedly directed attention.

Benjamin Franklin Secundus.—1. It is a chemical and not an electrical action.—2. Reverse the lens.—3. A good coke fire will answer quite well.—4. The optical centre in your combination will be nearer the back than the front lens. In an ordinary portrait lens the optical centre will be nearer the front than the back.

M. J. Drummond (New York).—Thanks for the enclosure. Respecting your queries—So far as we can ascertain the lamp has not yet been manufactured for sale, but if we can obtain any information concerning it, we shall inform you next week. We are, however, able to answer your fourth question. The lamp is not in any way suited for aiding the production of photolithographs. For this purpose you would require either the electric or magnesium light.

J. W. (Manchester)—A benzole varnish for the one layer and an alcoholic one for the other will probably be the safest system. If the first coating of alcoholic varnish were *thoroughly* hard and dry, a second coating of the same varnish might be so applied as not to disturb the first; we allude to a shellac varnish. If you apply an intermediate coating of a weak solution of India-rubber in benzole, you may then apply the last coat of varnish without any fear.

Nil Desperandum.—From what we have seen of the performance of lenses of the doublet and rectilinear class, we consider them to be not only as good for copying engravings as those of the "triple" class, but somewhat *better.* In those lenses that we have had an opportunity of examining, the aberrations were very carefully corrected, and, as a consequence, the definition was good. Other things being equal, the fewer the component parts there are in a lens the better.

W. H. C.—Keep the four feet, both of roof and sides of the studio nearest the sitter's end, opaque. Let the windows come to within two feet of the floor, and have the windows, both in the roof and sides, as large as possible; because by means of movable blinds you can then obtain a variety of effects in lighting which, with small windows, could not be got. Mr. Forrest, of your town, will give you good practical advice respecting the size of the glass you should employ.

"Titania."—If from the following reply you find that we have misunderstood you, write again. "Depth of focus" and "depth of definition" may, in photography, be considered as synonyms, although, *optically speaking*, the former has no existence. A lens very imperfectly corrected for spherical aberration will give depth of focus without any sharpness; to secure great depth, combined with great sharpness, the lens must be properly corrected, and must be used with a very small stop.

"Pyro. & Citric."—The defect which you describe is owing to the silver bath not being in good condition. The majority of photographers are acquainted with it to a greater or less extent. We had a letter from a correspondent so recently as last week in which he described the manner by which he got rid of the evil. He added carbonate of soda, in solution, until the bath was opaline from the formation of carbonate of silver; he then placed it in the sun for three or four hours. After filtering it he added a few drops of glacial acetic acid, and he has been free from the annoyance ever since.

Tyro.—You have not correctly estimated the relative times of exposure required with each stop. With a *half*-inch stop you got a good negative in forty-five seconds, or three-quarters of a minute, and you had concluded that with a *quarter*-inch stop you should have got an equally good negative in a minute and a-half, or double the previous exposure, but you have failed to do so, the negative being much under-exposed. A stop of a quarter-of-an-inch necessitates an exposure *four* times longer than that required with one of half-an-inch; and to get an equally well-exposed negative you must expose the plate for three minutes.

G. W. Bell.—We would not assume the responsibility of advising you in such an important matter as the giving up of a quiet and apparently comfortable little business in the country, and coming to London to commence operations here. London has, it is true, an immensely large population; but there are quite as many photographers, in proportion to the population in it, as there are in other places, and a great many more in comparison with some towns. You assume a degree of ignorance on the part of London photographers which you are not quite justified in doing. You have met with a London photographer who is not thoroughly conversant with his vocation, and you assume that he is a representative man—a type of Londoners generally—instead of being, as he probably is, a denizen of the quarter known as the "Seven Dials," possessing probably only a modicum of the little photographic knowledge to be found in such places.

Gelatine and Copper in the Developer.—Mr. A. G. Meeze, writing on this subject says:—"The developer I am about to describe, and which has proved very successful in my hands, contains nothing new as regards the substances used in it, it is simply in the proportions and arrangements that there is anything novel. The formula is as follows:—

Protosulphate of iron	210 grains.
Sulphate of copper	40 ,,
Alcohol	2 drachms.
Glacial acetic acid	2 ,,
Water	5 ounces.

Prepare a second solution as follows:—Mix two drachms of sulphuric acid with two drachms of water, and, when cool, dissolve thirty grains of gelatine in it. Add four and a-half ounces of water, neutralise with ammonia, and dissolve in it one ounce of loaf sugar. To prepare the solutien for developing, mix in equal parts the two solutions, and shake well; let stand till the froth disappears (which will be about twelve hours), then filter, and the solution is ready for use. If sufficient intensity is not obtained by the first development, pour back into the cup, and add a few drops of silver, and re-apply. The keeping of these solutions I am not quite certain about yet, but I believe they will keep either mixed or unmixed."

In Type.—Mr. Dawson's second article on *Collodio-Bromide of Silver*; the conclusion of the trial in connection with Spiritual Photography in New York; report of the last meeting of the Photographic Society of Marseilles; Mr. W. H. Harrison's summary of Professor Tyndall's lecture on *Light*; *The Charges for Carte Portraits*, by S. S. Crewdson; and communications from other valued correspondents.

Saronytypes.—We understand that, in consequence of the great addition to the business of Mr. Sarony, in Scarborough, consequent upon the introduction of the crayon photographs, he has taken a partner, and the firm will in future be known as Sarony & Co. The gentleman referred to, Mr. G. R. Smith, has attained a high reputation in Scarborough from his having been the energetic general manager of the well-known Cliff Bridge Company. We believe that the new firm purposes devoting increased energy and enlarged resources in order to meet the greatly increased demands of their brethren in the profession.

METEOROLOGICAL REPORT,

For the Week ending June 2nd, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

May 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
27	29·73	60	51	53	56	NE	0·42	Dull
28	29·89	47	44	44	45	NE	0·62	Rain
29	30·10	61	42	43	47	NE	—	Dull
31	30·09	61	38	50	54	W	0·06	Dull
June								
1	30·28	67	40	50	57	SSW	—	Fine
2	30·25	—	50	57	62	W	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 475. Vol. XVI.—JUNE 11, 1869.

THE FRENCH POLISH PROCESS FOR PHOTOGRAPHIC PRINTING.

Emulsions of various kinds appear to be fashionable photographic agents in the present day. We have had chloride of silver as an emulsion with collodion for glass positives, and the changes have since been rung to a surprising extent on the original collodio-chloride process, if we are right in our belief that many of the ready-sensitised papers—leptographic, Obernetter, &c.—are but variations of the primary idea. Again: we have the emulsion of bromide of silver for the negative process, and this collodio-bromide method promises to engross much of the attention of dry-plate workers and experimentalists during the present season. And, finally, we have Mr. Davies's resin emulsion with gelatine for the preparation of any kind of paper for photographic printing.

At the last meeting of the Edinburgh Photographic Society, Mr. Davies laid on the table a number of positive prints which, we are assured, were excellent of their kind, and which attracted no ordinary share of attention on account of the interest connected with the process by which they were produced. In laying the prints before the Society, Mr. Davies read a paper, which will be found in our last number at page 265, and which will be read with much interest by all who were familiar with the beautiful results obtained by the well-known resin process of Mr. Cooper. We understand Mr. Davies's method has been jocularly called the "French polish process," because ordinary French polish can be used in the preparation of the resin emulsion with gelatine. As Mr. Tunny, the chairman of the meeting, remarked, there is no novelty in the use of either resin or gelatine alone in a printing process, but the combination of the two according to Mr. Davies's plan constitutes the element of novelty in his method.

Since the publication of Mr. Davies's process we have tried a few experiments with it, which have resulted satisfactorily and are referred to more particularly below. The author recommends lac varnish, or even common French polish, which is nothing more than a spirituous solution of varying proportions of shellac, mastic, and gum benzoin. The shellac and mastic are believed to give "body" to the varnish, while the benzoin materially aids in getting up the fine surface or polish.

As Mr. Davies seems to think that almost any resin will do, our experiments have been made with mastic for two reasons:—In the first place it is easy to get this resin in commerce of a good colour; and, secondly, because we are familiar with its employment in gelatine, as some of our readers may be aware that an emulsion of gelatine and mastic resin forms, when dry, an admirable cement for broken glass surfaces, or for attaching glass covers to vessels of the same material.

We began by dissolving one ounce of good, clear, picked mastic in six ounces of ordinary strong methylated spirits. The solution is not, of course, complete, as this resin always leaves a residue insoluble in spirit; but sufficient is dissolved for our purpose if we heat the above mixture very gently for an hour or so. After this time it is well to filter the solution, so as to remove any impurities. When the spirituous liquid is diluted with twice its volume of water it ought to afford a copious white precipitate of the resin of a pure white colour.

Our next solution is one of gelatine, and in preparing this it is well to take care that the gelatine employed is of good quality, some kinds producing a good jelly with a very small quantity of substance, while other samples do not yield solutions which "set" well even when strong. The strength recommended by Mr. Davies for the gelatine solution is from five to seven grains per ounce; but we have found the latter proportion the least amount which would give good results. Having prepared our gelatine of the proper strength and warmed it until quite fluid, we added gradually, and with agitation, the tincture of mastic solution, the proportion being one ounce of gelatine solution to six drachms of mastic. If the mixture be well agitated the resin is precipitated in a very fine state of division, and exhibits no tendency to collect in flocks. When the emulsion is properly made it closely resembles good rich milk, and, when made with mastic, the resin precipitate is perfectly white and very dense.

In applying this emulsion to paper, almost any thickness of film may be obtained, according as we use the mixture more or less warm or cold. The mode of coating we have found most convenient is to float the paper on the emulsion—after adding four and a-half grains of chloride of ammonium to each ounce—and then lay the sheet on its back and brush over with more of the mixture. In this way a good and even surface is easily obtained on drying. In sensitising the paper, brushing gives good results, as the silver solution rapidly "takes" to the surface, without trouble arising from "greasiness."

The paper so sensitised is readily acted upon by light, yielding good prints, somewhat wanting in brilliancy but yet very pleasing, and exhibiting much of the softness of prints on plain paper, with some of the delicacy of detail of an albumen print, the silver deposit being kept well on the surface of the paper. The prints tone well, and are easily managed, since they lose but little in the fixing bath.

Altogether, we believe that Mr. Davies has made an interesting addition to our list of available processes, and that the "French polish" method has the additional recommendation of being applicable to any kind of paper, however discoloured or rough it may be.

ON A METHOD OF PROTECTING NEGATIVES.

In the report of a recent meeting of the Photographic Society of France, we observe a proposal to preserve negatives by interposing a layer of coagulated albumen between the collodion and the varnish. Taking advantage of the well-known fact that nitrate of silver, in solution, coagulates albumen—as, for example, in the everyday process of printing on albumenised paper—it is now proposed to interpose between the varnish and the collodion a film of albumen, which shall be coagulated by precisely the same means.

It is well known to every experienced photographer that the varnish which protects a negative becomes, in course of time, so much discoloured as to interfere seriously with its printing. The advantage claimed for the albumenous layer is the possibility of removing the outer film of varnish, after it has got damaged or discoloured, without disturbing the collodion film in which the picture is imbedded.

It is now several years since we described how Mr. England acted with respect to negatives which had become discoloured from the

almost insensible absorbtion of nitrate of silver under protracted use. He placed them in a bath of good strong methylated alcohol, by which the discoloured varnish was removed, and the negatives left in all their pristine bloom and vigour. When revarnished they were quite as good as when first prepared.

Accidents, however, have occasionally happened to the delicate collodion film when in course of having its protective coating removed, and it is with the view of so increasing its strength as to render it indestructible, even by severe friction, that the strengthening agency of albumen is proposed to be used. A varnish composed of equal parts of albumen and water having been applied to the negative, which is washed but not yet dried, it is first allowed to become dry and is then immersed for about half-a-minute in a bath of nitrate of silver of about seventy grains to the ounce. By this immersion the albumen is rendered insoluble, and the combined films become very hard.

The method proposed is objectionable on account of the difficulty of eliminating the organic salt of silver formed in the albumen; and a cheaper and better, if not a simpler, method of effecting its insolubility is to be found in the means adopted by Dr. Ryley for preparing his dried collodio-albumen plates.

Before, however, deciding upon the relative merits of the two methods described, we have had some negatives prepared in both ways. One set was coagulated in the manner proposed at the meeting of the Photographic Society of France; that is to say, a solution composed of an ounce of water to the white of one egg was poured over the surface of a negative, and, when the plate was quite dry, it was immersed for half-a-minute in a seventy-grain solution of nitrate of silver. The negative was then washed and dried, and presented a fine glossy coating of the albumenous varnish which had interpenetrated the pores of the collodion.

The other pictures were coated with albumen of the same strength and in the same manner as already described, but before allowing them to become dry they were each immersed for a few seconds in a flat tin bath containing boiling water, or water which was boiling when poured into this receptacle. When removed from the water the plates, owing to the heat, dried speedily, and the albumen presented a smooth glossy surface, just the same as the other. But it will at once be seen that while the simplicity of this method, where hot water can be obtained, is quite equal to the other, the expensive seventy-grain silver bath is done away with, and no silver is left in the film, to be removed only by long washing, if, indeed, the washing in simple water would be sufficient to remove it.

No matter which method may be employed to render the albumen insoluble, it afterwards receives a coating of ordinary negative varnish, and is then in a much stronger position, and better adapted to resist the wear and tear consequent upon having a large number of prints produced from it, than a negative which has not been so protected; and, moreover, when it is necessary or desirable to remove the varnish from the negative, it can be effected without any damage to the collodio-albumen surface.

COLLODIO-BROMIDE OF SILVER: REMARKS THEREON.

No. II.

In my last paper I drew attention to the kind of pyroxyline which I considered the most suitable for a collodion which should be at once fit for the compounding of an efficient emulsion of bromide of silver. Unquestionably a suitable normal collodion, the philosophy of which is not clearly understood, is the backbone of the whole process. A sample which may answer well for wet work is often ill adapted for converting into collodio-bromide, and I dare say—indeed I have good reason to believe—the *vice-versâ* proposition holds equally true. There are, however, several indications presented by a plain collodion which give some assurance of its being well or ill adapted for Sayce and Bolton's process.

Suppose any one is about to prepare his sensitive mixture without knowing whether the pyroxyline is specially suited for this work, ignorant of the strength and proportions of the ethereo-alcoholic solvent, or, in short, knowing nothing definite respecting the character of the normal collodion, the following easily-applied tests will be a tolerably safe guide:—

Test No. 1.—Clean a glass plate and coat it in the usual fashion with the *plain bromised collodion.* The flowing properties, or the thickness of the film, should be about equal to those considered the best for the wet collodion process; if anything, rather *less* fluid, because the subsequent addition of bromide of silver adds considerably to its body.

Test No. 2.—While the film is setting observe whether, when looking on it at an acute angle by reflected light, it settles down perfectly smooth, like polished glass, or wrinkly, like the human skin under a magnifying glass. One or other of these appearances should be noted within a minute after the collodion is poured on to the plate, because, after the film has dried for two or three minutes, their evidence is of no value. Should the collodion set down smoothly, like glass, in all probability it is well adapted for collodio-bromide work; if otherwise, no reliance should be placed on it.

Test No. 3.—After the film has set for two minutes at the common temperature of about 60° Fahrenheit—longer or shorter time according as the temperature is lower or higher—push the point of your forefinger with pressure across the collodion on the glass, and observe whether the edges of the furrow are comparatively smooth or deeply jagged. If smooth, or but partially indented, like the edge of a small hand-saw, most likely the collodion is suitable; if otherwise, and the film tears up across the surface of the glass in deep lateral indentations, like the teeth of a circular steam-saw, avoid it for collodio-bromide of silver, unless you have plenty of time and patience for prosecuting a hopeless experiment.

The above three preliminary and almost decisive tests for a good collodion can all be performed within three minutes on a small glass plate. *No.* 1 can be estimated while the collodion is being poured on; *No.* 2 while it is in the first stage of setting; and *No.* 3 when it has further set. But, that these indications of fitness, or otherwise, may be most accurately noted, the experiment should be conducted in a strong light.

I wish the fact to be clearly understood that when, in these tests, I refer to *plain collodion*, I mean *a collodion which already contains the soluble bromide* immediately before its conversion into the sensitive silver emulsion; because, after the soluble salt is added, the physical structure of the collodion sometimes changes very considerably within a short time.

I have been, for some time past, engaged in a series of experiments on the effects and the comparative value of some of the bromides and mixtures of them for collodio-bromide. So far as I have gone I can see no noteworthy difference between them, if the collodion be not kept long after being bromised; but I have little doubt some of them will react, like the iodides, more powerfully than others on the collodion, and tend to hasten its decomposition. This is a matter of some importance when bromised collodion has to be preserved for a long time in stock.

Another matter of the utmost consequence, and one about which there exists considerable diversity of opinion, is to ascertain whether any or what atomic excess of nitrate of silver should be beaten up with the bromised collodion. The general experience seems to be that any excess of the sensitising salt must be avoided. My own practice tends to confirm this view. I may, indeed, safely affirm that the soluble bromide *must* be in excess; but it would be well to collate and compare a great deal more evidence than we yet possess on this point. An experiment relating to it which I lately performed is suggestive and full of interest.

Two fluid ounces of collodion were bromised with ten grains of bromide of cadmium and six of bromide of ammonium, sensitised with twenty grains of nitrate of silver, and filtered through cotton wool. After standing about an hour two plates were coated from it, washed for an hour, tanninised, and set aside to dry. Immediately after these were prepared, four more grains of nitrate of silver were shaken up with the collodio-bromide, and the emulsion again filtered. Two other films from this were then prepared precisely in the same way, and next day all the four were exposed on the same object, and developed similarly. The negatives on the first two plates were both excellent; the negatives on the next two could scarcely be developed at all. On the latter the alkaline developer seemed to have no power to penetrate beyond the surface of the film, the image was extremely feeble, foggy, and of a greenish tint, and the high lights were not denser than the half shades. When it was attempted to push the development with fresh carbonate of ammonia and pyrogallic acid, the image, instead of gaining in strength, got weaker and weaker, or rather, perhaps, *appeared* to do so, because considerable more fogging set in, despite the free use of restraining bromide; finally, the outlines of the image could scarcely be traced. I tried to intensify one of these plates with acid pyro. and silver after the development was fairly commenced with alkaline pyro.; but that plan also failed to produce a presentable negative.

On the day that these plates were exposed—that is, the day after the collodio-bromide of silver had been compounded with an excess of nitrate of silver—I attempted to restore it to its originally efficient state by shaking up with it three grains of bromide of cadmium dissolved in a little alcohol. The experiment was completely

successful; the emulsion again worked well, although barely so sensitive as at first.

It is worth mentioning that the films prepared from the emulsion containing a considerable excess of nitrate of silver were really more sensitive than the others, although they fogged and refused to intensify. This fact was evidenced by the appearance of details in the shadows of the one, which seemed not to have been impressed in the more perfect negatives from the collodion containing no excess of silver.

This was a series of remarkable and suggestive experiences which may go far to explain many of the failures which are continually recurring to some of those who practise the collodio-bromide process, even when the normal or plain collodion may be well adapted for the purpose in view. Before one can invariably be successful, it must first be ascertained what is the best atomic ratio which should subsist between the soluble bromide and the nitrate of silver. That seems to me to be one of the main points which must be definitely settled; but in doing so there are not inconsiderable difficulties to be met with. We must have the purest of chemicals, most accurate balances, weights, and measures, and the requisite skill in using them. When the best proportions have been found by accurate experiment, the difficulties are not yet over; for it will still be necessary to have a stock of trustworthy chemicals whereby to work our formula, and these are more easily sighed for than obtained.

How long will collodio-bromide of silver keep in good working condition? That is another question which has been answered very diversely. The general impression is that it should be used within two days after its preparation. It undoubtedly is in the fittest state for work within that period; but I have sometimes kept it over six weeks with scarcely sensible deterioration. If it will keep once so long, why should it not in every instance be equally permanent? The following bit of experience connected with this question is worth recording:—

In the month of October of last year I prepared ten ounces of collodio-bromide of silver with a slight atomic excess of nitrate of silver. The emulsion worked excellently at first, and did not lose much of its good quality for a month. The portion left (about half) was laid aside, and not disturbed again till a short time ago. A great part of the bromide of silver had subsided; but when I shook the bottle violently for some time, the particles in the emulsion seemed as fine as ever they had been. A plate was tried with it, but the image was thin, greenish grey, and veiled, altogether very similar in character to the two negatives mentioned above, which were got from fresh collodio-bromide of silver containing a considerable atomic excess of nitrate of silver. I added to my old stock a little alcohol containing three grains of bromide of cadmium, shook up well, filtered, and tried another plate. To my astonishment the good photographic properties of the emulsion were all but restored. It now worked clean and well, the negatives developing very readily with alkaline pyro. to their full intensity. If anything, the sensitiveness was not quite equal to the former standard. That was the only difference I could detect. Here it is evident, that in the first instance, the whole of the soluble bromide had not had time to be converted into the sensitive form, but was subsequently decomposed.

I shall have occasion to refer again to the *eccentricities* of collodio-bromide, in the hope that, if we all pull together, these eccentricities may, like others, be proved to form part of a harmonious system, the laws of which we do not yet comprehend.

George Dawson, M.A., Ph.D.

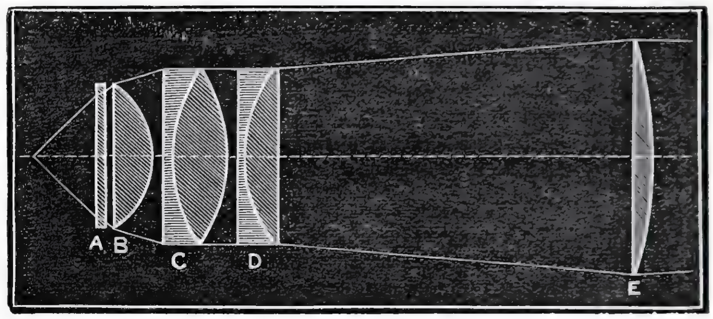
P.S.—The above was written nearly two months ago. Since then I think I have found out the keystone of invariable success, by tracing up the road of inquiry suggested by the experiments mentioned. My next paper on this subject will, therefore, be a practical one, and, I hope, will indicate a reliable mode of procedure.—G. D.

GRUBB'S NEW ACHROMATIC CONDENSER.

To improve the optical system known as the condenser is neither more or less than to improve both the quantity and quality of the light employed in transmitting an image of a small original on to an enlarged area. Herschell and others have given to the world computations of optical systems by which a very perfect transmission of light may be made; but, unfortunately, the angle of light included has been very small. One of the best means of readily distinguishing between a large and small angle of light included by a condenser is obtained through the agency of the magic lantern. Now let us suppose that, by the condensers of this instrument, an angle of 45° is included—and many otherwise excellent condensers that we have examined will transmit no more—and let us suppose, on the other hand, that another condensing system will transmit 90°: to make the former equal to the latter a light of four times the power will have to be employed.

We have now the pleasure of submitting to our readers an improved condenser, by Mr. Grubb, of Dublin, which is both achromatic and capable of transmitting a very large amount of light—90°. We have previously alluded to this condenser in a former number, and promised to give a description of it on the earliest possible occasion. This promise we are now in a position to fulfil, Mr. Grubb having kindly furnished us with the necessary drawings and description.

Although we have not seen the condenser nor the disc of light obtained by its means, there can be very little doubt, from a mere inspection of the drawing, that it will not only transmit a very large angle of light, but will do so in a very perfect manner. It is needless, in an article like the present, to give working instructions for making the condenser, as such would not be appreciated by the reader, who is more interested in the principle of action than in the mere mechanical construction. If the smallest lens of the group be assumed to be two and a-half inches in diameter, and the largest a size rather larger than the picture to be illuminated, a sufficient clue to the constituents of the combination will have been afforded, taken in connection with the following references to the diagram:—



A is a piece of plain plate glass, merely as a protection to the condensers; but Mr. Grubb also uses a piece of talc in front of this, which he finds very effective. B is a plano-convex lens, unachromatised. C is a combination of flint and crown, pretty nearly achromatised; and D is a combination very much over-corrected for colour and of a very slight negative power.

In the position shown in the diagram, the rays coming from C to D are nearly parallel. Passing through D they become slightly diagonal; then they are allowed to diverge until the pencil becomes of a sufficient size, when they are made either parallel or converging by the lens E. This is for lantern views. For microscopic views the condensers are moved slightly away from the light, and then the pencil of light is diminished in size down to a half-inch in diameter, if necessary.

Every person interested in achromatic condensers will thank Mr. Grubb for this addition to our resources.

ON THE BLISTERING OF ALBUMEN PRINTS.*

I have not seen an entirely satisfactory explanation of this phenomenon. It has been attributed to the fact that the fresh water, in which the prints are washed after fixing, tends to flow more rapidly in through the paper and albumen surfaces than the dense solution of hyposulphite of soda does to flow outward. It is said that this action, called osmose, causes a separation of the albumen film from the paper when the adhesion of the two is not sufficiently perfect, forming blisters by the accumulation of liquid between the two surfaces.

Now, it must have been observed by many that the blisters contain *air*, not water. They occur at times, and then again one has no trouble from them, although the prints may apparently receive the same treatment. When they form there is a separation of air from the water. This soon floats the prints to the surface, and, on stirring, bubbles will be seen to escape from among them. The air which thus separates was at first dissolved in the water. This supersaturation of water with air may be due to the water having been under pressure in contact with air, or to the fact of the water having stood for some time at a lower temperature than that of the room in which the prints are washed. The latter would happen most frequently in winter.

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Several unsuccessful experiments were made to produce water-blisters. Since osmose is most violent at a high temperature, some prints were taken from the fixing bath and immersed in water just before it had been brought to the boiling point. These were soon

* *Philadelphia Photographer*

covered with numerous small blisters containing air; while, upon others placed in a fresh portion of water after it had boiled for some time and had been removed from the source of heat, no blisters could be detected.

Water holds in solution one-sixtieth of its bulk of air at a temperature of 60° Fahrenheit. Cold water dissolves a small fraction in addition. This separates slowly when the temperature rises, as would happen if it stood in a warm room. A still larger portion—that is, the whole amount—separates on boiling, and prints thrown in when ebullition first commences would be subjected to the most favourable conditions for the formation of air-blisters. On the contrary, after water has been boiled it has parted with the air which was previously dissolved in it, and, as the temperature falls, it commences to dissolve air. At this time no air-blisters can form.

We may consider the diffusion of water and hyposulphite of soda solution as the predisposing cause of air-blisters, since they do not form when washing the prints before fixing. But this diffusion alone does not account for blisters, as the following experiment shows:—Some prints were taken from the fixing bath and washed slowly at first, to avoid the more violent action of osmose, and then the washing was continued with frequent changes of water for twelve hours. At this time there were no blisters upon them. The hypo. was, of course, reduced to an exceedingly small quantity, and could not influence the formation of blisters if the washing was continued; but, when these prints were put into water evolving air, blisters formed upon them with as much facility as upon prints just from the fixing bath. This fact proves the insufficiency of the theory heretofore proposed to account for the blistering of albumen prints.

But we need not conclude from this that some of the plans that have been proposed to prevent their development are of no value. It was the impression, after a number of experiments made by first immersing the prints in hot water free from air, that however safe this might be, if followed up by washing in water fit for the purpose, it increased the chances of destructive blistering above that with slowly-washed prints, when water containing an excess of air was used for removing the last traces of hypo. We may suppose that the albumen is loosened, as it were, by the previous treatment with hypo. followed by water, and that the air has a chance to operate, as will be explained.

If we watch the separation of air from water in a glass vessel, we will observe that the small bubbles which first form on its sides gradually increase in size, and this without uniting with other small bubbles. In fact, the dissolved air is transferred through the water by the force of diffusion, and does not actually separate in the gaseous form until it comes in contact with the surface of a bubble adhering to some object in contact with the water. We have the same action during the process of crystallisation. An element, or number of elements, which have a tendency to separate and form a solid, are transferred through the liquid until they come in contact with a growing crystal; then separation takes place and the solid is formed. There is a difficulty in starting the first crystal often strikingly manifested in certain solutions; but, a crystal once started, the deposit goes steadily forward.

Let us go a step further and suppose a bubble has started under the film of albumen. The same action could still go on through this film, the air in solution passing through it by osmose, where, if it were not in solution, it could not penetrate. A sharp bend in the paper often appears to start a blister, probably by introducing a particle of air under the albumen film. They are sometimes an inch across, and may contain a half fluid drachm of air. The print is then strangely drawn up and spoiled.

If we can by some means remove the excess of air which the water contains above the normal amount we can thus avoid the formation of blisters. There are two means of depriving water of air—by removing the atmospheric pressure and by boiling. A portion of water so treated might be added to water containing an excess of air in such proportion as to leave the mixture simply saturated, and thus the end we desire be attained without the necessity of subjecting the whole bulk of water to the same treatment. It takes several hours for the air to separate from a half pint of water drawn into a glass and left standing in a room. It would probably take much longer in case of a larger bulk, unless some objects presenting a large surface were immersed in it, upon which the bubbles might form and separate. It would be inconvenient, in many cases, to depend upon allowing the water to stand before use in a tank in a warm room for a sufficient length of time for this separation to occur. A plan which I have tried as an experiment may be of use where it can be conveniently applied. An inverted two-quart bottle was elevated to the upper part of the room. It had two tubes connected with it—the delivery tube opened at the upper part of the bottle, the other below. The latter was connected with the water pipes, and the flow into the bottle regulated by the cock at the pipes. The exit tube was made small, and was extended out the window—down, in all, twenty-seven feet. The effect of this arrangement, when the flow was properly regulated, was to partly remove the atmospheric pressure from the water in the bottle, and to cause the dissolved air to separate rapidly. This was made evident in the following way:—If the flow into the bottle was stopped for a few seconds to allow the bubbles to rise and the water to become clear, a fresh supply let in made the water in the bottle at once milky, with the separating bubbles of air, and the water cleared quickly as they rose and broke with a hissing sound at the surface. Although effective in removing air when delivering a small stream of water, it failed to be so when the supply was increased beyond a certain point. The delivery tube must be made less than one-quarter of an inch in interior diameter, so that the bubbles of air will be carried down the tube with the water, and not allow the water to flow past them, for this would soon destroy the proper action of the apparatus. For this reason it would be necessary to have two or more delivery tubes for a liberal supply. Increasing the size of the reservoir above would allow a given portion of water a longer time to part with its air. This would be advisable where circumstances require the perpendicular height of the delivery tube to be less than given above. In case one has sufficient pressure to admit of running a pipe up into the upper part of the building, and from this point there is a descent of forty or more feet to the washing tank, it is probable that no upper reservoir would be required. It will need a descent of considerably more than thirty-three feet to entirely remove the atmospheric pressure, for the greatly distended bubbles of separated air in the upper part of the tube occupy a good portion of its length. But there is no object in removing all the air, and we need not aim to do this. If the exit tube dips into the water in the washing tank, the separated air will be forced down and escape from it. This air cannot cause blisters. It is only the excess of dissolved air that is to be avoided. To ascertain if the apparatus is effective, or if a given sample of water is to be tested, the water can be drawn into a glass, and, should no bubbles form on its sides in the course of half-an-hour, it is evident that no blisters will result from its use—possibly longer, under certain conditions. At a time when blisters formed rapidly, it was noticed that the water, immediately on being drawn from the pipes, showed an effervescence, and a few minutes sufficed to line the interior surface of the vessel with bubbles, causing the glass to give out a dull sound when struck with the finger.

A quantity of prints which had been partly washed and had a few blisters upon them were dried, and the blisters carefully marked. They were again washed for twelve hours in water that would have ruined prints under other circumstances, but no blisters were formed, with the exception of the re-inflation of the old ones. This shows that the union between the paper and albumen had been re-established by drying. This theory is supported by the fact of the close adhesion of the albumen surface of a print to a glass or other surface when dried in contact with it. Advantage may be taken of this circumstance, since the final washings can be made with any water if this adhesion to the paper is secured. What effect this drying would have on the removal of the last traces of hyposulphite of soda afterwards—whether to shorten the whole time of washing, or to lessen the chance of removing all substances liable to cause fading in the print—is a subject for investigation.

The water used in these experiments was drawn from a tank located in a colder room. This was occasionally filled from the city pipes. A glass of water dipped from the tank and another drawn from the pipes as usual showed no difference in the amount of separated air adhering to the sides after standing in a warm room.

Water-blisters form under collodion films on glass. It was suspected that blisters forming on a certain preparation of gum dry plates, when wet with water after exposure, were due to air contained in the water. This was not the case; for they were produced by the application of water entirely freed from air, and, on puncture, only liquid escaped from them. They must have been caused by osmose due to the sugar added to the gum. The explanation of blistering heretofore given fully accounts for their formation.

John M. Blake.

Important Sale.—An important sale of high-class photographs, plain and coloured, together with a large number of very carefully-selected lenses and apparatus by the best makers, is announced by Messrs. Puttick and Simpson to take place on the 15th inst., at their rooms, Leicester-square, forming, we understand, an excellent selection from the stock of an eminent photographer now deceased.

SPIRIT OF THE AMERICAN JOURNALS.

Rembrandt Effects.—Mr. W. J. Baker, in the *Philadelphia Photographer*, describes the method by which he obtains the effects of lighting known as "Rembrandtesque:"—

"No part of the light is closed, but left as for an ordinary sitting. The subject is placed at about the usual point, under the light, and well supported by a firm back and head-rest—the 'Wilson rest' answers perfectly.

"But one reflector is used, placed close behind the sitter, on a line at right angles to the line of principal light. The camera faces the light, and must be shielded. For this purpose the slide of the plate-holder, aided by the focussing cloth, is effectual.

"The background should be dark. Mine is black velvet, and leaves clear glass on the negative.

"The vignetting may be done in the camera, or by a black cloth laid over the arm of a head-rest placed in front of the lens.

"The exposure is nearly twice the ordinary length. Developing as usual.

"The light effect can be varied on the following principles, to produce a more or less *severe* 'Rembrandt:'—The sitter being posed, the light becomes sharper and more brilliant, when the camera gives an exact profile (situation first). By now moving the subject nearer the camera, and retreating with that, the shadows are deepened and the lights strengthened. Again: move the sitter ahead, this time on a line at right angles to the last line of motion. The chances are that this situation would not answer, except for very regular features and light hair.

"To obtain a very soft, even illumination, go back to the first situation; now, instead of moving towards the camera, recede, and go out a little further under the light, then bring the camera round so as to include a little more than the exact profile.

"Of course, the effect at any point can be varied by turning the face more to the light, or away from it, and by moving the camera so as to take more or less of a front view, and by varying the position of the reflecting screen.

"The 'Rembrandt' style gives the operator greater power over the light than any other method to alter expression by the shading, to conceal or reveal salient features; and while at first sight it would be deemed only suitable for 'classic profile,' yet in practice there will be found very few physiognomies that cannot be made interesting in one or another of the many modifications of the effect.

"I shall be very much gratified if the present example and description of the method by which it was obtained shall incite other photographers to take hold of this style, and thus render it popular through the country. The right management will be found with a little practice, and from the rapidity with which my collection has increased, it cannot be doubted but that customers will willingly pay the extra charge demanded by the additional time and skill required to produce this class of work."

Keeping a Bath in Good Working Order.—Mr. Fennemore, in the second of a series of articles in the same journal, describes the method by which he keeps his baths in good condition. He says:—

"My negative solution is forty grains to the ounce in strength. I keep it up by adding every evening after work sufficient solution, sixty grains strong, to make up for the amount of solution drawn from the bath during the day. The bath is always kept covered, to keep out dust, &c., and a strip of clean filtering-paper drawn over the surface of the solution, in the morning before work, to remove any scum or other matter that may have formed on the surface of the solution during the night. In this manner your bath may be kept clean and of sufficient strength without the trouble of filtering every day. But if your bath is small, I recommend filtering every night after work. My bath holds three gallons of solution, and this I use three or four days, according to the number of plates dipped therein. It is then taken out and set in the sunlight, until the other is ready to come out; the first is then taken in, filtered, and strengthened, if necessary, and takes the place of the one taken out. This routine is followed until they show signs of having excess of alcohol. In that state, before putting it in the light, it is evaporated to one-half its bulk, in a porcelain dish, the quantity made up with distilled water, and then set in the sunlight as before. When it shows signs of pinholes, treat it as recommended in answer to question first. I never wait for a bath to show signs of exhaustion before taking it out, but feed it every day, and for three or four days' work give it as many days rest; therefore my bath seldom troubles me. In answer to question third, as to what developer I consider best, I answer emphatically, iron; and that, without any organic addition whatever, except acetic acid. I have tried almost everything that has been recomended in the shape of sugars, gelatine, albumen, candy, &c., and find them very useful for some purposes, such as copying, making transparencies, &c.; but for portrait negatives I think nothing equals plain iron and acetic acid.

"The strength of the developer should always be determined by the results you wish to get.

"My developer varies from fifteen grains to sixty grains strong, but my average developer is thirty grains; this is used for subjects in general. But there are many subjects that require different treatment. For instance, a person with fair complexion, light hair, eyebrows, &c., should have a weak developer, because that increases contrast, while, on the contrary, a fair complexion, with black eyes and hair, should have a strong developer, because that reduces contrast. Experience alone can determine the kind of developer suitable for each individual, and every photographer should aim to so regulate his developer that it will give him harmonious and, at the same time, the most brilliant results."

Blair's Carbon Process by Single Transfer.—Dr. Towler remarks on this process as follows:—

"For this process you require a negative laterally inverted, otherwise the prints will be, like so many tintypes, laterally inverted. In portraiture this does not make much difference, but in landscape photography it would be a great disadvantage if it could not be remedied. But the remedy is quite simple. Prepare a plate-holder which will allow you to turn the collodion plate from the lens, and not towards it. Focus, expose, and develope as usual. A negative so prepared will be what you require for this simple carbon process. But, as I just remarked, one of your ordinary portrait negatives will do for the experiment. The carbon tissue can be had of the stock-dealer. You want, besides, an ounce of bichromate of potassa. This is all that you need in this beautiful process—that is, all that you need in addition to what you already possess.

"Sensitising Solution.

Bichromate of potassa	1 drachm.
Rain water	3 ounces.

"Dissolve and filter *always* before use. This solution can be used repeatedly, but it is necessary to keep all dust out of it. Cut out a piece of the carbon tissue of the size of the picture to be printed, and immerse it in the sensitising solution. This operation must be performed in the dark room. Take care that the tissue is kept wholly in the solution. In about five minutes take the tissue out, let it drain, and then hang it up to dry. When it is dry you may place it between the leaves of a book until it is wanted.

"The tissue, thus sensitised, is placed on the negative in the usual way, and exposed to light; but, however long it is exposed, no picture is visible, and on this account it is necessary to make a few experiments with your negatives before you can know approximately what amount of exposure will be necessary. I expose the tissue under my negatives to a bright sunlight (May) just one minute, and find this length of exposure quite sufficient. Of course if the light is diffused a much longer time will be required.

"The next step to be performed is to cause the exposed tissue to adhere, face downwards—that is, the exposed surface—to a *piece of albumenised paper*. This is Blair's novelty in the carbon process, and a happy one. You may take your ordinary albumen paper for experimenting with, but it is much better to albumenise plain (unsalted) paper yourself, until the stock-dealers prepare it for this special purpose; and when they do prepare it let the albumen be undiluted. Mr. Blair recommends you to brush over the albumen surface with methylated alcohol, and as soon as the surface is dry to immerse the paper in cold, clean water. The intention of the alcohol is partially to coagulate the albumen. Now this part of the operation is unnecessary. I proceed as follows:—Take a piece of the albumen paper slightly larger than the negative, turn up the four corners as you do when you are about to sensitise paper on the silver bath, only in this case the corners must be turned in the opposite direction, that is, towards the albumen film; now lay this paper, plain side downwards, upon the surface of a dish of clean water. It is very possible that the paper will cockle, and thus refuse to lie upon the surface; therefore, breathe upon it and press down the corners gently until it lies smoothly and uniformly upon the water. Take care not to get any water upon the albumen surface. Leave the paper to soak, or until the albumen surface begins to glisten, and is soft and moist.

"The next step is this:—Take a piece of clean glass, as large as the albumen paper, and, inserting it in the water, bring it up just beneath the paper, and lift the paper completely out of the dish by means of the glass. Let the excess of water drain off. Perform this operation in the dark room. Now take the exposed tissue, dip the tissue into clean water, as also the albumen paper on the glass for a moment, and then lay the tissue, exposed surface downwards, on the moistened albumen, and, placing the combination of glass, albumen paper and tissue, between several folds of blotting-paper, rub and press them together until the tissue is uniformly adherent to the albumen paper. The blotting-paper containing the above combination is next placed between two smooth pieces of board as large as the negative, and screwed firmly together by means of two hand screws or bench-clamps, or it is submitted to a heavy pressure.

"In this condition it is left for several hours, or until all the moisture is absorbed by the blotting-paper, and the two paper surfaces are dry and of a yellow colour.

"At this stage Mr. Blair recommends us to expose the albumen paper to light for a short time. This, I presume, would be of benefit when the paper is sized with gelatine, but I do not think it can avail anything with paper sized with starch. In fine, I omit this part of the operation, and proceed at once to the development.

"The development of a carbon print is very interesting. You cannot help being charmed with it, but it requires much patience, that is, you cannot hurry the operation; be patient, therefore, and, rely upon it, success will crown your efforts. Throw the dry tissue adhering to the albumen paper into a pan or pot of boiling water; this will coagulate the albumen and render it insoluble. After remaining about five minutes in boiling water, the tissue is taken out and left in a dish of hot water. Soon you will observe some of the black or coloured pigment of the tissue escaping from between the two papers; let this go on awhile, and then you may try to raise the corner of the tissue paper, but do not force it away, but let the water get between and dissolve more of the soluble tissue. Finally, the tissue paper leaves the film, and the picture appears, but not sufficiently clear, for patches of gelatine still adhere. You may now take a fine shaving-brush and rub off these patches gently in the water; but I prefer letting warm water dissolve them off slowly. This may appear to you a tedious operation, but you can leave a quantity of prints in this way in a tin vessel on the stove and attend to other business in the meanwhile; the prints will take no harm, although you may leave them in the water after the picture is developed. Finally the prints are taken from the developing water and washed in two or three changes of clean, cold water; they are then taken out, dried, and mounted in the usual way.

"This carbon process is a charming operation; it is also easy and reliable. If it were only for the sake of experiment, I urge you to try it. I think, too, the process will be profitable; it is new altogether in all our provincial towns, and is sure to take. The first pioneers will make the richest harvest. Stock-dealers have on hand unsalted albumen paper."

Developer for Coffee Plates.—At the last meeting of the Photographic Section of the American Institute a member stated that he had satisfactorily developed negatives by the coffee process (which had been exposed for fifteen seconds) by the following solution:—

"Water	15	ounces.
Gelatine	15	grains.
Protosulphate of iron	1	ounce.
Double sulphate of iron and ammonia	1	,,
Glacial acetic acid	4	drachms.
Tartaric acid	15	grains.

"Thirty-two drachms acetic acid, No. 8, will do instead of the glacial acetic.

"Mr. Chapman stated that these coffee plates were as good as some he had prepared by the collodio-bromide of silver process, and required but half the time.

"In regard to this process, Mr. Chapman said that he had placed in a window a bottle of the collodio-bromide of silver solution, where it had remained the whole of one day, one-half the time being exposed to full sunshine, and that upon its removal to the dark room, and flowing upon the plate, no difference in its working could be detected; it was as sensitive and good as other samples which had always been kept in the dark. He thought this was an argument in favour of Mr. M. Carey Lea's theory of physical or mechanical action, in which view Professor Tillman joined him."

SPIRIT PHOTOGRAPHS.

CONCLUSION OF THE MUMLER TRIAL.

On the third and last day of this protracted trial, Mr. Mumler read the following statement, which we extract from the *New York Tribune*:—

"In 1861, in the City of Boston, while engaged in business as an engraver, I was in the habit of visiting a young man who was employed in a photographic gallery kept by a Mrs. Stewart, on Washington-street. Occasionally I would experiment with the instrument and chemicals. One Sunday, while entirely alone in this gallery, I attempted to get a picture of myself, and then it was that I first discovered, while developing it, that a second form appeared on the plate. At this time I had never heard of spirit pictures, although I had been somewhat interested in the doctrine of spiritualism. At first I laboured under what is now the general impression—that the plate upon which the picture was taken could not have been clean, and that the form which showed itself beside my own must have been left on the glass; and I so stated to my employers and others. Subsequent attempts, however, made under circumstances which preclude such a possibility have confirmed me in the belief that the power by which these forms are produced is beyond human control, and the experts that have been called by the people have failed to produce a picture made in that manner. I wish to state that, at the time I developed the shadow or form above alluded to, I was a complete novice in the art of photography, and had no experience whatever in the composition of chemicals used in the business, and that my use of them in my experiments at that time was simply in conformity with what I had seen my friend do, while himself engaged in his business. After getting the form of the plate, at the suggestion of several friends to whom I showed the plate, I made other attempts, and generally with most remarkable results. I then determined to leave my own business and devote myself to photography. Before long the subject of spirit photography, and particularly my success, became the theme of every tongue, and I was overrun with people of inquiring minds, and obliged to go over and over again, for their pleasure, the routine of taking and developing the pictures. For a long time I never refused any person who came to investigate. It soon became apparent, however, that I must either stop it or cease to support myself; for, as a general thing, these *savants*, while greedy themselves for intellectual food, seemed entirely oblivious to the fact that I myself was a material body (laughter). However, I can truly say that I have never refused, intentionally, any person who desired to have a picture taken from making every examination or inquiry they chose to make; and, had I been allowed in this examination to have produced evidence from abroad, I could have shown, by scientific men, whose names would have satisfied every one, that the most careful and minute examinations have often been made into all the details of my business while I have been engaged in taking pictures. I solemnly assert here that I have now but comparatively little knowledge of photography, or chemicals, or science of any kind, further than is absolutely needed to take ordinary photographic pictures. I positively assert that in taking the pictures on which these forms appear, I have never used any trick or device, or availed myself of any deception or fraud in producing them; that these forms have appeared in each and every instance when they have been presented without any effort, except my will power to produce them.

"As to my refusal to entertain propositions from the self-appointed committee of photographers who appeared in my room since my arrest, and who desired, as I am informed by Mr. Guay, to make me take pictures for them, whether I would or not, I have only to say that since my arrest I have placed myself entirely in the hands of my counsel, and have been guided by his advice, and I am pleased to say that one of the first cautions he gave me was to refrain, during the examination, from being led into any trap of that kind. Having been charged with a crime which, temporarily at least, placed me before the public in the same category with gamblers and men of that ilk, I have been deprived of the privilege of having my utensils seized at the time of my arrest." [Here Judge Dowling said: I was applied to to have your tools seized, but refused to have it done, because I disapproved of such proceedings.] Mr. M. continued:—"If I had been engaged in such nefarious proceedings as I am charged with, the implements themselves would have been the strongest evidence against me. They were not touched. They have stood ever since in the position they have always occupied in my gallery; and, for the safety of others who may hereafter be called to occupy my place in a court of justice, I sincerely hope that such proceedings may cease."

Mr. Townsend, on behalf of the defendant, first addressed the court. After an able introduction, Mr. Townsend first directed his Honour's attention to what appeared to be the legal aspect of the case. He then entered into the evidence given by the respective witnesses for the defence. Mr. Mumler has obtained spirit pictures in strange places, on other instruments, and with strange chemicals. The pictures thus obtained have been recognised by the sitters, in many instances, as deceased friends and relatives. Mr. Guay has been present many times when they were recognised. Judge Edmonds recognised one. Here the learned counsel gave a synopsis of the testimony, making commentaries as he proceeded. He continued:—"Five hundred persons could have given similar testimony to those who had been called for the defence. Mr. Mumler has been here but a few months, and it is wonderful that so many respectable people would come without demand. He obtained pictures of persons dead, who had no pictures taken during life. He took these pictures sometimes without even touching the camera. He took his pictures through a yellow light, with no gas. There is no evidence that Mumler pretended to do what he knew to be false, and consequently the whole element of the crime is wanting. Mumler may be wrong in saying he can give a spirit picture, but that does not constitute a crime, unless he knew he could not give one. Upon the prosecutor's own showing this case must be dismissed. It will not change a believer, or prevent one from believing. Spiritualists will stand by him at all hazards to the utmost extremity. The case, in a court of justice, should be looked upon simply as one of law. But suppose those defences should fail, we come to our affirmative defence, namely—1. That spirit pictures can be taken. It has been proved that pictures of the dead have been taken. 2. That such pictures have been taken, where there was no picture of the deceased in existence. These two things have been distinctively, positively sworn to by unimpeached witnesses, and, in a judicial proceeding such as this, that testimony must control, unless it has been overborne by countervailing evidence. Now let us look at this countervailing evidence. It is proved that shadowy, ghost-like pictures can be produced by other photographers. Everybody acquainted with photography knows that to be so. It has never been denied by us; Mumler's circular says that. But still the question remains—and it is the real question in the case—Can such shadowy pictures as produced by others be pictures of the dead? But even against the testimony for the prosecution, which was theory, we have direct practical evidence. Mr. Hull, their principal witness, selected, among others, Nos. 5, 7, and 10 (Mr. Gilmore), for the defence, as having been made by a reflection from a negative plate. Mr. Gilmore

says that he was warned of this particular way of taking them by Gurney, and watched closely, and there was but one plate when it went into the slide, or when it was developed. And Hull says it could not be developed by yellow light, which was, however, done." Mr. Townsend then remarked, "that if all spiritualists were insane there must be a great deal of insanity in America, for statistics showed that in the United States there were 11,000,000 of spiritualists to 10,000,000 of other denominations." After pursuing his argument in a theological light, Mr. Townsend concluded his most able and eloquent peroration.

Mr. Geary then rose, and, after expressing his admiration of his adversaries' argument, said—"This is no private prosecution. One of the gentlemen connected with a public journal of this city examined into these so-called spirit photographs, satisfied that a large swindle was being perpetrated. He called to it the attention of the chief magistrate of this city, who at once directed his chief marshal to make a personal investigation. Hence, any assertion that private malice instigated these charges is as baseless as it is untrue." He then elaborately reviewed the whole of the evidence for the defence. After criticising the testimony of other witnesses, Mr. Geary continued:—"Now what does all this prove? Why, that the trick was so cleverly done that not even photographers could discover how it was done. That very many persons of ordinary intellect, competent to conduct the everyday business of life, went to the prisoner, paid their money, received these spirit photographs, and (Polonius-like), fancied they recognised likenesses of their departed friends, and therefore believed the prisoner's statement. There is no proof of any spiritual agency—only evidence that certain persons believe it exists. Man is naturally superstitious, and in all ages of the world impostors and cheats have taken advantage of credulity to impose on their fellows less sharp than themselves." Mr. Geary then accounted for the testimony of Judge Edmonds and Paul Bremond on the theory of hallucinations, which affected Lord Byron, Cowper, and Göethe. He then showed the application of the principle in the present case. He asserted that probable cause had been shown to warrant the commitment asked for.

At the close of the address the Judge said:—After careful attention to the case, he had come to the conclusion that the prisoner should be discharged. He would state that, however he might believe that trick and deception had been practised by the prisoner, yet, as he sat there in his capacity of magistrate, he was compelled to decide that he should not be justified in sending the defence to the Grand Jury, as, in his opinion, the prosecution had failed to prove the case.

THE LIGHT OF THE STARS.

On Tuesday, April 27, Professor Robert Grant, F.R.S., Superintendent of Glasgow Observatory, lectured at the Royal Institution upon the light from the fixed stars. He said that the questions of the distances of the fixed stars, and of the amount of light reaching us from each star, are more intimately connected than is apparent at first sight. In early astronomical times it was not possible to discover the distances of the stars by parallax, so an attempt was ingeniously made to discover how far they are off by reasonings founded upon photometric measurements of the comparative amounts of light which they emit.

In a total eclipse the moon takes a long time to cover the sun, but if the sun were removed from us to the distance of the planet Neptune, the apparent diameter of the sun would be so reduced that the moon would eclipse it in ten minutes. Therefore, as the suns which we call fixed stars are eclipsed instantaneously by the moon, it follows that they are at enormous distances from the earth. As astronomers could not at one time measure this distance by parallax, they tried to find it out by comparing the intensity of the light of the stars with the light of the sun. This, however, was a difficult task, because when the stars were visible the sun was below the horizon, and when the sun was near the zenith the stars could not be seen.

This difficulty was surmounted by using the planets as intermediate bodies, and Saturn offering special facilities was chosen for the purpose. The distance of Saturn being known, as well as the extent to which the sun's light was enfeebled by reflection from the planet, it was possible to compare the intensity of the light from the planet with the intensity of the light from the sun and with the light from the stars. Mitchell and other astronomers tried this method, and found that the sun must be removed to 220,000 times its actual distance to give us the same amount of light we receive from a bright star.

In these experiments it was necessary to assume that the stars were of the same magnitude and splendour as our sun. Now that the distance of some of the fixed stars is known by the unobjectionable method of parallax, it has been proved that the photometric measurements placed some of the stars nearer to us than their real distance. It follows, therefore, that those stars are either larger in size or more brilliant than our sun, and this is the way in which photometric measurements give some clue to the relative sizes of the stars, and show that some of them are larger and some smaller than our sun. In the present state of experimental astronomical science it is impossible to learn the diameters of any of the stars by actual measurement, their distance is so enormous.

The following is the result of the measurements of the intensity of the light of some of the principal stars:—

Comparative Brightness of Stars.

Star.	Light.
Sirius	416
Canopus	204
Alpha Centauri	100
Arcturus	72
Rigel	66
Capella	51
Alpha Lyræ	51
Procyon	51
Alpha Orionis	49
Aldebaran	44
Antares	39
Alpha Aquilæ	35
Spica Virginis	31
Fomalhaut	26

The excessive distances of the nearest of the fixed stars are very difficult to measure, and with more distant stars the difficulties of measurement are vastly increased. The only clue to the distance of faint stars depends upon the space-penetrating power of telescopes. It is assumed that the faintest stars are those which are most distant, and this is a very reasonable supposition, because if stars are pretty evenly distributed in space, the fainter stars should greatly outnumber the bright ones, and this is the case in reality.

Rosse's small reflector will bring into view stars 100 times less bright than the smallest visible to the naked eye. His forty-feet reflector penetrates into space 192 times further than the distance of the smallest star visible to the eye, so that the furthest stars revealed by his telescope are so far away that the light from them takes about 8,064 years to reach the earth, travelling at the rate of nearly 190,000 miles per second. Yet through this telescope, beyond these distant stars, many a faint haze is revealed, which might be resolved into other galaxies of stars, could more powerful instruments be brought to bear.

In a previous lecture Professor Grant called attention to the peculiar light which benefits the inhabitants of the worlds which revolve round coloured double stars. For instance: the inhabitants of a world which travels round a green and a red sun must have red or green day, according to which sun chances to be above the horizon. Two or three months ago Mr. James Buckingham, F.R.A.S., was kind enough to let me have two evenings with his great refracting telescope, which powerfully separated many of the double stars and resolved some of the coloured star clusters into magnificent individual gems, the whole of them flashing more brilliantly than the finest jewels. Mr. Buckingham, by curiously-constructed steam machinery, and long years of labour, in which he was assisted by Mr. Wray, the optician, has overcome the enormous difficulties in the way of grinding great telescopic object-glasses. The object-glass of the telescope just mentioned is 21¼ inches in diameter, and perfect up to the edge, with a fine "black polish" over its whole surface. I believe it to be the largest object-glass in the world in practical daily use. Although many opticians have tried to make larger glasses, I think that none approaching this in size have proved successful.

William H. Harrison.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 16th	Edinburgh	Hall, 5, St. Andrew-square.

LONDON PHOTOGRAPHIC SOCIETY.

The last meeting for the session was held on Tuesday last, the 8th instant,—James Glaisher, Esq., F.R.S., President, occupying the chair.

Messrs. William Ackland and Frederick Wolff were elected members.

Mr. Spiller, Hon. Sec., read a communication *On Parchmentising Photographs*, and exhibited several specimens of parchmentised paper, together with some photographs prepared twelve years ago by Mr. Crookes. The advantage claimed, when the subject was first mooted at the time referred to, was the probability of greater permanence being obtained from closing the pores of the surface of the paper, and the specimens by Mr. Crookes were adduced to show that this result was really obtained. The method of parchmentising paper was to immerse unsized paper for a very brief period of time in a mixture of two parts of sulphuric acid and one part of water, and instantly to transfer it to an abundance of water. When a photograph was subjected to this operation, any hyposulphite of soda which might have been left in the paper was removed, its retention being a chemical impossibility and its destruction indisputable. Mr. Spiller also called attention to the fact that India-rubber solution was not a good paste for mounting pictures, as it decomposed and allowed the picture to peel from the mount.

No remarks having been offered on this communication, the Chairman thanked Mr. Spiller for his paper.

Mr. J. R. JOHNSON then proceeded to give the promised demonstrations of the working of his new method of carbon printing. It will be recollected that a paper by that gentleman was read at the last meeting of the Society, but, owing to his absence, through indisposition, the practical illustrations could not be proceeded with. He was now in attendance, and conducted the demonstrations in a most successful manner. They differed in no essential feature from the *séance* before the members of the Amateur Field Club, which we minutely described in our issue of April 2nd. A slight difference in the strength of the sensitising solution was all that we noted. Mr. Johnson now prefers a three-per-cent. solution of bichromate of potash, and floats only for one minute. This he finds to be quite sufficient. The experiments were exceedingly satisfactory, being conducted without a hitch, and elicited the hearty applause of the members.

The CHAIRMAN congratulated Mr. Johnson on having so successfully worked out such a beautiful process of printing. The prints developed before them were not only beautiful but also permanent, and were produced by a simple and certain operation. He (the Chairman) conveyed to Mr. Johnson the thanks of the meeting.

Mr. Spiller then read a paper descriptive of the gum-gallic process of Mr. R. Manners Gordon, which, he said, had been drawn up by Mr. Gordon and himself conjointly. The description is essentially similar to that published in our ALMANAC, but, as there may be slight modifications in some matters of detail, we shall publish the paper next week.

Mr. GORDON supplemented the observations in the paper by stating that the process was not a very rapid one, the exposure required being about double that necessary for wet collodion. On the question of the most suitable kind of substratum to employ, he had not yet made up his mind which to recommend. India-rubber in chloroform he found objectionable, as it gave rise to minute white spots after the lapse of some time. Uncoagulated albumen was also objectionable if too thick, and if too thin it caused blisters.

Mr. F. G. ELIOT suggested that he should try a film composed of thin solution of gelatine, rendered insoluble by being immersed in alum. If it were simply a question of adhesion it would answer the purpose, although, from the complex nature of the film, it might not, possibly, be very desirable to use it.

The CHAIRMAN having thanked the authors of the paper, intimated that the Council had determined upon opening the winter session with an exhibition similar to those of the two previous years. It would be opened on November 9th, and remain open for a week.

The following gentlemen exhibited various articles:—Mr. F. G. Eliot exhibited a portrait of the late Dr. Wright, from a negative by Dr. Diamond; Mr. Duncan C. Dallas showed a number of prints from line subjects, printed from surface blocks executed by photographic agency; Mr. Thomas Davies presented a number of prints from collodio-albumen negatives; Mr. A. L. Henderson exhibited a large collection of ceramic photographs executed by himself; and Mr. F. Good submitted a new series of Egyptian views taken by himself.

The meeting was adjourned to Tuesday, Nov. 9.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Wednesday, the 2nd instant,—Mr. Simpson presiding. There was a small attendance of members, and no special business was brought forward.

Mr. Griggs exhibited a number of interesting specimens of photolithography, the work of MM. Tessie du Mothay, Drivot, Marie, &c.

Mr. Taylor exhibited specimens of zirconia and hard magnesia prepared for the oxyhydrogen light, and explained their relative merits when compared with the lime light. [See leader in last number.]

Mr. Calloway (a visitor) exhibited some prints obtained upon talc by collodio-chloride containing a quantity of kaolin. The effect was very good.

Some pictures, by Messrs. Robinson and Cherrill, containing fine cloud effects, were also exhibited.

After the transaction of some private business the meeting separated.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A GENERAL meeting of this Society was held on Friday, the 7th ult.,—M. Balard in the chair.

A number of choice proofs which figured in the late exhibition at the Palace of Industry were presented to the Society, after which

M. FROMENT presented three positive proofs which, he stated, had been obtained by a new process more simple, more expeditious, and less costly than the ordinary process. He (M. Froment) said that he operated without silver bath, development, or strengthening after insolation, but gave no indication of the manner in which the proofs were produced.

The meeting decided that M. Froment should be requested to furnish details and explanations.

The meeting came to a similar decision with reference to a presentation from M. Marcony, who had sent a communication to the Society, with proofs, which he represented as having been obtained by a new process, based upon the employment, in variable proportions, of the carbonate of lime and nitrate of copper.

Mr. Sarony presented a number of specimens of his new description of portrait, and which he had patented under the designation of "photo-crayons." This process is already familiar to our readers. The Society having listened attentively to the accompanying explanations, thanked Mr. Sarony for his communication.

M. Blanc, Jun., had addressed to the Society the following note (which was read to the meeting), on the printing in of skies in stereoscopic proofs:—

"In a note which I addressed to the Society in December last, I described the method which I employ for printing clouds upon ordinary positive proofs; but if it be desired to print them on stereoscopic proofs it is necessary to proceed as follows:—Upon the proof, the sky of which is to be printed, I place, horizontally, a flat rule. I fix the lower edge so that it will coincide with corresponding points in each of the two images. With regard to the upper edge, it is a little below the upper margin of the proof, and according to this edge I trace a right line and withdraw my rule.

"Afterwards taking a compass I measure very exactly the distance between the points farthest apart in each image, if the view has been taken with a single objective, and by the method of displacement, or the points nearest to each other, if the view has been taken with a binocular apparatus. This distance I mark upon my right line, each point of the compass corresponding with an image, and I prick two holes. Then, displacing the co npass without changing the opening, I prick two new holes at a few centimetres from the first, and always upon the same line. These holes are my points or guide marks.

"In order to facilitate the marking I cut a sort of V mark upon the upper edge of the proof, the point of which V corresponds exactly with the hole pierced by the compass, then I fold the proof in two, and so that each of the images is placed externally.

"The proof is then ready for printing the clouds. On the border of the negative I place a band of white paper, by which it is sufficiently supported, and put it into the press.

"The printing side of the proof is placed in such a manner upon the negative that the upper part—that which bears the marks V—goes a little beyond or over the white paper; it is then easy to trace these latter upon it by means of a pencil.

"The first part of the proof being printed, I turn it in order to print the second, taking care that the signs V correspond with the trace of those in the first image.

"It is more particularly for the benefit of amateurs that I have given this account of my process, which takes much longer to describe than to execute. They will find in it the advantage of being able thereby to dispense with the painting of skies in *clichés*, while it is not at all necessary that the part cut out should approach very near the objects which are drawn there, such as the tinted glory, which the printing of the clouds would necessarily cause to disappear.

"I wish to anticipate one objection which, perhaps, may be made, namely, that it would be much more simple to take a double view of clouds rather than be subjected to all the precautions I have described. To that I would reply that it is rarely a double view of clouds can be had with a separation suitable for the proofs to which we would apply them, should they be made with the same instrument."

The Society thanked M. Blanc for his communication.

M. Clément Sans had addressed the following letter to the Society on the means of preserving negatives required for much printing:—

"Photographers, landscape painters, adherents of the wet collodion know that all negatives, in spite of a good varnish to protect them, become damaged in the long run. Supposing, besides, that the durability of this varnish were such that accidents of this kind were not to be feared, it is nevertheless likely to become tarnished, and the stereoscopic negatives—destined in most cases to undergo a considerable amount of printing—when once so affected, only yield proofs which are covered with small white points. In order to restore to these negatives their original freshness, it is necessary to take off the varnish, and wash and varnish them afresh; but then the layer of collodion is not sufficiently resistant. In these different operations it becomes detached from the glass, and we thus lose sometimes most valuable negatives which it is impossible to replace.

"For many years I have used a preparation with my negatives which has preserved their original qualities, and I have some now which date back ten years, from which many hundreds of copies have been printed, and these proofs have always been identically clean. I have not seen in any photographic work a similar process; mine, therefore, may perhaps be considered useful.

"My manner of operating is as follows:—When the negative is finished and well washed (no trace of hyposulphite of soda being allowed to remain), it is covered with the following solution, well beaten, allowed to settle and filtered:—

Water	30 cubic centimetres.
Whites of eggs	30 ,, ,,

Leave it to dry naturally. It is necessary to observe these proportions of albumen, for, if the whites of the eggs should be in too great quantity, the layer of collodion after desiccation will be apt to scale, particularly if the negative has been worked in the development. The albumen being well dried, plunge the negative into a silver bath of fifteen per cent. The silver bath for positive paper will serve for this purpose. Leave it in the bath from thirty to forty seconds; this time suffices to coagulate the albumen. It is then washed and passed to the concentrated hyposulphite of soda; again well washed, left to dry, and varnished at a gentle heat in weak benzoin—

Rectified alcohol	100 cubic centimetres.
Benzoin	5 grammes.

When this layer of varnish is worn out it is removed by a bath of alcohol at forty degrees; then the negative is washed, if that be necessary, and varnished afresh. Thus it will regain all its original beauty."

At the end of the foregoing communication a member observed that a perfectly similar manner of operating, and depending also on the employment of coagulated albumen through the nitrate of silver, was found in Taupenôt's primitive process; but this priority took nothing from the interest of M. Clément Sans' communication.

The Society thanked M. Clément Sans; after which

M. Davanne communicated the following letter addressed to him by Mr. Wm. Blair:—

"I read in the photographic journals an account of the communication which you made at the last meeting of the French Society of Photography, in which you claim in favour of M. Marion the priority of the employment of albumenised paper for the transfer of carbon proofs. I beg to inform you that I adopted, or rather I discovered, this process, which I have practised and published since the year 1864. On this subject you can consult the article inserted by me in the *Photographic Notes*, edited at Jersey by Mr. Sutton, in the month of August, 1864. I would also remark that I have practised and published my method of transfer by coagulated albumen since the year 1867, which you can likewise see published in an article in the *Photographic Notes*, dated 15th June, 1867. You will easily judge by these dates that neither M. Marion nor M. Jeanrenaud can claim the priority of this invention. Both have simply followed the means which I had pointed out many years ago without having had any knowledge of what had already been done in England."

When this letter had been read, M. DAVANNE observed that the dates produced by Mr. Blair certainly established a priority in his favour.

A letter was then read from Mr. Edwards, of London, who had forwarded to the Society a packet containing some specimens obtained by the aid of his method of printing with coloured powders, matters necessary for this process, and specimens of transferred negatives; also, a detailed description of his way of operating. After giving this description, which has already appeared in our columns, Mr. Edwards added:—

"This process (which in substance is that of M. Fargier) presents no novelty except in one point of view. I speak of the preparation and employment of the matter for transfer. This support is prepared simply by making a sheet of paper or any other product float (as is the case in sensitising albumenised paper) on the surface of a solution of gelatine, to which is added a certain quantity of alum. Once dry, the gelatine support is ready to be employed in the manner described. The substances to which this mode of transfer is applicable are paper, cloth of all kinds, glass, wood, brass and other metals, &c."

At the end of this communication,

M. AIMÉ GIRARD remarked that, by a singular coincidence, M. Despaquis had presented, in March and April last, a process of transfer on gelatine prepared with alum.

The coloured papers and gelatine sent by Mr. Edwards were distributed amongst the members, who promised to make trial of them and report the results of their experiments.

M. PUECH called the attention of the members to the employment of a cast-iron roller in photographic studios as being of great advantage in the transfer of carbon proofs, from the facility it gave in pasting positive proofs with precision, getting rid of air-bubbles, &c.

M. FRANCK DE VILLECHOLES communicated an accident of which he had recently been the victim in the preparation of his *clichés*. After varnishing, when taking away the image with which the plate was covered, he observed the collodion suddenly disappear. He asked if any one could explain how that was occasioned, and how it could be avoided in future.

M. DAVANNE said that a similar accident had happened to him some years past. He considered it was not attributable to the varnish, but to the nature of the pyroxyline of which the collodion was formed. Certain pyroxylines dissolved in alcohol only, and in consequence the layers they produced could not resist the action of alcoholic varnish.

M. LAULERIE announced that the exhibition was then regularly opened, and that members of the Society and exhibitors were invited to call for their cards of admission.

M. DUCOS DU HAURON had addressed a letter to the Society relative to his new process of heliochromy, of which he presented specimens. His pamphlet, revised and corrected, would appear in a few days; but he had been advised to present his process at once to the Society, as another pamphlet on the same subject had appeared since his had been published in numbers in the *Le Gers* journal. His patent was taken out on the 23rd November, 1868.

M. DAVANNE said there had recently been published two pamphlets on heliochromy—one by M. Ducos du Hauron, in *Les Gers*, and the other by M. Charles Cros, in *Les Mondes*. They were very similar in most respects, and the principle of operating was the same. Instead of seeking to produce on the same surface all the colours of nature indistinctly, an opportunity was afforded of analysing and separating them, in order to obtain three proofs corresponding with the three primitive colours, red, yellow, and blue; and these three proofs, presenting all the gradations of tint, which are so well given by photography, being obtained, were united by an act of synthesis, and being mingled together produced all the other colours, as they contained all the elements of the spectrum. Omitting the theoretical ideas discussed, he (M. Davanne) went at once into the practical part of the subject, as follows:—M. Ducos du Hauron (he said) made a circle divided into twelve segments, representing the solar spectrum, and tried to reproduce it in following its theory. In order to do so it was necessary to have three proofs. One should give the maximum blue for one of the segments, with diminution of intensity for the segments turning towards the red and for those turning from the yellow. The first will be required to make the violet, and the second the green. The second proof should give the maximum red for one of the segments, with diminution of intensity right and left for making the secondary colours, violet and orange. The third proof should give the maximum yellow for one of the segments, with diminution of intensity right and left for making the secondary colours, orange and green. Whence it results that as soon as these three proofs are obtained they have only to be placed one upon the other to reproduce the model with colours. This being obtained, all other objects in nature should be operated upon in like manner. These three proofs can be produced in a direct way by obtaining immediately three positive monochromatic images; but M. Ducos du Hauron prefers printing three negatives—one to represent the red, another the blue, another the yellow, and afterwards making with these negatives three proofs, which are to be placed one upon the other. These *clichés* are obtained with bromide of silver, by a method which the author carefully describes. In order to obtain the negative of the blue it is necessary that all the blue tints, simple or compound of the subject to be reproduced, should, so to speak, be extinct and have no action upon the sensitive layer. For this it is necessary to take the proof through an orange-red glass, and, after exposure, which should be sufficiently long, an image is obtained in which the blue and its compounds have had but a very feeble action upon the sensitive layer, whilst the yellow and red have taken sufficient effect. The *cliché* to make a red proof is obtained by extinguishing the red rays by means of a green glass. For the yellow the proof is taken through a violet glass. The three *clichés* being obtained, the positive proofs are made from them. Amongst other means proposed for making a sensitive layer, a mixture of gelatine, bichromate of potash, and water, with the necessary colouring matter, may be employed. The three surfaces of red, yellow, and blue bichromated gelatine being ready, they are printed under their corresponding *clichés*. That obtained with the violet-blue glass is exposed on the yellow layer, and when washed a monochromatic yellow proof is obtained. The *cliché* obtained under the green glass is used on the red gelatine; and that taken through the orange-red glass on the blue gelatine. After exposure, development, and desiccation of the images, they are placed one upon the other, and produce the polychrome proof with all the series of gradations of the tints.

The image of the spectrum which accompanied this presentation is certainly far from perfect, but it is not the less affirmative evidence of what has been stated; and the second proof, which is a reproduction of a transparency, and which may have been obtained by placing one image upon another without having recourse to the camera, gives an idea which is a near approach to the model.

M. Borie presented in his own name and the name of M. Tournemine an apparatus, to which they had given the name of the "portable and photographic solar microscope," which, by a peculiar but very simple mechanism, was capable of being mounted in nine different ways, and so could be used at pleasure as—1. A solar microscope. 2. A photographic solar microscope. 3. A compound dioptric and catoptric microscope. 4. An ordinary photographic apparatus. 5. Apparatus for enlarging negatives. 6. Ordinary telescope. 7. Telescopic apparatus for photography. 8. Apparatus for enlarging *direct* on paper. 9. Ophthalmoscope, both photographic and for observations.

Mr. Domeneck, an American engineer, presented a travelling laboratory constructed for him by M. Jonte, and called the "American photographic apparatus," which was said to be admirably suited to armies on the field or when campaigning.

The meeting, having witnessed some experiments performed by Mr. Domeneck with his new invention, was then adjourned.

"PHOTOGRAPHIC PRINTING IN CARBON AND OTHER PIGMENTS."—Mr. Blair's new book under this designation is now ready. It is a volume of pocket size, containing seventy-six pages, and, in addition to valuable historical and practical observations on carbon printing and the preparation of tissue, there is a chapter devoted to *A New Tissue and a New Process*. In this the substitution of cloth for paper as a basis for the gelatinous pigmented layer is the leading feature. The textile fabric recommended is thin, semi-transparent, starched or glazed cloth, such as used by architects, &c., for tracing plans. This, being dipped in cold water, is pressed in contact with a plate of glass, to which it adheres temporarily. Upon this surface is poured the pigmented gelatine, not too hot. This, when dry, is sensitised in the usual way and is then exposed. When placed in water to be developed the unaltered gelatine passes out through the pores of the linen, leaving the picture on its surface. This, of course, is merely an indication of the process. In preparing carbon tissue for ordinary printing Mr. Blair uses Cox's and Nelson's gelatine in about equal proportions, a fourth part of their weight of sugar and a little common salt being added. From four to eight parts of water may be used. India ink, or any other pigment, may be employed. We shall have more to say respecting this work hereafter.

Correspondence.

Foreign.

Paris, June 8, 1869.

The June meeting of the French Photographic Society was held on Friday evening. The attendance was not large, and the subjects were not of great interest.

M. Despaquis communicated some observations with respect to Mr. Edwards's carbon process, specimens of which were exhibited at the previous meeting. M. Despaquis stated that the only novelty claimed by Mr. Edwards—that of the albumenised gelatine subjectile—was included in a patent taken out by him (M. Despaquis) in 1863. M. Despaquis did not bring a copy of the patent with him to support his assertions ; he said he made them with a view to show that he had not *copied* his process, of which he had recently presented specimens to the Society. M. Despaquis also stated that he now employed lactic acid for "coagulating" the gelatine films. He places his subjectile in hot milk containing sugar candy.

M. Marion presented to the Society a large number of fine carbon pictures printed with differently-coloured pigments. A fine crimson print was produced by carmine, and a black with blacklead. M. Marion accompanied his presentation of the prints with the following observations :—

"I have the honour of submitting to the French Photographic Society some gelatino-bichromated pictures of different colours, amongst which is one in blacklead. The weight of the colours used in these processes does not seem to me to be any obstacle to the production of the picture, as that formed of blacklead will prove. Any colour of whatever density appears to be able to be employed. The process which I indicated last year is of the greatest simplicity. It rests, as is well known, upon the principle popularised by M. Poitevin in 1845. That which distinguishes it from other processes is the manner of transferring the image, and the material employed in making the transfer. The preparatory process for the development of the image is the most important of all, and upon it depends, in a great measure, the final result of the operation—the good or bad development of the picture. This delicate operation consists in applying with a perfect flatness, without any air-bubbles, a gelatinous-coloured film which has been impressed by the light, upon a paper with a sticky film of any kind. The paper which experience has made me prefer to all others for this purpose is an albumenised paper without any salt, and of a thin film. I prefer it for this reason—that at the moment of the development of the picture the hot water, which is used for developing the gelatine, serves equally for coagulating the albumen without any special labour or expense. This double action in an inverse sense, of solidification on the one hand of the film of albumen and the solution on the other of the gelatine film, has this advantage besides—it puts into exercise the attraction of the gelatine film, which constitutes the image which has been formed by the light. This attraction of the gelatine is made by the coagulated albumen film of the vehicle. When the image has been freed from the coloured mixture which has remained soluble on the paper, the vehicle becomes the subjectile of the image, which remains unalterably fixed upon its surface."

M. Marion is going to print detailed instructions for the use of the pigments, which he will give away to any one who may desire a copy. He also informs visitors to Paris that they can see the operations performed at his factory at Courbevoie, near Paris, every Tuesday, between three and five o'clock.

Another communication on the carbon process was received from M. Jeanrenaud, with respect to economising the use of alcohol in his modification of this process.

The *séance* was concluded by an interesting experiment by M. Bertsch, who explained in a clear manner the principles upon which it was founded. The phenomena of whirling a lighted stick in a dark room, and the figures of the phenakistoscope are so well known that I need only allude to them, remarking that their peculiar effects are owing to the fact of the persistence of images on the retina for a certain time after they are received upon the screen. The duration of the impression may be considered to be about one-tenth of a second. M. Bertsch has been experimenting with a view of ascertaining whether the time of persistence on the retina was the same for each of the coloured radiations of which white light is composed, and he is of the opinion that the time is the same. The experiment he showed was conceived in carrying out experiments of this nature. An ordinary "turnspit," moving by clockwork, was mounted with a card placed in a horizontal position, upon which was a coloured design. A small globe of solution of sulphate of quinine, in which was a spiral tube, the whole constituting a bright globular Geissler's tube, was suspended above the card, and the light was reflected down upon it by a little opal glass reflector or shade. An induction coil, set in action by a bichromate of potash battery, was placed in connection with the luminous globe, and intermittent discharges of light varying in duration were constantly sent through the Geissler's tube. When the card disc was made to revolve rapidly before the coil was put in action, no figures or shapes could be distinguished upon it from the swiftness of its revolution in one direction ; but as soon as the gas was lowered, and the intermittent electrical discharges were produced, the card disc appeared sometimes motionless, sometimes with a tremulous vibration, sometimes revolving in a contrary direction to what it really was doing, and the designs were always visible, although the speed of the revolution of the card was not altered nor its direction changed. The effect is very curious and striking, and the experiment will always please. It illustrates in a most complete manner that seeing is by no means always productive of belief in what is seen. We know the card disc is revolving rapidly in a certain direction, and yet we see it either motionless or going round in a contrary direction, to all appearances.

I have been much interested in reading the account of the experiments made by the Editors upon the magnesian and zirconian lights, and I think that some of the conclusions have been hastily come to, and all the data necessary for the carrying out of comparative experiments have not been obtained, or even taken into consideration. I am rather amused at the decided condemnation of the zirconia cylinder. "It was at once obvious that the bit of zirconia was too small;" and about the magnesia—"We strongly advise the makers not to issue pieces of such paltry size, but to make them at least four times the diameter." May I ask one question—Upon what does the intensity of the light produced by the action of the oxyhydrogen flame upon bodies depend, and why is it produced at all? The mere heating of an infusible substance will not do it, or we could take a piece of quartz and throw on our jet of mixed gas, or we could take a cylinder of some infusible metal. It depends, some will reply, upon the property that some bodies have of becoming incandescent under the influence of intense heat. Well, upon what condition of matter does *this* property depend? Are there any rules respecting the proportion of incandescent light produced by so much heat? Doubtless there are; and it is these rules and the whole question of the causes and effects of the phenomenon of incandescence that M. Tessie du Mothay and his fellow-workers are investigating in their researches upon the *practical* utility of the oxyhydrogen light. They have found that with a large cylinder of an incandescent body it is necessary to consume more mixed gas to obtain a greater light. The greater the mass to be ignited the more the expenditure of gas and heat. Of course, if I have a globe of lime or magnesia or zirconia as large as a fist, I must have large jets to play upon it to render it incandescent. I shall obtain more light, but I shall use a great deal of gas; and the amount of light obtained will not be greater in proportion than if I used a small piece of incandescent matter and a smaller jet.

I ask the Editors to repeat their experiments in a more careful manner, and to come to their conclusions after noting the following:—The amount of gas consumed per hour with the French lamp and the magnesian and zirconia cylinders; the pressure; the light obtained estimated photometrically, and reduced to its expression in batswing burners; the size of the cylinders of incandescent matter employed; the *same* observations with respect to the "oxyhydrogen burners in common use in this country—one of them being the 'safety' burner, the other that in which the gases are mixed previous to their issuing from the orifice." When the results of a careful series of comparative experiments of this sort are obtained they will enable us to decide upon the merits of magnesia, lime, and zirconia for the production of light.

These experiments *have* been tried here very carefully, and oftentimes repeated, and the results are known. After the amount of light produced and the quantity of gas consumed is ascertained, the enduring properties of lime, magnesia, and zirconia under the influence of heat can be inquired into. The zirconia cylinders have been in use *here* every night for a *month*, and neither the brasswork nor the matter has been injured. Last evening I saw a paltry-sized piece of magnesia which had been in constant use for a week every night, and was no worse for wear. The process for the economical production of oxygen, as described in your last, has long been abandoned by M. Tessie du Mothay, who only uses the permanganates now. I have no time to add more today, and must return to the subject in a future letter.

R. J. Fowler.

[The shortness of the time placed at our disposal between receiving proof of the above and going to press prevents our appending such remarks as we should like to have done. At the request of our friend, Mr. Fowler, we shall devote another evening to the trial of the zirconia and magnesia lights.—Eds.]

Home.

THE CHARGES FOR CARTE PORTRAITS.

To the Editors.

Gentlemen,—As I have not for some time observed any articles upon the above subject, I think that a few remarks upon it at the present time may possibly induce my brethren in the profession to reconsider the matter, and be productive of some good.

After enjoying an unparalleled demand for the popular *cartes* we cannot reasonably expect an unabated demand for them at the present time; therefore I would venture to suggest the desirability of artists using every effort to produce the best results, and I think the public generally will be found willing to pay an advance to secure some improvements.

Yet there are patrons of the art who cannot pay without a grudge the extraordinary low prices of the photographer who goes in for sup-

plying the million, and who would find the same difficulty to contend with should he reduce his prices even much lower still, although they have now, I think, touched the lowest point.

It has been with me for some years a question how many of the profession who have worked at the low prices I have heard of have succeeded in evading the Bankruptcy Court so long, knowing the labour and economy required to carry on our own business, where rents and expenses are comparatively light. I consider the profession usually but very ill requited for the amount of labour required and the quantity and cost of apparatus used in the operations, to succeed in which requires a vigilant eye to be kept upon the various requisites in use and to be used.

Should we require the services of medical gentlemen, and were they to use the same amount of instruments, their account would amount to about the same number of guineas as the photographer's would in silver coins of the same size, probably for the same amount of labour.

But to think of a solicitor causes one a sigh. Now, I do not wish to make any insinuations regarding that honourable profession. The renowned "Poet Close," I remember, in one of his publications, makes mention of an "honest lawyer," and I almost regret now placing those works in a portion of a closet to which the juvenile portion of our household had access, as I cannot refer further to them, if required.

As I think the prices differ as widely as the quality of the photographs produced in various places, my communication would possess little practical value without appending our scale of charges, &c. I am not aware that there is anything extraordinary in it. I am well aware that there are parties avowedly obtaining better remuneration for their artistic labour. To such persons I offer thanks for assisting to elevate and make our profession honourable. Those who are not obtaining so much I would advise to try to improve their standard of work, and make a resolution to obtain higher prices for work and abide by it, or decline doing it. To those who are indulging in apathy, regardless of improving their position or productions, I say that we are patiently awaiting, ready to take advantage of, improvement, hoping that more prosperous days are in store for those who seek to attain an honourable position in the profession.

On glancing upwards before me, I find, printed in large type and framed, and hanging in several prominent places, the following :—

"Mr. —— wishes it to be understood that no work is executed on approval. When proofs of *cartes* are required, two are done, which are charged 4s. when ordered, regardless of *additional* number required.

"Prices of *carte* portraits :—

Taking portrait and	2	first *cartes*	4s.
,,	6	,,	6s.
,,	12	,,	10s.
,,	24	,,	18s."

&c., &c.

The above are our conditions, and in carrying them out we find no difficulty. Should anyone feel agreeable to adopt them, but look wistfully at the expense of getting the matter printed, I make the offer of a few which I have left on hand with pleasure. The name can readily be altered.—I am, yours, &c., S. S. Crewdson.

Ulverston, June 3, 1869.

DRY PLATES ON THE CONTINENT.

To the Editors.

Gentlemen,—From some experience of continental travelling with photographic luggage, I can say that your correspondent, "Charles Drake," will find no difficulty in passing the Custom-houses either in France, Switzerland, or Italy, provided he courteously explains the nature of his luggage.—I am, yours, &c., Oxoniensis.

June 5, 1869.

To the Editors.

Gentlemen,—A very good way in which to pack sensitive plates, so as to be safe from light when passing through a foreign Custom-house, is to have a window of orange glass in each side of each plate box. The examining officer has only to hold it up to the light to be assured that it contains nothing but glass plates. An intimation to this effect should also be written in the language of the country and pasted on each box, coupled with a polite request that, when examining the box, it be not exposed to more light than is absolutely necessary.

This, I venture to say, will secure for the plates an absolute immunity from danger.—I am, yours, &c., George Frederick King.

London, June 8, 1869.

IN RE PYROXYLINE.

To the Editors.

Gentlemen,—Mr. Fry is right in his surmise—I *have* exhausted my *verbal* arguments in the matter of pyroxyline, because I believe no practical good can be gained by that mode of procedure. I merely again refer to the challenge to a competitive trial already given by Messrs. Rouch & Co. and myself.

I should, indeed, be glad if I could be convinced of the practicability of producing a first-class photographic pyroxyline from cotton wool steeped in cold acids, because the product would be very much cheaper. At the same time I beg to state that my experience is not of yesterday, for since the year 1853, when I first prepared pyroxyline with Mr. Archer, I have made more experiments in all sorts of modifications, and tested them too, than most living men; and therefrom I have the best reasons for believing that the temperature first laid down by Mr. Hardwich is substantially the best for a good normal pyroxyline.—I am, yours, &c.,

King's College, June 7, 1869. George Dawson.

Miscellanea.

The Light of the Sky.—A gentleman—Mr. Harrington, of Ryde, in the Isle of Wight—has propounded a new theory which explains the light of the sky to be the result of chemical change in the inflammable gases which form so large a proportion of the earth's atmosphere—that these inflammable vapours, while under the agency of the sun's actinic and gravitating power, form a tide in that part which is opposite the sun, in which sufficient heat is developed to render that half our atmosphere luminous, thereby producing the heat and light which warms and enlivens the earth's surface. Mr. Harrington enunciated his views in a lecture before a large and influential audience at Ryde, on the 22nd of Febuary. At the close of the lecture, a resolution was carried unanimously, "that the subject commended itself as worthy of careful investigation." A committee was appointed, of which the mayor and vicar form part, to arrange a public discussion.

To Prevent Peeling of the Collodion Film.—Sometimes in the spring and fall operators are troubled with the film peeling off their plates. If the collodion is not at fault it is easily remedied:—1. *By using absolutely clean plates.* A dirty plate is always liable to peel more or less. A plate that has been used before is more liable on this account to peel than a new one. Occasionally an old plate remains obstinately dirty; better throw it away than run risk with it. 2. An under-exposed plate long developed and redeveloped is apt to peel. The acid in the developer has a tendency to loosen the film. The remedy here is obvious: give more exposure, and use, if need be, a stronger developer. *The stronger the developer the less acid required.* 3. Every person must have noticed that a tumbler of cold water brought into a warm room in summer soon becomes covered with condensed moisture; so it is with your plates. You clean them perfectly, put them in a box, and shut it up. They, perhaps, lie in your dark room all night, and in the morning the temperature of the plates in the box will be as low as the temperature of the room was at the coldest portion of the night. Perhaps you start a fire in your studio, and the temperature of the dark room rises, say ten degrees, but the box being shut, the temperature of the plates does not rise. When you take out a plate to flow it, the natural consequence follows: the moisture condenses on the plate—in a slight degree, it is true, but enough to keep the film from adhering firmly. The moisture may not be visible, nevertheless it is there, and does the evil. The remedy is obvious. Let your plates be at least of an equal temperature with the dark room. In our own practice, in winter we place the plates beside the stove for a short time before commencing to operate, in order that they may be slightly warmer than the atmosphere of the dark room. *We never have a slip.* If you have any doubts of the above, if your plates are slipping, and you know they are clean, slightly warm them and try. They won't come off even with very rough usage.—*Ewing's Photographic Circular.*

EXCHANGE COLUMN.

A quarter-plate *carte-de-visite* lens, by Burr, of London, would be exchanged for a Grubb's 10 × 8 B aplanatic, 2½ in. diameter, 12 in. focus, portable mount.—Address, W. Vickers, Photo., St. James's-terrace, Station-street, Crewe.

A portable studio and a 5 × 4 square mahogany camera and portrait lens, arranged for views 7½ × 5, will be exchanged for a watch, guard, or rolling machine. Values adjusted.—Address, W. K. Menns, photographer, West-end, Chipping Norton.

I will exchange for anything useful, in or out of photography, The British Journal of Photography for 1867, the *Photo. News* for 1866, 1867, and 1868, and a tin still in complete working order. The journals are bound in cloth. Cost of the lot, £4.—Address, G. Noble, 7, Vicar-lane, Hull.

A superior 16 × 12 water-tight bath in mahogany case, nearly new, best oak printing-frames for same, Murray and Heath's draining box, and two large dishes, will be exchanged for a 1B card lens, by Dallmeyer, or a No. 1 or No. 2 Ross, to take vignettes, or a Shephard's ten guinea 1-1 plate lens, or Ross's 12 × 10 orthographic lens for the same, or a good triplet or wide-angle lens. Any difference in value can be arranged.—Address, Mr. S. Mason, 9, Artesian-road, London, W.

Photographs Registered During the Past Week.—

Charles Mason, Camelford.—*Portrait of Mary Cowling.*

A. M'William, Newton-Stewart.—*Portrait of John Brodie.*

W. Clayton, Nottingham.—*Portrait of the late Sir Robert Clifton.*

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

N.—The discussion may now be considered at an end.

X. Y. Z.—The picture is rather under-exposed, but on the whole it is not bad. Select the lenses having the longer focus.

J. C.—We can at present suggest no other cause for the spots than that suspected by yourself, viz., the enamelled cards. A London photographer of our acquaintance was recently annoyed in a similar manner.

"Fusbos;" "A. C.;" "Pyroxyline," and others, are informed that to render their communications of any value their names ought to be attached. An expression of opinion is valued according to the ability of the writer, and without such a certificate the opinions in question are valueless.

J. T. L.—1. The address sought for is Mr. Dodson, 147, Strand, to whom you should apply. The pictures named by you are not copyright.—2. If a photograph be taken from a German copy of an English copyright work, the photographer can be prosecuted for doing so just the same as if he had operated on the original.

An Interested Photographer.—See answer to "J. T. L." It is practically impossible to obtain a list of copyright engravings. By specifying any *particular* engraving it would be possible to get information concerning the legality of photographing it. The copyright lasts for forty-two years from the date of publication, or seven years after the death of the artist, should he survive that period of time.

T. G. W. (Maesteg).—The print No. 1 is obtained from a good negative, but, from the lowness of tone all over the picture, we infer that there has been too much light in the room in which the toning has been effected. Its principal fault is heaviness of tone. For successful vignetting your background is too dark. No. 2 is also "heavy." Do not print quite so deeply. The posing and lighting are good, but a little longer exposure would have improved it.

G. Light.—We have obtained from Somerset House the following information for you:—Write to the Commissioner of Inland Revenue if you wish your name engraved, which will cost £8. You must also have a license to sell, which in London costs £2, and in the country ten shillings. The stamps cost three-halfpence each. You will obtain the requisite information by applying at the Inland Revenue Office in your city. It is situated in Waterloo-place, if we remember aright.

"Strike Light" (Preston).—We shall send your letter to the friend referred to, and expect it will have the effect of inciting him to complete and publish his experiments. Add just enough of silver to the water to produce a slight milkiness, after which place it in the sun for an hour or two. But it would be much better to use distilled water at once. The bichromate solution may be kept in either a gutta-percha, a lead, or a porcelain bath. Respecting the collodio-bromide process, we are publishing some articles on this subject, by Mr. Dawson, which will supply you with the information required.

Ascot.—It is evident that the negative of the copy has been much over-exposed. A shorter exposure with a longer development would have yielded you a good negative. The plates issued by the Liverpool Dry Plate Company can be depended upon. To enlarge with your camera, remove from it the lens at present attached to it, and use, instead, a short focus lens reversed in position, or having its outer end turned towards the ground glass. Now, having the negative to be enlarged placed against a bright sky, move the camera sufficiently near to it to give you a sharp image on the focussing screen. Thanks for your invitation, of which we shall probably avail ourselves.

Geo. B. Alexander.—1. The Editors of this Journal, *as such*, hold no opinions either in politics or religion. What their opinions, as citizens, may be in respect of those matters is, we presume, of no interest to any reader. Having stated thus much, you will not be surprised to learn that we decline to publish your letter.—2. There are two societies devoted to the question in London, viz., the National Sunday League and the Lord's Day Observance Society. Their scope and objects are different.—3. Your best method of procedure would be to arrange with the Publisher for issuing your *Warning Voice to Photographers* as a slip to be inserted in the Journal in connection with the advertising department.

"Wisteria."—The fine deposit or powder which renders your collodino milky is iodide of silver; but it is not the cause of the fogging. Add a little tincture of iodine until the collodion assumes a deep sherry colour, and the fogging will probably disappear. It will *not* spoil your bath. The rapidity of the lenses is not determined in your case by the aperture, but by the aperture of the stop compared with the focal distance. A lens of one inch diameter with a quarter-of-an-inch stop will be quite as rapid as one two inches in diameter with the same size of stop, the focus being the same. Nay, theoretically, it will be quicker, because a large diameter of lens implies a greater thickness of glass than a smaller one.

Ignorance.—In saying that the perpendicular lines are not straight, we do not quite understand what you wish to convey. If you employ a single lens with a stop in front, and take with it a larger picture than you ought to have done, the marginal lines of the building will be barrel-shaped, or, in other words, will be curved. This defect can be remedied by employing a non-distorting lens, of which there are now many manufactured. If the distortion consist in the lines of the building converging or leaning towards the centre, it is not the fault of the lens, but of yourself, and can be remedied by keeping the sensitive plate quite vertical during exposure. If you send us a specimen of the defects referred to, we shall then be better able to advise you.

Messrs. Macniven & Cameron.—Thanks for the sample of steel pens. The mechanical construction of the point of the "Waverley" is quite novel, and, we may add, very excellent. The bending back of the extreme tip is a happy thought, and enables a person to write rapidly without fear of spluttering the ink over the paper, as is too frequently the case with other pens. We consider the sample of pens received a great improvement on those hitherto ordinarily used.

Renfrew (Glasgow).—1 and 2. You may recognise an over-exposed negative by its being full of detail, but containing no contrasts. An over-developed negative is too dense, as a whole, if the exposure has been correctly timed, and is very much so if the exposure has been too long. With under-exposure it is hard and patchy.—3. The lenses numbered 3 and 5 will take as good landscapes as No. 2, while for copying engravings they are superior, inasmuch as, for one reason, they do not distort the image.—No. 4 was, and still *is*, a useful lens, but it is being superseded by those containing fewer surfaces.—4. Lime toning, with ordinary plain or non-albumenised paper, will prove best.—5. We have found the iodide and bromide of ammonium to answer rather better than any others for the purpose referred to.

Subaltern (Deesa).—You will experience much pleasure in the production of transparencies from your negatives. The method by which you propose we should send you the specimens is exceedingly novel, but will prove, we think, to be quite safe and effective. Respecting the other matter: it is, perhaps, better, in the meantime, that you pay no attention to the articles in the work mentioned by you, inasmuch as there are some parts so hard to be understood that we as yet know of no person who can read them as the author, no doubt, intended. See an article on the subject in the present number. And now for the subject treated of in yours of Jan. 17th, and which was only partially answered at the time. Commencing at the beginning, we shall make a passing comment on the topics discussed. As to the "subjects," whose skins are as black as ebony in some cases and of a Vandyke brown in the most favourable instances—these being already bad enough—mounted up in an elaborate head gear of pure white linen, and a paletot also of white linen, you could not possibly have a more crucial test of your photographic ability. Your chemicals appear all right, and of your lenses we may say the same. Try the following developer:—

Protosulphate of iron	15 grains.
Glacial acetic acid	1 drachm.
Water	1 ounce.

If this prove too rapid in its action, dilute it by adding a little more water. *Do not use any gelatine.* Bring out all the details with this solution, and, if the picture be too feeble, intensify by means of a two-grain solution of pyrogallic acid, containing one and a-half grain of citric acid—of course with one or two drops of a silver solution added to it just before application. Theoretically it is better to use a small stop than a large one in encountering such strongly-contrasted subjects as those to which you refer; but we should in your position use as large an aperture as convenient. If the image "jump out" in applying the developer it is too strong, and requires to be diluted with water. These are all the comments that suggest themselves to us on a re-perusal of your letter.

Received.—H. Pumphrey; D. Winstanley; George Price; James Harrison; A. Brothers; W. H. Harrison, and others.

Davies's "French Polish" Process of Printing.—Since writing our leading article on this process, we have received from Mr. Davies some specimen scraps, as he calls them, which attest the merits of the process. Some very delicate and beautiful pictures are on such untoward material as the back of a large printed posting show bill, a piece of brown paper, &c. In all the specimens there is evidence of the non-absorptive power conferred upon the paper by Mr. Davies's treatment. One print on white paper possesses in a special manner those characteristics of brilliance combined with perfect flatness or deadness of surface which were found in Brinckerhoff's paper, about which much was said a few years ago, but which suddenly disappeared before its commercial existence might be said to have commenced. We are very favourably impressed by Mr. Davies's process, judging alone by the specimens.

LONDON GAZETTE, *June* 4.

Bankrupt.

F. Simpson, Nottingham, photographic artist. June 30, at Nottingham.

METEOROLOGICAL REPORT,

For the Week ending June 9th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

June 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
3	·30 06	70	52	54	56	WSW	0·01	Dull
4	29 97	67	49	53	56	W	—	Dull
5	30·13	83	51	59	63	W	—	Fine
7	30 21	90	51	72	78	SSW	—	Fine
8	30·19	72	58	60	65	NW	—	Fine
9	30 20	—	62	58	63	W	—	Fine

CONTENTS.

THE BRITISH

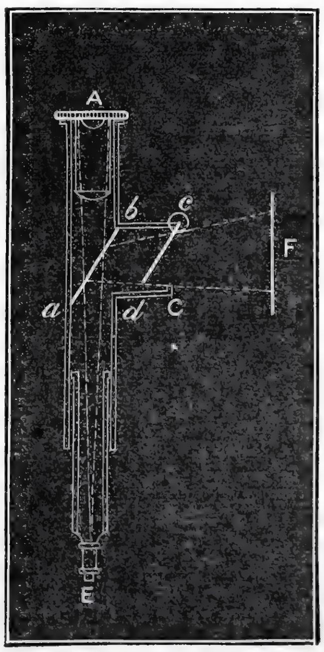
JOURNAL OF PHOTOGRAPHY.

No. 476. Vol. XVI.—JUNE 18, 1869.

PHOTOMICROGRAPHY.

In the number of our contemporary, *Les Mondes*, for May 27th, M. Bourmans, of Maestricht, has given a description of a microscope suitable for photographing living organisms. The arrangement which M. Bourmans adopts is one, in some respects, not by any means unknown to English photomicrographers. The apparatus is designed to admit of the operator obtaining the object in the best focus at the most suitable quiescent moment, and then photographing it immediately. As the method by which this is accomplished is defective in one respect at least, we now call attention to the subject.

We shall first describe briefly the apparatus employed by M. Bourmans, and then point out the defective part of the arrangement. The plan consists in employing an ordinary microscope having a mirror fixed in the tube between the eyepiece and the object glass of the instrument, as shown in the accompanying diagram. This mirror is of lightly-silvered glass, and the light reflected from its surface is thrown out of the instrument laterally, and at a right angle to the course of the rays leaving the object glass. The rays so deflected from their ordinary path pass on to F, and are there received on a focussing glass or on the sensitive plate. But the mirror, while reflecting a large proportion of the rays, transmits, according to M. Bourmans, about twenty-five per cent. of the total light which it receives, and the rays so transmitted pass on to the eyepiece of the instrument and finally reach the eye of the observer. When an object has to be photographed, it is suitably placed on the stage of the microscope, and viewed in the ordinary way through the eyepiece of the instrument. It can then be accurately focussed by means of the small amount of light passing through the mirror *a b*. Having placed the sensitive plate in its carrier at F, but protected from light by the shutter *c d*, the object is now caught at the right moment, the shutter turned aside by means of the milled head shown at *c*, and the plate exposed for a suitable time. Even during exposure the object on the stage can be watched in the usual way through the eyepiece of the instrument without in any way interfering with the process.



Let us now examine the instrument, which, at first sight, appears to present considerable advantages. We understand that the point of novelty in M. Bourmans's arrangement is the employment of a lightly-silvered glass plate as the reflector for the rays coming from the object, but the author states incidentally, and without apparently noticing the force of his remark, that the light transmitted by the silvered mirror to the eye is of a decided *blue* tint; in fact, the fine silver film only appears to transmit the more highly refrangible rays, and, since light of this kind is most chemically active, and that chiefly concerned in the production of the photographic image, we think the loss of these rays a serious objection to M. Bourmans's plan.

When silvered glass mirrors were first much employed by M. Foucault, many scientific men in this country tested their value in various ways; and though they were stated to reflect seventy-five per cent. of the light falling upon the surface of the silver, the late Lord Rosse was of opinion that but little more than sixty per cent. was really obtained from the ordinary silver surface. Since the light lost by transmission is of a comparatively high degree of refrangibility, this loss is not very apparent or of much importance in instruments which we use for ordinary astronomical observations, such, for instance, as the silvered glass reflector used by Mr. Browning in the construction of astronomical telescopes. However, when such reflectors are used for photographic purposes the case is quite different, for here the rays lost by transmission through the metallic film are those of chief value. M. Bourmans's instrument may, therefore, appear to work admirably so far as producing a good visible image on the focussing screen at F, but the author does not tell us anything about the photographs actually taken with his photomicrographic camera, or the exposure required in order to obtain a good negative. Owing to the loss of a large proportion of the blue rays, we can well believe that the time of exposure of the sensitive plate is decidedly prolonged, and thus the advantage which would be otherwise gained by M. Bourmans's ingenious arrangement is really lost. We need scarcely say that if the layer of silver were made so thick as to be quite opaque there would be less objection to the plan proposed, but such an alteration would do away almost completely with the advantage of the arrangement above described.

It appears to be not impossible that the instrument did not quite realise its designer's anticipations; for we find him suggesting subsequently, as an improvement on his arrangement, the employment of a plane opaque mirror instead of the semi-transparent one. The arrangement of the second instrument is such that, when the eye of the observer is at the eyepiece of the microscope, the opaque mirror is lifted up out of the path of the rays; but at the moment that it is desired to take the photograph of the object on the stage, the mirror is dropped into its place, as at *a b*, and it then at once reflects the rays on to the sensitive plate without further trouble. The mirror thus serves the double purpose of a shutter and a reflector, and in such respects the ingenious arrangement resembles the apparatus long ago recommended by Mr. Sutton for taking instantaneous photographs, though it is but right to add that M. Bourmans acknowledges the origin of the suggestion.

This latter mode of arranging the apparatus is one which appears preferable to the first plan with the semi-transparent mirror, and we have little doubt that the hint will be received with interest by those in this country who take much interest in photomicrography.

COLLODIO-BROMIDE OF SILVER: A PRACTICAL MODE OF WORKING.

No. III.

THE following method of working the collodio-bromide process has, in my hands, proved uniformly and eminently successful. I shall, therefore, with the view of guiding those who may have had less experience than myself, enter into seemingly trivial details, which, however, are of really more importance than many suppose. In the course of my experiments many modifications and ramifications have naturally suggested themselves; but, in order not to perplex the reader, I shall not enter into these at present.

Let me take this opportunity of confessing to my having previously entertained several erroneous conceptions of the principles on which this process is based, and of having largely experienced the proverbial difficulty of shaking off preconceived ideas, founded on incomplete experiment.

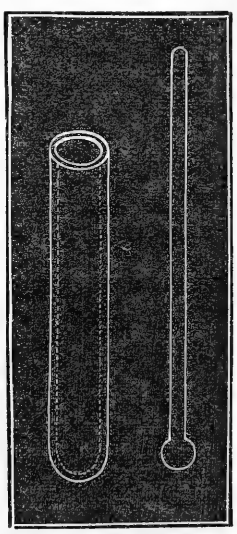
1. *Preparation of the Collodion.*—Any old plain collodion that I have met with, and which possesses the requisite fluidity, answers very well for a basis of operations. But I much prefer to make the collodion by the following formula:—

Pyroxyline (powdery) made in acids at 165°	5 grains.
Ether (sp. gr. 725)	4 fluid drachms.
Alcohol (sp. gr. 805)	3 „ „
Bromide of cadmium	5 grains.
„ ammonium	3 „

Place in a bottle, first, the bromides, then the alcohol, and next the pyroxyline. Stopper up the bottle, and shake till the bromides are completely dissolved; then add the ether, and again shake till all the pyroxyline has passed into solution. Allow to stand for at least a week; then decant off the clear portion for future use.

If an old plain collodion, which has been bought in the market, is to be used, there necessarily exists considerable uncertainty respecting the proportions of its constituents. It should be of the fluidity required for the wet process—if anything, slightly thinner—and should flow on the glass and set fully without exhibiting structure of any kind. In a previous article I have shown how these properties can be easily and quickly tested. It should also be of the consistency to bear one drachm more of alcohol (to be added at an after stage) to make up each ounce. Bromise seven fluid drachms of this collodion with five grains of bromide of cadmium and three of ammonium.

2. *To Compound the Collodio-Bromide.*—Weigh out carefully ten grains of finely-powdered nitrate of silver, introduce it, without losing a particle, into the bottom of a tube-mortar, by means of a long spatula, which can easily be extemporised by folding a slip of stout paper down the middle. The tube-mortar is simply an explosion tube, closed at one end, and made of very thick glass. It can be bought at most philosophical instrument makers, of various sizes.* The pestle for it must be made specially. It consists of a strong solid glass rod, three or four inches longer than the tube, and with a rounded knob at the lower end of a curve rather less than that of the bottom of the tube. An illustration may, perhaps, serve better to explain my meaning.



Having introduced the silver, pour in one fluid drachm of alcohol, sp. gr. 815, but not weaker than 820; or, if only alcohol of 805 is convenient, add to one drachm of it four drops of distilled water, and pound up with it the silver in the tube with the end of the pestle into a fine pulp. Remove the tube-mortar with its contents into the dark room, and at once measure out seven drachms of the bromised collodion, which is to be poured gradually into the tube by an assistant while you work vigorously with the glass rod in mixing and grinding up the emulsion. If the tube be fixed in a block of wood an assistant is not necessary. When all the bromised collodion that will flow out has been poured in from the measuring glass, add to the emulsion in the tube about ten or twelve drops more to make up for the portion which has adhered to the measuring glass. Then press down with one hand, on the top of the tube, a disc of cardboard furnished with a small hole in the centre through which the glass rod projects. The object of this arrangement is to prevent evaporation of the ether and alcohol. Now churn and grind vigorously for at least four or five minutes, by which time the whole, or nearly the whole, of the silver nitrate will have been converted into very finely divided silver bromide, leaving about one grain of the soluble bromide unconverted. Finally: filter, through a tuft of cotton wool in the neck of a funnel, into a stock bottle, add about a minim of ether to make up for unavoidable evaporation, and shake up once more. In ten minutes the emulsion is fit for use.

Instead of the tube-mortar, which I have found so handy and efficient, a bottle may be used in compounding the collodio-bromide; but in this case as much as eleven, twelve, or even more grains of nitrate of silver may sometimes be required to obtain an effective collodio-bromide. The reason for the difference of proportions is this:—

In the first place there must be an excess of soluble bromide in the emulsion.

Secondly, the true equivalent for five grains of bromide of cadmium and three of ammonium is 11·45 of nitrate of silver. But you may shake up for a long time, in a bottle, twelve grains of nitrate of silver with eight of bromide of cadmium and ammonium, in the proportions I have named, and still leave a considerable proportion of the soluble bromides unconverted into bromide of silver. The fact is, some of the larger particles of nitrate get encrusted round with a coating of bromide of silver, which prevents them from combining with the external bromides, and no shaking in a bottle will break the lumps. It is only by the grinding action of a pestle that the whole of the nitrate can be made to combine immediately. After a time—it may be days or weeks—the encrusted nitrate will ooze out from its temporary prison to combine with the bromides that may be left in solution; and, if these are all converted, the collodio-bromide is worthless in that state, but may again be made to work well by shaking up with it a little bromised collodion, or adding a little bromide dissolved in alcohol.

But to return to my bottle method of preparation. Introduce eleven grains of nitrate of silver and the drachm of alcohol as before; insert the cork, and shake up for a short time. Then add the seven drachms of collodion, in small portions at a time, shaking violently after each addition; finally add about twelve more drops of bromised collodion, shaking again occasionally for a few minutes, and filtering into another bottle as before, for almost immediate use.

With the proportions I have given, and by whichever method the emulsion is prepared, the collodio-bromide is fit for use within a quarter-of-an-hour after preparation, and continues in its best working condition for two days; but with occasional shaking up it will remain serviceable for, at least, several weeks.

Once more I would emphatically repeat the *sine quâ non* of a good collodio-bromide emulsion. *It must contain a considerable excess of soluble bromide;* and yet not too much, for the silver bromide particles, being coarse, soon subside. The film also requires a great deal of washing to get reasonable sensitiveness. In other respects it works well. The finest obtainable state of division of the particles occurs when the atomic equivalent of the silver is just under that of the soluble bromides, and when the nitrate is all converted; but in this case it is necessary to impregnate the film, in the future stage of washing, with a trace of bromide, to prevent fogging during developement, and this mode of procedure does not answer so well as if the bromide were in the film originally.

3. *Preliminary Coating of the Plate.*—Clean and dry-polish the glass plate as usual, after which the collodion emulsion may at once be applied without any preliminary coating, but, for various reasons, I consider a substratum desirable. Many methods have been proposed, all possessing some advantages; but I would strongly recommend the following method of procedure, which I find better than any other I have tried:—Take the whites of two eggs, ten grains bromide of potassium, about two grains crystallised carbolic acid or a little creosote, and twenty-eight ounces distilled water. Shake or stir up till all the salts are dissolved or intimately mixed. Filter through cotton wool into a stock bottle, and use as occasion may require. Carbolic acid or creosote prevents mould and decomposition, and does no harm to the film. The solution will probably be slightly opalescent in consequence of the presence of carbolic acid; but this is of no consequence, and is not apparent in the very attenuated film on the glass.

Brush or pour the above solution over the cleaned surface of the plates, removing any air-bubbles, &c., which may cling to the surface with the point of a camel's-hair brush, and stand up away from dust to dry spontaneously, or dry them by the fire. The plates may at once be used for receiving a coating of the collodion emulsion, or they may be stowed away until required. If kept in a dry place—and that is important—it will only be necessary to draw lightly over the prepared surface a broad camel's-hair brush, to remove dust, before applying the sensitive medium. Should any doubt arise as to

* If there be any difficulty in obtaining them elsewhere, they can be got at Griffin's, Garrick-street, Covent-garden, London.

which is the prepared side of the glass, breathe on the surface. The breath will not condense on the side that has been coated with albumen.

4. *Coating the Plate with Collodio-Bromide.*—I need not say anything further about this than that it should be done as in the ordinary wet collodion process, and that it is desirable the film should set well before being placed in the washing water.

5. *Washing the Films.*—I prefer—for no good reason, perhaps—first to rinse the sensitive plates for two or three minutes in distilled water. Afterwards I steep them for (altogether) a full half hour in three changes of abundance of common water, draining each plate for about half-a-minute between the successive changes. I am also careful to wash each plate for the same time and in the same way as all others of the same batch; thus equal sensitiveness is secured, and, the time of exposure and mode of development for one being ascertained, a greater uniformity of negatives and certainty of good results are obtained. Finally: if I wish the films to be particularly free from pinholes in the sky or elsewhere, I rinse again in distilled water before soaking them in the preservative.

6. *Application of the Preservative Solution.*—I have tried all conceivable sorts of preservatives, but I find none to be equal to tannin for general efficiency. A little gum arabic is always a useful addition; so also is a little honey or glycerine when the weather is very dry and hot. Formula for solution:—

Tannin	240 grains.
Gum arabic	60 grains.
Honey	1 dessert spoonful.
or Glycerine	1 tea „
Distilled water	20 ounces.

Dissolve and filter. Then dissolve a small piece of camphor (about five grains) in an ounce of alcohol, and add to the filtered solution. This will prevent mould and decomposition.

Either soak the washed plate in the tannin solution for four or five minutes, or pour the tannin on and off the film repeatedly for two or three minutes. The same solution will answer satisfactorily for many batches of plates, provided it is always filtered immediately before use and has not acquired a too great accession of soluble bromide from repeated contact with insufficiently-washed plates. If the latter proviso be not guarded against, the films will be less sensitive than they might be; if the former proviso be neglected, of course dust, &c., will tell their tale in the finished negative.

After the tannin has been applied, by far the best plan is to allow the plates to dry spontaneously in a spacious dark cupboard, by standing them up on end on several folds of clean blotting-paper, to absorb the moisture as fast as it drains to the bottom. They may be dried artificially; but then there exists a risk of their not drying equably, in which case *drying lines* will be apparent in the finished negative, just as surely as if a pause be made while immersing a collodionised plate in the nitrate bath.

7. *To prevent optical halation* it is very useful to paint the backs of the glasses, after the tannin has dried, with a non-actinic pigment. Burnt sienna and gamboge, mixed, do very well. Grind them up into a thin paste with water, a little gum, and some treacle. Add a very small quantity of creosote or carbolic acid to keep the contents of the stock bottle from moulding. Apply with a broad camel's-hair brush to the backs of the glasses, and stand up again to dry.

8. *The time of exposure* should be only twice that of a wet plate if the collodio-bromide be carefully compounded and all the washings are carried out for the period of time and in the manner I have described. If done less efficiently, or for a shorter time—say for ten or fifteen minutes—three times the exposure of a wet plate will be required, and then probably no soluble bromide will be needed to check development, because a sufficient quantity already exists in the film.

Details of the method of conducting the development, and some general observations which could not well be introduced into a condensed description of a practical mode of working without breaking the sequence of observations, will be given in another communication; while various modifications and improvements on which I am now engaged will be treated of in separate articles as soon as I have confirmed their value and reliability.

George Dawson, M.A., Ph.D.

Exhibition of the Royal Cornwall Polytechnic Society.—The annual exhibition of this Society is to be held at Falmouth at the end of August, and after the close of the meeting of the British Association. Medals and prizes are to be awarded to exhibitors of the best photographs, as well as for scientific papers in the departments of fine art, photography, natural history, mechanics, &c.

THE GUM-GALLIC DRY PROCESS, AS PRACTISED BY RUSSELL MANNERS GORDON.*

The process about to be described has passed the experimental phase and been already adopted by several distinguished amateurs, whose works were shown together with those of Mr. Gordon at the Society's Exhibition in November last. High encomiums have been pronounced in favour of the gum-gallic system of dry-plate photography; and no one who has had the advantage of witnessing the manipulations and seeing the finished results could arrive at any other conclusion than that the process in question satisfies a want which is felt particularly at this time, the commencement of the outdoor season of practical operations. It is not, therefore, necessary to rehearse the claims of this process upon your attention before proceeding to describe the main features of Mr. Gordon's mode of working.

In preparing the following instructions for the guidance of practical photographers desirous of adopting the gum-gallic process, it should be stated at the outset that considerable latitude may be allowed in the mode of conducting the several manipulations, and judgment exercised in varying, within moderate limits, the strength of solutions and periods of washing and exposure, according to the season of the year, climate, and other circumstances. It is satisfactory to know that Mr. Gordon has succeeded equally well in working this process at home and abroad; we have it on record that plates were prepared at Madeira, in May, 1867, then packed with the usual precautions, and transmitted by the long sea voyage to this country. They were afterwards exposed and developed upon Mr. Gordon's arrival in England at the expiration of three months, and gave perfectly satisfactory results. Illustrations selected from a large stock of gum-gallic negatives are now submitted for inspection, and some of these furnish evidence of the possibility of preserving clear glass upon development in those portions of the plate not exposed to light. This is particularly evident in the stereo-negatives with clear space between the twin pictures corresponding to the blackened partition in the camera. There is, indeed, a remarkable immunity from tendency to fog; so that it becomes possible for the operator to avail himself freely of the benefits arising from long exposure. No inconvenience has been felt on the score of blistering of the film, which Mr. Gordon seems disposed to attribute, in cases where it appears, to the employment of too thin a layer of India-rubber or too thick a substratum of albumen imperfectly coagulated, applied as a preliminary coating, or to the use, perhaps, of an inappropriate solvent for the caoutchouc.

Details for Working with Plates Measuring $7\frac{1}{4} \times 4\frac{1}{2}$ Inches.

Preliminary Coating.—A solution of India-rubber in chloroform; strength one grain to the ounce. This dries immediately, and is preferred to the use of albumen.

Collodion.—The glass plate, with its India-rubber film, is then at once coated with collodion, and immersed, after the usual interval, in the silver sensitising bath. With regard to the collodion, a suitable quality is prepared by adding two grains of bromide of cadmium extra, per ounce, to Mawson's "collodion for iron development;" or, to six drachms of the normal collodion of the same maker may be added the following sensitising solution:—

Alcohol (sp. gr. 805)	2 drachms.
Iodide of cadmium	3 grains.
„ ammonium	1 grain.
Bromide of cadmium	1 „
„ ammonium	1 „

If it be desired to prepare collodion specially for this purpose, take as the maximum proportion—

Ether	4 drachms.
Alcohol (sp. gr. 805)	4 „
Iodide of cadmium	3 grains.
„ ammonium	1 grain.
Bromide of cadmium	3 grains.
Soluble cotton, about	6 „

Instead of the last-named ingredient Dr. Liesegang's "papyroxyl" may be employed, but it will not carry so high a proportion of sensitising salts; the iodide of ammonium should then be omitted. In any case use a

Silver Bath, of strength not less than forty grains to the ounce, and as nearly neutral as possible. Time of immersion in this bath ten minutes, or fifteen minutes if the highly-charged collodion be employed.

Washing the Film must be accomplished by removing the sensitised plate into two successive dipping-troughs filled with distilled water. Streaks are caused by attempting to wash under a tap. When taken from the second trough the plates require to be immersed for about

* Read at a meeting of the London Photographic Society, Jun 8, 1869.

two hours in a comparatively large bulk of distilled water; and Mr. Gordon employs for this purpose a very convenient form of apparatus —a large dippingbath made entirely of ebonite, with close-fitting cover, and inner rack grooved so as to hold eight or more plates. The rack is suspended within the bath by means of a hook whilst the plates are being introduced, and, when charged, let down to the bottom, the glasses themselves resting upon two round bars or cross pieces, so as to permit of free diffusion. Finally, flush with distilled water from a washing-bottle, and apply the preservative. Common water may be used for the prolonged immersion, if it be afterwards displaced from the film by pure water.

The Preservative is composed of—

I.	Gum arabic	20 grains.
	Sugar candy	5 ,,
	Water	2 drachms
II.	Gallic acid	3 grains.
	Water	6 drachms.

The latter is prepared with the aid of heat, mixed with I. in the proportion indicated, and filtered through sponge at the time of application. Air-bubbles should be avoided by inclining the sides of the recipient vessel at such an angle as to prevent splashing.

For each plate half-an-ounce of the gum-gallic preservative will be required; apply one drachm of this for the purpose of ridding the film from water, and follow up with the remaining three drachms worked over the plate for about a minute, then poured off and the glass reared up to drain. This last operation is facilitated by standing the plates upon small dice-shaped tubes of glass, through the centre of which a morsel of blotting-paper is passed which can be renewed without disturbing the plate, which rests merely at one corner in a small circular cavity drilled through the glass. The dimensions adopted in this useful little contrivance are one-inch cube, with aperture on one side of about an inch diameter. Failing this special glass rest, miniature tumblers may be employed if supported rigidly by being let into the base-board of the drying-chamber; the top corners of the plates are invariably supported against glass faces whilst draining; and each niche is numbered for convenience of preserving memoranda relative to the preparation of the plate.

The Drying Chamber is an ample wooden box or cupboard with all joints made light-tight, and a movable shelf for the accomodation, if necessary, of a double series of plates; it has a ventilator at the top, bent twice at right angles, like a magic-lantern chimney. In damp weather a small tin can of hot water should be placed in the middle of the drying chamber; but as a rule, in summer time, this will not be required. The time ordinarily occupied in drying the plates is ten or twelve hours; the film then appears transparent, and, to prevent blurring, must be backed with pigment.

Backing of the Gum-gallic Plates.—Quantity for preparing eight plates. Take—

Burnt sienna, ground in water	100 grains.
Dextrine	30 ,,
Glycerine	2 minims.

The addition of a trace of carbolic acid prevents fermentation of this mixture, which can then be charged into collapsible tin tubes, so as to be ready for use at any time. The dry plates, being rested in the dark slides or carriers, are brushed over the back with this pigment, leaving a narrow margin all round to prevent the possibility of its creeping on to the face of the plate. When dry the carriers may be closed and packed for transmission.

Exposure in the Camera.—Give twice, or, better, three times the period required for wet plates. As already stated, the plates will bear long exposures without much detriment; and the error should always be on this side, since the development can, if necessary, be moderated.

Development.—With wet sponge remove the pigment from the back of the plate. The margin of the negative is then painted for about one-eighth inch all round with a thick solution of India-rubber in benzole or chloroform. Immerse in *dipping bath* of ordinary water, and flush twice with distilled water to get rid of the preservative. Apply then the developer compounded as follows, the first being a stock solution:—

I.	Gelatine	64 grains.
	Glacial acetic acid	2 ounces.
	Water	14 ,,
II.	Sulphate of iron	25 grains.
	Water	1 ounce.

For use mix one part of the gelatine solution with three parts of the iron; take half-an-ounce for each plate, adding two drops of a thirty-grain solution of nitrate of silver, and increasing the amount of silver by two drops at a time as the details come into view. Intensify with any of the ordinary citro or aceto-pyrogallic intensifiers. Two grains each of pyrogallic and citric acid in an ounce of water will answer.

Fix with hyposulphite; and subject the negative to a supplementary treatment with pyrogallic and acetic acids, more for the purpose of changing the colour of the deposit than of adding to its substance.

Blurring may be prevented, or reduced to a minimum, by the addition of ten drops of glycerine to each ounce of the gum solution. With this modification the film will not become transparent on drying, but will work very much like wet plates; they will not, however, keep good for more than a fortnight.

The foregoing description contains, it is believed, a full statement of Mr. Gordon's plan of operations, which may be conducted almost with the same facility as here described, and will be found to give results of almost unerring certainty; so much so that Mr. Whiting, who has favoured us with an independent account of the gum-gallic process as worked by himself, states that, out of a parcel of eighty plates exposed by him last summer in Scotland, only *six* failed to furnish good printing negatives on his return. It should further be mentioned that the employment of ordinary collodion, immersed for the usual time in the ordinary silver bath, washed *once* with distilled water, and then under a tap, will give successful results; but such dry plates will not keep so long nor be equal to the standard of excellence attainable by the above process.

John Spiller, F.C.S.

ALKALINE DEVELOPMENT FOR DRY PLATES.

The subject of alkaline development for dry plates was, according to previous arrangement, introduced for discussion by Mr. Howard at the last meeting of the South London Photographic Society. Mr. Howard's remarks were as follow:—

To venture on the important discussion of the relative advantages of the aklaline and plain pyro. development of dry plates would, at this hour, be doubtless very undesirable; but as we do not meet again till most of the opportunities for exposing dry plates will have passed, I would willingly, as it has been allotted to me, open the question by detailing my experiences of the advantage of the alkaline method of development. The negatives which I have brought to the meeting were prepared by the collodio-albumen process; but gum, tannin, and the washed albumen, or Fothergill processes, all admit of the same method of development. The solutions necessary are— 1. Plain pyro., three grains to the ounce of water. 2. Five minims liquid ammonia to one ounce of water. 3. Bromide of potassium eight grains, water one ounce. 4. Citric acid five grains, water one ounce. 5. Silver ten grains, water one ounce. By applying these solutions as follows most rapid development will be effected, shorter exposure will be allowed, and, with care, no fog should be seen on the plate. After moistening the surface of the plate, pour over sufficient of solution No. 1, having four or five drops of solution No. 3 added to it. Now add two or three drops of No. 2, and the image will appear very rapidly, but will only develope, not intensify. The image having been well brought out well wash the plate, and flush with citric acid solution. Having removed all trace of alkalinity, intensify with citric acid and silver without pyrogallic acid. As regards advantages by the alkaline developer: you save time, the processes of development and that of intensification are kept separate, shorter exposure is allowed, and, after a very little experience, there is no fear of fogging the plate. Mr. Mawdsley has described this method as very successful, and, in drawing a comparison of its advantages (if any) over plain pyro., I venture to say that it is a step on the ladder to rapid dry-plate photography. F. Howard.

ON A METHOD OF PRODUCING ENLARGED TRANSPARENCIES WITH CRAYON-LIKE EFFECTS BY A SINGLE OPERATION.*

The subject of my paper this evening is a simple method of producing engraving, or crayon-like, effects in photographs; and should I be found wandering and introducing other photographic matter, pray be patient and grant me a little indulgence.

When taking negatives purposely for enlarging, reproducing, or for transparencies to be viewed by reflected light, it is absolutely necessary that, to produce the best results, the negative should be sharp, thin, and full of detail—in fact, an unintensified iron picture.

I shall assume that I have got such a negative, and wish to produce a crayon-like effect in a transparency from it. I first take a piece of ground glass and hatch lines thereon, *à la* Sarony. This glass is placed against a window and a thin negative taken therefrom, reduced in size to suit the picture to be photographed. But

* Read at a meeting of the South London Photographic Society, June 10, 1869.

bear in mind that what represents crayon lines should be perfectly clear glass. If it be desired that the crayon-like lines should be strong and dark in the finished picture, it may be necessary to slightly intensify the negative representing those lines, but in my experience I have found it unnecessary.

All that is now required is to place the negative with the crayon lines against the negative portrait and copy the whole together, vignetting the picture, if desired, in the ordinary way.

Another method of making crayon vignetting masks is to place the ground glass containing the crayon lines against a window; then place a glass positive vignetting glass in front, or a piece of black paper cut out the form of the figure to be photographed. A copy of this is to be taken in the camera.

We will now have a black or opaque margin with a transparent centre. The part emerging from opacity to transparency will have the hatched lines. All that is now required is to put the crayon vignetting glass and negative together, as before described, and a transparency taken from it to the required size. This glass will answer for any other picture of the same size; or the crayon vignetting glass may be made any size to suit the picture. This will, to a great extent, overcome one of the difficulties of the Sarony crayon portrait.

Here is a simple method of vignetting transparencies which, I think, is more applicable for producing crayon vignetting glasses, or for ordinary vignette glasses for paper printing:—

It consists of two long pieces of wood with slots down the centre and bound together by a screw, so that it may be shortened or lengthened at pleasure. At the bottom of this piece of wood is attached a frame with another inner frame, sliding with a lateral movement. At the top of the sliding bars is a cross-piece of wood like the beam of a pair of scales, somewhat sharpened, so that when the sharpened edges are placed on a flat surface the whole machine will swing like the pendulum of a clock. I need scarcely say that the greater the swing while the exposure is going on the softer will be the gradation. One curious thing in connection with this style of vignetting is that the opening of the machine through which the picture is to be photographed acts as a diaphragm, and, as it were, opening and shutting itself and diffusing the focus of the image.

In conclusion: I may sum up the advantages of this style of producing crayon-like effects in photographs. Any size of picture can be taken from the same negative. The crayon lines will represent the same proportion to the figure by enlargement. A solar enlargement can be taken containing the lines, and great labour be thereby saved. Photographic dealers could supply, at a small cost, pattern crayon masks of all sizes and designs to suit the tastes of their customers. The same mask will suit any picture of a similar size. Lastly, the idea or process is not patented.

A. L. Henderson.

JOHNSON'S CARBON PROCESS.

The following synopsis of the new carbon process was given by Mr. Johnson, at the last meeting of the London Photographic Society, previous to his proceeding to demonstrate the working of the process, which, as we stated last week, was accomplished in a very satisfactory manner. For full details concerning the manipulations we refer to our number for April 2nd:—

1. The first operation consists in sensitising the tissue. This is effected by floating it for one minute on a bath of bichromate of potash, containing one ounce of the salt in thirty ounces of water.

2. The sensitised tissue, thoroughly dry, is then exposed under a negative until a piece of silvered paper marks a tint of a light chocolate colour—say about one-fourth of the exposure required for albumenised paper.

3. The exposed tissue is then immersed in water, and laid, face downward, upon any impermeable surface. This is best done under water. If the print be intended to remain upon the surface upon which it is thus laid, that surface must be extremely clean and free from grease; but if the surface be employed as a temporary support, it must, on the contrary, be covered with a thin layer of wax, or wax and rosin, &c., &c.

In the present case we propose to use a temporary support, viz., a glass or metal plate.

4. After the wetted print has been laid for a few minutes on the plate, it must then be developed by immersion in water heated to about 95° or 100° Fahr. The paper at the back of the tissue is removed after about one minute's immersion; and the soluble gelatine, unacted upon by light, is then washed away, leaving a perfect picture on the plate, which is finished by simple washing in cold water.

5. If the print thus obtained be not intended to remain upon the plate, it is transferred by being brought into contact with paper coated with albumen or gelatine. If the gelatine sheet be immersed in water containing a small quantity of alum, there is no occasion for subsequent immersion in a solution of that salt.

6. For those who prefer a picture which shall be absolutely insoluble in boiling water, the print obtained on gelatinised paper must be immersed in a weak solution of shellac in aqueous ammonia. This penetrates the gelatine, and, becoming insoluble after the ammonia has volatilised, combines with it and forms a compound upon which water, hot or cold, has no action. Or the shellac may be used in place of the gelatine, the solution being laid upon the paper and upon the print with a flat brush, and the two surfaces brought into contact.

When the print with its attached paper has become perfectly dry, it usually falls from the plate which has acted as a temporary support, and only requires to be cleaned with a little turpentine to be complete. These, Mr. President and gentlemen, are all the operations necessary for producing the prints, which I now remove from their supporting plates and lay before you.

NEW METHOD OF TREATING A DISCOLOURED PRINTING BATH.

The discolouring of the printing bath, after it has been for a short time in use, is a subject which has frequently engaged the attention of photographers. Although a strong solution of nitrate of silver renders the albumenised surface of the printing paper insoluble, it does not in ordinary practice do so to such an extent as to prevent some of this organic coating from being dissolved, and, as a matter of course, giving rise to discolouration.

Animal charcoal is recognised as a powerful agent both for disinfecting and decolourising; hence it is not to be wondered at that its services in the latter capacity were early utilised in the restoration of discoloured printing baths. After a reign of several years it was eventually deposed; and, at the present time, kaolin has assumed the position formerly held by animal charcoal. Other substances, however, have been proposed for this purpose, and some of them have been employed with much success. Of these we may mention chloride of silver, a small portion of which is retained in the stock bottle and is shaken up at intervals. Carbonate of silver is said to have the same effect.

In December, 1860, Mr. Tunny proposed a method of decolouring the bath which he had found to prove successful. It consisted in making the bath slightly alkaline, and adding thereto a few drops of a saturated solution of citric acid. A flocculent precipitate was deposited, which, however, was nearly all redissolved by a little shaking. When filtered the bath was found to be as bright and clear as it was originally.

Mr. England has communicated to the *Journal of the Photographic Society* another method of removing the discoloured organic matter from the printing bath. It is based on the simple principle that, if a mixture of albumen and water be boiled, the albumen will be coagulated and will sink to the bottom as an insoluble body. This operation is well known to those who have occasion to clarify such solutions as those of gelatine, sugar, &c.; for, thoroughly miscible with these solutions when cold, the application of heat causes it to fall, and, in so doing, to carry with it every particle of insoluble matter in the solution.

As we have said, the silver bath for printing rapidly acquires a large accession of albumen abstracted from the paper that has been excited; but at this stage we give place to Mr. England, whose description is as follows:—

"When the silver solution has become red or discoloured from repeated use, pour it into a porcelain evaporating dish supported on a gas or other convenient stove, and raise the liquid to the boiling point; continue the ebullition for ten minutes or a quarter of an hour, at the expiration of which time the organic matter will have been precipitated or destroyed. After subsidence and cooling down to the ordinary temperature, the nitrate bath, however much discoloured before this treatment, will be found once more quite clear and bright. If the solution should be required for immediate use after boiling and cooling, filtration can, of course, be resorted to in the usual way. Those who adopt this method will be surprised at the large amount of albumen which becomes dissolved by the nitrate bath during once or twice using, and which, by the simple method above described, will be coagulated and precipitated in the black deposit, which should not, of course, be wasted, but thrown into the receptacle for silver residues. I may also mention that it is necessary to measure the silver solution before boiling, so that an equiva-

lent amount of water may be added to replace that lost by evaporation. If it be suspected that the bath is below the standard strength, the whole or a portion of the water may be omitted. I feel sure that those who once adopt this method of treating the discoloured solutions will for ever discard the use of kaolin, as being a much superior and efficient system of purification, less troublesome, and more economical. "W. England."

SPIRIT PHOTOGRAPHS.

It was our intention to have published in connection with the termination of the Mumler trial the following letters on the subject which appeared in the *New York Tribune*, but our space was then too limited. With their publication we may assume the matter to be closed.

CAN A SPIRIT BE PHOTOGRAPHED?

To the Editor of the Tribune.

Sir,—It is sometimes a thankless task to oppose villany. It is always a thankless task to throw yourself against a popular belief, with nothing in your hands but a new truth. Mr. Mumler may be a villain. I do not know the man. I never saw him. If he is a trickster, his villany is of the darkest hue, for he speculates on the holiest instincts of men. I have nothing to do with Mr. Mumler. He may be honest, or the Court may find him a swindler. The questions raised in this trial do not turn on the innocence or guilt of one man.

Can a spirit be photographed? Whether Mumler be acquitted or convicted, most intelligent men will say No. Ask them why, and they cannot tell you. They have certain vague ideas of a spirit as something incorporeal. They dismiss the question with an *à priori.* One day, in a conversation with Herbert Spencer, I told him of certain facts which had led Alfred Wallace to a belief in the nearness of a world of spirits and the communion of spirits with mortals. Mr. Spencer met the facts by saying that he had settled the question on *à priori* grounds. Wallace is one of the first naturalists of Europe. He tells me he has seen and heard certain things, and I, making my own experience a measure of the universe, dismiss his testimony as contradicting nature. Is that the method of modern philosophy?

I have brought to the investigation of this subject no wisdom above that of common sense; but I have not followed the Spencerian method. In common with many others I have sought only to find the truth, and have been content to keep the results I have reached to myself. Some of these results I will now give to the public. Gentlemen of the *à priori* method may dismiss the subject now and here.

In February, 1867, I formed the acquaintance of a photographer living in the Connecticut Valley. I had gone to his rooms for a photograph. While sitting for the picture I saw that the artist was strangely agitated. When the plate was developed a bright but vapoury female form appeared standing at my side. I had never heard of Mumler or spirit photography. I asked the photographer how that form got on the plate; he did not know; he could only say that while he was photographing me he saw that woman standing at my side. He did not want the picture taken from his gallery, and wished me not to speak of it. He told me that now and then, for years, he had taken such pictures; that they came through no agency of his; that he could take them almost any time by yielding to the control of beings which he believed to be spirits, but he wanted nothing to do with it. He would not have his name mixed up with spiritualism in any form.

I had such confidence in my friend's honesty, that I wished to make an investigation of this strange power. It was only after many interviews and much urging that he consented to give me sittings, and yield to the "invisibles." I offered to pay him generously for his time, but he declined any consideration, saying that he could not be tempted to use this mysterious gift for gain. He gave me every facility in making the investigation. I took a friend to assist me. We had his time for four afternoons. We had the utmost confidence in him, but made the investigation as if he were a trickster. I assisted in preparing the plates, and stood by while the pictures were developed. We took *every* precaution to prevent or detect trickery. At almost every sitting we got the photograph of a woman—the same bright, vapoury form that appeared when I went alone, or *thought* I was alone! And at almost every sitting the photographer was partially entranced. What shall we say? He is a man of position and character. I would as soon think of flinging the charge of falsehood against the Chief Justice. He had no motive to deceive. He would not sell his gift for money. If I believed him capable of falsehood, still I should be unable to account for the pictures. I know of only two ways by which a photograph can be taken. It must be taken either by *reflected* or by *transmitted* light. To get a picture on the sensitised plate, something capable of reflecting light must be placed at a proper distance before the lens; or the plate may be sensitised and covered by another picture, and then exposed to the light. A dim picture will be printed on the sensitised plate by *transmitted* light. These are the only methods by which a photograph can be *taken.* The artist may use an old plate, and a picture may appear, the result of a latent impression left by an old photograph. This last is a solution proposed by a writer in Saturday's *Tribune.* My artist did not use old plates. He must find the solution in one of the other alternatives. Now I know that my artist did not hold an old negative to the sensitised plate and get a ghostly impression by transmitted light. We have one more alternative: was an object placed before the camera? This is the way the bogus Shenstone ghost was photographed. A sheeted man flitted ghost-like before the camera. Were *these* pictures taken so? The photographer, myself, and my friend were the only persons in the room. Could we have been deceived for four days by such a shallow trick? And, if we were deceived, how did the confederate who personated the spirit make herself transparent? How did she suspend herself in the air? for one of these photographs is the picture of a woman floating down through the air. They are all as transparent as gossamer. How, then, were they taken? I was in no haste to form my conclusions. Another case came under my notice.

A young girl in Chelsea called on one of the leading photographers of the city to have some tintypes taken. He was about to close his rooms for the day. The girl sat, and, while the picture was taking, she felt a blur coming over her eyes. She spoke of it to Mr. A., who was standing by the camera. He told her she might wink, but she must sit still. When he developed the plate a pair of hands appeared on each face! There were eight faces on the sheet. This photograph is very remarkable. I have examined four of the impressions, and have one of them in my possession. The hands are clasped around the girl's neck. They are shown up to the wrist, where they fade away into a formless vapour. They are transparent. One hand comes down over the girl's chin, and you see right through it the perfect outlines of the chin. There is a wonderful family likeness in all these pictures. Judge Edmonds testifies that the spirits he sees are transparent; and one of the leading doctors of divinity of New England (orthodox) tells me that he sees spirits in the same way.

Now, you cannot suppose that these hands had been photographed on the tin before. The photographer tells me that he used a new sheet. Suppose I do not believe him. How, then, did the hands appear *over* the face? Can you suppose the hands were photographed *after* the girl? You will see that the little finger and ring finger on the left hand are thrust under the girl's collar. You must say, then, that girl and hands were all taken together. And now, did some one steal in and clasp her hands around the girl's neck, and still elude the eye of the artist? He tells me that no one was in the room but himself and the girl. Suppose some one did steal in, how did she make her hands transparent and conceal the rest of her body? The photographer is a man whose word no one will doubt. He tells me that he had never thought of spirit photography; that he has no theory; that he only knows the hands came through no agency of his.

Now, gentlemen — you who have not settled these questions on *à priori* grounds—can you escape the conclusions to which I have been driven?

First: That the sensitised plate may be more sensitive to light than the human eye.

Second: That men and women—spirits, but not incorporeal—can, under certain conditions, clothe their person with elements sufficiently tangible to reflect light.

If these things are true, the world had never such need of knowing them. We are losing our faith in immortality. We cherish a vague belief that the dead are still living; but we think of them as gauzy abstractions, without form or substance. The men who give precision to their talk of the after life, and tell us their faith that our loved ones who have gone before are *real* human beings, with human forms and human affections—we call them dreamers. Hallucination is the mildest word we apply to them. While reading a report of the trial of Mumler, and finding lawyers trying to break the testimony of witnesses because of their belief in spirits, I thought of the words of a living German philosopher:—"No one who has eyes to see can fail to remark that the belief in the immortality of the soul has long been effaced from ordinary life." We swear a witness on the Bible, and then impugn his testimony if he believe in spirits!—believes that the writers of the New Testament were not mistaken when, on almost every page, they speak of spirits, and admonish us "to *try* the spirits!" Whither are we drifting? How would an item like this appear in the *Tribune?*

The Bishop of Rhode Island has written to the Bishop of New York that three men whom he had known in Providence appeared to him, and talked with him after their decease. The Rhode Island Bishop thinks that bad spirits can personate good ones and deceive us; but he is confident that these three spirits were really his friends. The Bishop of New York has replied that, doubtless, there are deceitful spirits and false visions, and wishes that we had some sure means of distinguishing them from the true.

Our table-talk over such an item would be a measure of our departure from the faith of primitive Christianity. For the Bishop of Rhode Island put Exodius, a Bishop in Africa, and for the Bishop of New York put Augustine, and for the nineteenth put the fourth century, and you have an historical truth.

But spiritual gifts have ceased. No Testament has told you so. But modern science avers that spirits are illusions. *What* science? If a tree had sense and science, I suppose that such poor science as it would develope might say, "Animals are illusions; they come and go out of dead spaces, by no vegetable law, and our science of stumps avers that

birds are apparitions, and that the birdless and beastless wilderness is vegetable orthodoxy. W. D. L.

Boston, Mass., April 26, 1869.

SPIRITUAL PHOTOGRAPHS.

To the Editor of the Tribune.

SIR,—The question has been frequently asked during the Mumler trial—Why, if it be not a deception, cannot he produce his articles in some other establishment than his own?

In answer, I beg space for a brief statement of facts within my own knowledge and experience. With a desire to fully investigate this subject, I invited Mr. M. to visit Poughkeepsie. He accepted, and on the 30th of March last came to our rooms.

I had, previous to his visit, made every arrangement possible for a full investigation, removing all old negatives from my operating rooms, preparing fresh plates from glass never before used, and putting everything in a shape to prevent or detect any attempt at imposture. A reward of $50 was offered by me to any of our *employées* who should succeed in detecting any trickery or deception.

Mr. M. entered our operating rooms without any previous preparation or appliances whatever, and with the camera, chemicals, &c., in daily use by us, and under the closest scrutiny of my operator and myself, produced at once his so-called spirit pictures. In three instances during our experiments my operator performed all the manipulations himself, from the coating of the plate to the developing of the pictures; the result in each case being the same, a second figure appearing upon the plate. In one instance the camera was taken into the developing room by him, the plate-holder there removed and thoroughly examined and the picture developed. Result the same, no second negative or mechanical arrangement whatever being discovered. One fact is worth more as evidence than all the theories in existence, and it is a fact that Mr. Mumler's pictures were produced in our rooms, with our instruments, chemicals, &c., without his touching the plates or taking any part in their production whatever, save only that of laying his hand upon the camera box during the time of exposure. The theories advanced by so-called experts all involve previous preparation of cameras, plate-holders, &c., none of which was it possible for Mr. M. to have made upon this occasion. The different processes described by them, by which Mr. M.'s pictures may be imitated, are known to most photographers. They may prove a satisfactory explanation to the minds of said experts, none of whom have investigated Mr. M.'s operations themselves, but are far from satisfying those who have. Messrs. Gilmore, Gurney, Silver, and myself, with a host of others, know they utterly fail to afford a solution of the problem, or account for the facts within our knowledge. I will pay $100 to any *expert* who will come to my rooms, and under the same circumstances that Mr. Mumler's pictures were produced there, do the same by natural means without detection. If he succeeds, and can give a satisfactory explanation of the matter, I will promptly acknowledge the fact to the world, and thank him for the solution of a mystery beyond my comprehension.

My operator was present at the trial on Friday last, ready to give his sworn testimony to the facts stated. His testimony was not admitted, on the ground that what occurred in Poughkeepsie was foreign to the case; and yet the question is asked—Why cannot Mumler produce his pictures in some other gallery than his own? It would seem, if the desire was to arrive at the facts in the case, and not to condemn the man, innocent or guilty, that any evidence tending to a solution of the matter should not have been ruled out upon mere technical grounds. A sworn statement of the facts mentioned has been made by my operator, and is now in the hands of Mr. M.'s counsel. Mr. M., while here, was not only thoroughly watched by those immediately about him, but also by our printers, who, stimulated by the reward offered, and believing the whole thing a deception, had loopholes prepared looking from the printing room above into the developing and dark rooms below; and during the little time Mr. M. was left unwatched, or supposed himself to be, his every movement was noted by them. They failed to detect anything in his operations different from the ordinary process. I have no personal interest in Mr. M., and had no acquaintance with him previous to a casual visit made to his rooms in New York, where, at his invitation, on learning I was a photographer, I investigated the subject as far as possible. Not being fully satisfied there, although unable to detect any sign of imposture, I induced him to visit my rooms, with the above result. WM. P. SLEE.

Poughkeepsie, N. Y.

Our Editorial Table.

PHOTOGRAPHIC PRINTING IN CARBON AND OTHER PIGMENTS.

By WILLIAM BLAIR.

IN our last number we briefly announced the publication of Mr. Blair's new work on carbon printing, promising to return to it on the earliest possible occasion. This we now do. Before, however, proceeding to a detailed notice of the book, it may be desirable that we say a few words on Mr. Blair himself and his connection with carbon printing.

About eleven years ago Mr. Pouncy, of Dorchester, patented a carbon process, which consisted in coating the surface of paper with a mixture composed of gum arabic, vegetable carbon, and bichromate of potash. This was printed on in the same way as silvered paper—that is to say, the negative was applied to the face of the pigmented paper; but, as it was obvious that no gradation could be secured in this way, Mr. Blair, who experimented with the process, discovered the principle which lies at the foundation of all successful effort to secure gradation, namely, that to get a good picture the carbonised film must be lighted from the back of the sheet, or, more strictly, the side next to the paper. Without this discovery carbon printing could not have become the accomplished fact that it now is. As this discovery was made in 1859 it will be seen that Mr. Blair is a veteran in this department of photographic art.

The opening chapter of the work is introductory and partially historical, and ushers in a series of chapters replete with the practical details of various processes invented and worked out by the author. Indeed, we may here observe that Mr. Blair avoids, as much as possible, going over the old ground now generally known to photographers, and confines himself to matters and processes on which the public are, for the most part, quite uninformed.

Of the various processes detailed we select as an excellent specimen of the work the first section of the second chapter—this chapter being devoted to the production of carbon prints *without* transfer, and the special process described in the first section being that designated as the "simplest method."

"By this method I have produced prints which competent judges considered good, and I now proceed to explain the process in its simplest form. The main characteristics of the process may be first stated and the details given afterwards. As nothing could be simpler in the manipulation than my original process of sunning through the paper, I have fallen back upon it with a slight but important modification. I cover one side of thin paper with pigmented gelatine, and when it is sensitised and dry I sun it through from the back against which the negative is placed. The novelty, or what I believe to be a novelty, which I have here introduced, however, is a method of rendering the paper *temporarily* transparent while being sunned, so that it recovers its original whiteness on the picture being developed. To accomplish this I use turpentine or other volatile oil or spirits, the evaporation of which is retarded during exposure, but which afterwards leaves the paper so completely, that though during the last twelve months I have shown many prints by this process to various persons, they have never detected the treatment mentioned. This is the main idea on which this process is founded. As far back as 1859 and 1860, when I was working with waxed paper, I endeavoured to attain the same end by dissolving the wax out of the paper when the picture was developed, but I did not succeed in restoring the paper to its original whiteness.

"Though I have now stated the principle on which this process is founded, I have ascertained that, in practically carrying it out, there are a number of minor details that require attention, and, indeed, are essential to success. For instance, only some kinds of paper can be used. Paper sized with gelatine will not answer; and, even with suitable paper, if the hot carbo-gelatinous compound is poured on its unprotected surface, it will penetrate, to some extent, the pores of the paper, and grasp hold of the small films or fibres on its surface, and, to that extent, afterwards intercept the passage of the turpentine or spirits, and produce irregular and partial transparency. I have found it necessary, therefore, when I am to coat the paper direct with pigmented gelatine, to give it a previous coating of albumen, and partially coagulate the albumen with spirits. Starch and other substances may answer, but I have only tried albumen. Albumen does not resist the penetrating power of the turpentine as gelatine does, and it keeps the gelatine entirely outside the paper. By this expedient we can get the fullest transparency of which the paper is susceptible, and yet have one surface covered with pigmented gelatine, out of which the picture is to be obtained. There are other particulars which will fall to be noticed in detail.

"1. Select a very thin fine-grained paper, which, when dipped in turpentine or other volatile oil or spirits, will become very transparent. Paper sized with gelatine will not answer. I have found some tracing paper very suitable, but the best I have yet used is the thinnest Rive. If this paper were manufactured somewhat thinner than the thinnest at present in the market it would be exceedingly good for the purpose. Let this paper be albumenised on one side. Brush the albumen over with methylated spirits; and if the spirits are not very strong dry smartly before a common fire, so as to coagulate the albumen pretty stiffly. But it is better that it should not be rendered *thoroughly* insoluble at this stage. Each sheet, for the sake of greater regularity, should be brushed and dried separately. Of course immersion in a large dish of spirits will answer the same purpose as brushing.

"2. Prepare some fine pigmented gelatine. What I generally use is equal parts of Cox and Nelson's gelatine with about a fourth part of fine sugar, and a very little common salt. Add six or eight parts of water

(according to the temperature of the weather) in which a suitable quantity of India ink or other pigment has been dissolved or mixed; and when the gelatine has well soaked and swelled in the cold water, subject it to heat till thoroughly dissolved, and then strain it through fine linen or flannel. It should be strained into a long bottle, so that any grit may sink to the bottom. It is now ready for use. The albumenised side of the paper is coated with this mixture, but not in any greater quantity than is sufficient to produce the depth of shade afterwards wanted in the picture. I shall describe my method of making this and other gelatine tissue in a separate chapter. What has specially to be attended to in the above tissue is, that only the finest of the gelatine mixture should be used, and it should be used of a consistency and at a temperature that will make it *set* quickly, so as to prevent any subsidence of the floating particles to the surface of the paper, where the lights and half-shades are ultimately formed. When dry it can be kept in stock for any length of time.

"This, then, is the paper on which the picture is to be taken. It could be made and sold at a very moderate price, as albumenised paper is at present, and the process then would be much simpler than silver printing.

"3. The next step is the sensitising, The paper is *floated* on a bath of bichromate of potash or ammonium—strength, one part of bichromate to twenty or twenty-five parts of water—for four or five minutes, taking care to keep the back of the paper clean. It is lifted up slowly and steadily by one end, so that it is drained by the time it is lifted, and it is then laid down on its dry back on a broad board. Another sheet is sensitised in the same way, and laid beside it; and so on, till the board is nearly covered. The papers are then pinned at their upper corners, and the board is raised on one end, and laid against a wall or other support, so that the papers shall drop forward and hang free of the board. In this position they are left to dry. Of course a good drying place should be selected from which light is excluded. As the coating of gelatine in this process need be no thicker than what is needed for good deep shadows, it may be dried in a comparatively short space of time. This will be found a great convenience. I generally pin long slips of cork to the bottom of the sheets, to keep them from curling up in the course of drying, and sometimes put them in a book, when dry, under pressure for a short time before printing, to flatten them.

"4. *Printing.*—Place your negative in its place in the frame. Take your sensitive sheet, lay it face down on a sheet of blotting-paper, and with a soft brush put as much turpentine over the back of it as will saturate the paper. It is better, of course, that the paper be *thoroughly dry* before this is done. Then, with a small sponge or the front of your finger, sweep the surplus turpentine to the sides, and on to the blotting-paper, until the sensitive paper looks nearly surface-dry. Then place the paper, back down, on the negative; lay the pad on, and shut up. The turpentine thus imprisoned will keep the paper transparent for hours if necessary. But in sunshine or a good light a few minutes will generally suffice; the exact time must be ascertained by experience, or a photometer may be used.

"5. *Development.*—When released from the printing frame the turpentine may be allowed to evaporate for a short time, and then the print should be placed for some minutes in cold water, after which warm water should be added gradually, when the picture will soon show itself. It must then be watched, and taken out when ready, or allowed to steep for a time in cold water (if it has developed rapidly), so as to get quit of the unaltered bichromate. It may be fixed in alum, if thought necessary. On drying, it will be found that the turpentine has gone, and left little or no trace behind.

"I may here mention that sometimes when the weather was dull, and I anticipated a long exposure, I have mixed a very little nut or poppy oil with the turpentine to retard its evaporation, and found it rather a benefit.

"By this process reversed or transferred negatives are required, just as in any of the single transfer processes, where it is necessary to preserve the correct position of the objects in the picture, as regards right and left; and I should here also mention that some attention is required in the varnishing of negatives to be used in this process. Some of the varnishes commonly used for negatives will not answer, as the turpentine softens them. What I have found best is to give the negative a coating of clear gelatine, and spirit varnish may be used above the gelatine.

"If any difficulty is experienced in obtaining good small pictures by the above process, there is nevertheless a large class of subjects that may be well represented by it—landscapes and particularly architectural subjects—and the ease of working it is a very great convenience. When Rive paper is used you can see the impression made on the back of the white paper immediately on taking it from the frame; and, indeed, it could be examined in that respect in the course of printing, so as to judge of the exposure. You can also easily see the impression within the gelatine by holding it against a candle, as the coating is not required to be very dense or opaque. This allows one to judge to some extent of how the development is to be regulated, and whether very hot water will be required. There is no waste of material, and the whole process is about as cheap and simple as can well be conceived. There are other more complex modifications which I shall refer to by and by. Meantime I shall conclude this chapter by remarking that I am aware that finer and more delicate materials than paper, though varnished or oiled, have been suggested for printing through, such as the 'pellicle Marion' and collodionised gelatine, &c.; still I am not aware that many have succeeded with these, and I have not attempted it, for this reason, that I find a material of considerable strength to be necessary to control the warping and curling, the contracting and expanding, power of the gelatine; and any material weaker than paper becomes almost unmanageable at some stage or other of the work. Moreover, I have also found that some paper *can* be rendered so transparent that it is possible to obtain pictures through it in which no grain can be detected without magnifying power. I have tested this myself, and shall have more to say of it before I have done."

In the other sections of the same chapter we find a non-transfer process by means of ordinary tissue, in which the use of albumen is dispensed with, and a process by which a combination of colours is obtained.

We have in previous articles directed attention to the translucent paper introduced by Mr. Blair; and we observe that he describes some processes depending upon its employment.

But carbon printing may be effected by means of positives or transparencies as well as by negatives, and hence we have a chapter devoted to "printing from a positive *cliché*." Passing, meanwhile, excellent chapters on "white pigments," and on the preparation of "carbon tissue," we find Chapter vii. devoted to a description of "a new tissue and a new process." After alluding to the circumscribed field of action for the paper tissue of the Autotype Company, Mr. Blair says:—

"I am now to propose a kind of tissue, however, possessing different properties, and which, while it may be used for any or all of the known transfer processes with very good results, is more especially required—indeed, seems to be essentially necessary—for the process which I am presently to explain, and by which pictures are obtained in all the natural gradations of light and shade, by direct printing on pigmented gelatine, from ordinary unreversed negatives, without transfer of the print, and without violating the acknowledged correct rule of carbon printing.

"The tissue I refer to is made by the substitution of *cloth* for paper. The composition and texture of the cloth may be varied according to circumstances, the only essential being that it should not be too closely woven. This tissue may be made in various ways. The cloth may be damped, and sheet gelatine, made with the proper admixture of carbon or other pigment or dye, may be pressed into contact with it, and the tissue is made. The gelatinous composition adopted by M. Poitevin or M. Fargier may be used, but a little sugar, syrup, or glycerine may be added with advantage. This tissue may also be made by drawing the cloth over warm pigmented gelatine several times till a sufficient coating adheres to it; or the gelatine may be poured on well-cleaned glass previously coated with ox-gall or wax, either with or without a preliminary coating of collodion, and, after it has thickened, the cloth may be laid down upon it and brushed into contact with a soft brush—the air escaping easily through the cloth—or the gelatinous mixture may be allowed to dry and the cloth afterwards laid down damp upon it. When again dry it is relieved round the edges with a knife and lifted off the glass. The plan that I have usually adopted, however, is this:—I take a piece of the thin, semi-transparent starched or glazed cloth used by architects and land-surveyors, &c., for tracing drawings and plans. I dip this in cold water, and immediately, by means of blotting-paper placed above it, rub it flat and level on a slab of plate glass, to which the damp starch gives it a temporary adherence. Upon this I pour and spread quickly the gelatinous mixture not *very* hot, as the quicker it *sets* after being spread the better. The glass had, therefore, better not be warmed beforehand. Any small quantity that may go through the cloth and adhere to the glass will do no harm; but if the gelatine is used too thin or too hot it will find its way below the cloth in considerable quantity and impoverish the surface. A small margin may be left uncovered all round for convenience in handling. When the gelatine has solidified sufficiently, the cloth is lifted off the glass and hung up to dry. This tissue can be handled wet or dry, and tacked round the edges without fear of tearing.

"For any of the transfer processes this coating of pigmented gelatine should be put on rather copiously; but for the process that I am now to explain the coating need not be so heavy, but a superstratum or skin of clear gelatine, and also a coating of collodion or other strengthening varnish, should be put over the surface.

"This tissue is then sensitised in the bath in the usual way. If a waterproof varnish has been put over the surface it may be sensitised through the cloth, but otherwise it may be immersed or floated as found most convenient. When dry (and it is best to dry it on frames to keep it stretched) it is sunned, with the face of the negative direct against the gelatine surface. A small margin of the blackened surface may be allowed to protrude on all sides beyond the negative, so as to fix the gelatine to the cloth round the margin more firmly.

"The development is effected in warm water, by washing the melted gelatine and loosened pigment out through the back and sides of the

cloth. The water penetrates the cloth so quickly and copiously that the print is soon undermined and loses its hold of the cloth, except, perhaps, at the deepest shadows; and the discharge of the black matter may generally be facilitated, especially if the texture of the cloth is rather close, by raising the print gently from the water and allowing it to escape by the sides. To effect this operation more easily and safely it is well to attach by pins the cloth tissue before development, gelatine side uppermost, to a small floating frame, which can be moved about and up and down in the water, to assist in the disentanglement of the dissolved matter from the cloth. The high lights and half-shades may gradually swell out considerably—indeed rather too much to be manageable, if a waterproof varnish has not been put over the surface; but varnish or collodion will check this. The frame should be kept floating in the water until the picture appears sufficiently developed. It may then be lifted, and the picture allowed to dry on the bare cloth, or it may be turned in the hand, face downwards, and a little warm gelatine mixed with white pigment may be gently poured upon the back. This will find its way through the cloth, and may be run along the back of the picture to soften the grain of the cloth, if that should be desired; or this may be done (better, perhaps) after the picture is dry, only to certain parts of the print, by damping those parts and inserting the pigment. But the minute and regular grain of the cloth is, to my taste, a great improvement to some prints, giving them somewhat the appearance of oil paintings on corded canvas. Indeed, cloth might in some cases be advantageously used as a medium of transfer from paper tissue, and remain as the final support.

"If it is wished, however, to remove the cloth after the picture is developed, and substitute paper in its place as the final support, this is easily done, especially if the starched cloth above recommended has been used for the tissue, as it drops off in the hot water very readily; and white paper can be inserted underneath, and the picture lifted upon it, to which it will firmly adhere on drying.

"The negatives used in the above process should not be completely opaque in any part, unless a tough skin of collodion or varnish has been spread on the gelatine, otherwise the lights may break through into holes. But this outer skin may be rendered so tough with varnish put over the face of the tissue and well dried beforehand, that the picture, if not very large, may be lifted out of the water upon it, particularly if small strips of paper have been placed round the margin in the shape of a little frame, attached to the gelatine by India-rubber or other waterproof varnish. It appears tedious to detail all the minutiæ of these little manipulations, but they become very simple on being reduced to practice.

"I may here suggest that probably some kinds of leather and old useless skins of vellum or parchment might be found useful as a support for carbon tissue, and answer in place of paper; but I canot speak from experience as to this, and unless such skins had otherwise become useless, or nearly so, for their original purpose, their expense would of course operate as a prohibition against their use in this way."

In conclusion: there are so many useful and suggestive observations in Mr. Blair's work that we cordially commend it to the attention of our readers. Mr. Blair is his own publisher; but we presume the book can be obtained through the ordinary channels, or direct from the author, Rosewell Cottage, Bridgend, Perth, N.B.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 18th......	Oldham	"Hare & Hounds," Yorkshire-st.
,, 18th......	Bristol	Philosophical Institution, Park-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 10th inst., and was the closing meeting of the session. The Rev. F. F. Statham, M.A., President, occupied the chair. The June meeting has hitherto been the annual one, at which the officers and council were elected and the report of the Council submitted; but, in accordance with a notice given on a former occasion and formally carried at the present meeting, the laws of the Society were so far altered as to make the annual meeting fall in future in December instead of, as heretofore, in the present month.

The Secretary read the following

ANNUAL REPORT.

Your Committee have much pleasure in submitting to the members of the South London Photographic Society their report for the session ending June, 1869.

The proceedings of the Society have fully borne out the hope expressed in last year's report that the future might be "sunshine and success," and this has resulted from the high degree of interest which has been shown by those members who have hitherto always given so much attention to its welfare.

Your Committee, in alluding to the fact of so few "papers" having been prepared and read during the past session, see no cause for regret on that subject, as the tendency of the day seems to be running into a closer examination of those points of detail which had not hitherto received so careful a consideration; hence the thoughts of many minds have been more desirable than the elaborate production of one.

Under these circumstances the "question box" has proved to be a "step in the right direction" towards supplying matter for research, observation, and discussion; and your Committee refer with great satisfaction to the use that has been made of that vehicle for furnishing subjects of interest during the meetings of the past session.

The papers read have been by

Mr. C. Pearce.—*On Producing Open-Air Effects in the Studio.*

Mr. J. T. Taylor.—On a subject taken from the question box:—*Is it Desirable for Amateurs to Practice Outdoor Work with Wet or Dry Plates Exclusively?*

Mr. Henderson.—*A Method of Producing Enlarged Transparencies with Crayon-like Effects by a Single Operation.*

Mr. Valentine Blanchard on one occasion made some valuable and useful *viva voce* observations upon the stereoscope.

From the question box the following have been introduced for discussion, by some exceedingly thoughtful remarks, viz.:—

Mr. T. Sebastian Davis.—What is the Cause of Pinholes in Dry-Plate Photography?

Mr. Hart.—Which is the Best Way to Convert Gold Residues?

Mr. T. S. Davis.—Can Plate Glasses that Give Dirty Images with Ordinary Cleaning Solutions be Thoroughly Cleaned by Other Means?

Mr. V. Blanchard.—What is the Principle Involved in the Production of Extreme Sensitiveness in the Collodion Process?

Mr. F. Howard.—Which is the Best Method of Developing Dry Plates with respect to Rapidity?

And the following generally discussed:—It is said that a carbonate of soda toning bath will not do to be used over again. Has anyone tried it, and how long?

On two evenings the usual subjects, either artistic or scientific, have been superseded by, on one occasion, a very interesting exhibition of transparencies in the magic lantern, shown by Mr. How, during which the President, the Rev. F. F. Statham, made a running commentary upon everything exhibited; also, on another occasion, by a repetition of the exhibition meeting of last year, which also resulted in a highly interesting evening.

The Committee are indebted to the following gentlemen for interesting specimens, photographs, and apparatus, viz.:—Messrs. G. W. Simpson, Blanchard, Bockett, Henderson, Taylor, Howard, Pearce, How, Fox, Browning, Cobb, Bensa, Schmerl, Warlick, Hunter, T. Sebastian Davis, E. Cocking.

In conclusion: your Committee have to congratulate the Society on the increased number of new members during the past year, and trust that the motives which have induced them to enlarge the roll of members will also induce many others to join a society which holds out such advantages for the acquisition of the earliest information and the free discussion of all artistic and scientific matter in connection with photography.

It was resolved to postpone the receipt of the Treasurer's report until the annual meeting in December. It was understood, however, that the funds of the Society were in a highly satisfactory condition.

The following comprise the officers and council elected to serve till December, 1870:—*President:* Rev. F. F. Statham, M.A., F.G.S.—*Vice-Presidents:* Messrs. Davis, Simpson, and Blanchard.—*Council:* Messrs. Bockett, Cobb, Elliott, Hart, Johnson, Pearce, Taylor, and Werge.—*Treasurer:* Mr. Noel Fitch.—*Hon. Secretary:* Mr. E. Cocking.

The following meetings were arranged to be held during the summer recess:—By the kind invitation of the President, the members are to meet at his house, the Parsonage, 204, East-street, Walworth-road, on Saturday, July 31st., at five o'clock, p.m.; and on Saturday, September 25th, the members will meet at Hampton Court, detailed information concerning which will be sent to each member by the Secretary.

Votes of thanks were accorded to the President and the other gentlemen who had held office during the past year.

The President, in responding, said that it was probable he would have a paper on the art-phase of photography prepared for reading at an early period of the next session.

Mr. A. L. Henderson then read a paper *On a Method of Producing Enlarged Transparencies with Crayon-like Effects by a Single Operation.* [See page 290.] Mr. Henderson prefaced his paper by some remarks condemnatory of patents in connection with this branch, stating that they had a deterrent effect on the progress of the art. He defended his position in keeping his enamel process as a secret on the ground that the degree of perfection to which he had attained had been realised by a considerable expenditure both of time and money. In illustration of his paper, Mr. Henderson exhibited a number of transparencies containing the hatchings *à la* Sarony printed on the glass, requiring only a sheet of plain paper to be placed behind so as to render them all distinctly visible. The negatives of the subjects, together with those of the hatchings, were also exhibited. The method employed by him for producing vignettes in camera printing was illustrated and explained. It consisted in a pendulum-like bar, which was suspended on a "knife edge," and oscillated between the negative to be copied and the lens. There was an arrangement for carrying an opaque plate containing an aperture of an oval or any other shape, and also permitting this aperture to be adjusted in either a vertical, a lateral, or a horizontal position. The oscillation of this in the axis of the lens produced any desired

degree of softness in the outline of the vignette—the greater the range of vibration given to the pendulum the softer did the vignetting become.

The PRESIDENT thanked Mr. Henderson for his paper. While the idea was very ingenious, the specimens exhibited spoke highly for the process.

Mr. FITCH inquired if the negatives from which the pictures had been obtained were taken expressly for the purpose, or if they were the ordinary printing negatives.

Mr. HENDERSON said they were the latter; but that to produce the highest class of transparency the negatives should be very clear and thin. He (Mr. Henderson) further exhibited some transparencies which had been backed with a new composition, viz., a mixture of finely-pounded glass and gelatine, there being just sufficient of the latter to bind the glass together in a coherent film. With respect to the difference between the hatchings in the specimens placed before them and those produced by the process of Mr. Sarony, Mr. Henderson called attention to the fact that by his process there were no hatching lines carried beyond the margin of the vignette, as in Sarony's, and which he considered objectionable.

Mr. COCKING said that the great object of the hatchings in Sarony's pictures being to carry out the photograph to nothing, it was worth considering whether there would not be more harmony and less incongruity in doing so by means of washes rather than by hatchings.

Mr. BLANCHARD quite agreed with Mr. Cocking in this idea. He instanced the vignettes of Mr. T. R. Williams as the most perfect he had seen.

Mr. SIMPSON said that something was due to public taste in the matter of the Sarony crayon pictures. Whether they were based upon right or wrong principles was not at present before them for discussion, but as a question of business photographers would find that it would tell.

Mr. FRANK HOWARD (as requested at a previous meeting) introduced a subject selected from the question box, viz.:—"What Advantage Arises from Using an Alkaline Developer with Dry Plates? and What is the Method of Using It?" [See page 290.]

A vote of thanks was to awarded Mr. Howard for his communication, and a number of negatives exhibited by him in illustration of his remarks were examined with much interest. Owing to the lateness of the hour, there was no discussion on the subject.

Mr. J. T. Taylor exhibited several specimens of printing by means of a process described by Mr. W. H. Davies at a recent meeting of the Edinburgh Photographic Society [*ante* page 265]. Some of these, as we stated in our issue of last week, were printed upon brown packing-paper, some on the backs of handbills, and some on drawing-paper, but all were firm and sharp. Mr. Taylor also exhibited some *carte* figures, taken in difficult positions by the aid of Harrison's head and body rest. These and the specimens by Mr. Davies were carefully examined.

After a vote of thanks the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A MEETING of this Society was held on the 5th ult.,—M. Teisseire in the chair.

Amongst the correspondence read by the Secretary to the meeting was a letter from M. Clement, which, in substance, stated that he could not permit M. Meynier to insist upon his analysis of the *sel Clement* being correct which stated that it contained fifty-eight per cent. of nitrate of magnesia, more particularly as M. Davanne, in his new *Annuaire Photographique*, had thought fit to echo this analysis, and to designate this salt, without naming him, as the "alleged economic salt." "It is, however, true," added M. Clement, "that this salt—First, contains no more than six per cent. of nitrate of magnesia; secondly, that there is nitrate of ammonia in it; and thirdly, that it contains two organic bodies." In support of his statement he offered to pay the expense of a quantitative analysis to decide the matter, and control the statements of M. Meynier and his own, provided the analysis were made by competent chemists whom the Society should kindly nominate for the task, and upon a sample obtained in the trade and bearing his seal and signature. M. Clement added that he thought it right to insist upon this consideration—First, that he was permitted to sell, at 120 francs per kilogramme, a product which contained forty-two per cent. of nitrate of silver, and different other substances, communicating certain preservative and sensitising qualities to positive papers; and that, moreover, if this price was too great, and the analysis really correct, it would be easy to manufacture a similar product at a cheaper rate. M. Clement concluded his letter by calling attention to the terms of the report made to the Marseilles Photographic Society unsupported by any chemical analysis—that the practical employment of the *sel Clement* was advantageous because it was economical, and rendered the sensitive paper capable of being preserved for a longer period.

The Chairman begged M. Meynier to be good enough to frame a reply to the observations and the demands of M. Clement.

M. MEYNIER replied that he had never attached serious importance to any other matters beside the nitrate of silver contained in the so-called *sel Clement*, and it did not matter to him whether there were more or less nitrate of magnesia, ammonia, or any other substance. The principal point, and that on which he was nearly in accord with M. Clement, was, that the product contained but about 40 per cent. of nitrate of silver. The different samples analysed by him had not given him the same proportions—as from one he had obtained 38 per cent., and from another 40 per cent. He would even concede to M. Clement his own figures, 42 per cent., as a mixture would frequently vary in proportions—indeed they were never absolutely invariable, except in a veritable salt. As to the rest, he did not refuse the proposal for an analysis, and even offered to have it made in different laboratories and at his own expense.

The CHAIRMAN said that he was desirous of closing the debate upon this matter as soon as possible. It appeared to him the question might be viewed in two ways. As regarded the quantitative analysis, it would, in his opinion, be useless, as M. Meynier, without occupying himself with the product of nitrate of magnesia, agreed with M. Clement as to the proportionate quantity of nitrate of silver introduced into the composition called "*sel Clement.*" It was to be ascertained whether a kilogramme of this *sel Clement*, which cost 120 francs, would produce an equal number of proofs and as good proofs as a kilogramme of nitrate of silver, which cost 180 francs. That was the examination required; and if it could be shown that for 120 francs a result was obtained equivalent to that which could be produced at the expense of 180 francs, the superiority of M. Clement's salt would be completely established, and with *eclât*. But how about the competency to resort to an examination of this kind? They were there to judge of the artistic value and the value as to durability of the proofs obtained with the one or the other of the substances thus compared, and he did not think they could entertain the subject so as to pronounce authoritatively upon it.

M. VIDAL was of opinion that any analysis was useless, and that there was no reason for the discussion; for the opponents were agreed on the point which had given rise to it, as the Chairman had very properly stated.

M. MEYNIER treated the question in a perfectly commercial point of view. He found 120 francs too much to pay for a product which contained only forty per cent., or thereabouts, of nitrate of silver, and sixty per cent. of other matters, whatever they might be; it was admitted they were of small value, and as to the kind indicated by M. Clement that was of no consequence.

M. VIDAL proposed to write to M. Clement and inform him of the reasons why the Society could not consent to take part in the analysis as requested by him, which proposition, having been put by the Chairman to the meeting, was unanimously adopted.

M. Henri Pelissier submitted some new proofs obtained with the strontium papyroxyline collodion of M. Liesegang. This collodion would yield to none, according to his account, in regard to rapidity and the firm nature of the layer produced thereby. Many members of the Society, who had made trial of this collodion, endorsed M. Pelissier's opinions respecting it.

The Secretary laid before the meeting a parcel containing pigmented and albumenised paper, sent by M. Marion to the Society, and intended to be used in the carbon printing process of which he was the inventor. Several members of the Society undertook to make experiments with it.

M. VIDAL gave some details respecting the employment of these papers, particularly the albumenised, as a substance peculiarly adapted to the transfer of images.

A carbon proof of a portrait, which was not inferior to the finest chloride of silver proof, was included in the parcel sent by M. Marion.

The CHAIRMAN, in thanking M. Marion, recommended amateurs and practitioners not to neglect this new means of obtaining permanent works, as it was now shown that by perseverance they would be certain to arrive at the desired end.

Correspondence.

Foreign.

Paris, June 15, 1869.

I AM very glad that our esteemed Editors are going to re-experiment upon the French lamps and the oxyhydrogen lights, and I have no doubt we shall have more light upon the subject. I observe that the experiments of Dr. J. Emerson Reynolds do not include a comparison between the photogenic power of light emitted by a cylinder of magnesia and a cylinder of lime. I believe he would have found that, other things being equal, the magnesia light contained more actinic rays than that emitted from incandescent lime. I am also tempted to believe that if Dr. Reynolds had used a cylinder of magnesia which would represent the magnesium he burnt, he would have obtained *more* actinic light than from the piece of metal. He would have obtained a quantity of light lasting for some hours, and instead of taking one negative he might have taken a dozen. I do not know that the zirconia light has been pronounced more photogenic than burning magnesium metal, nor than the light emitted from a cylinder of magnesia. Some years ago an Italian suggested the use of magnesia for obtaining a more powerfully photogenic light, and it seems reasonable to conclude that if the earthy metal in burning should give an actinic light, the incandescent earth

should be endowed with similar properties. I do not know the properties of metallic calcium compared with magnesium, although it burns also with brilliance when heated in the air, and it decomposes water at ordinary temperatures.

The oxygen process of M. Tessie du Mothay consists in heating in iron retorts, divided in two by a horizontal grating, a quantity of manganate of soda. This is heated to a dull red, and a current of superheated steam is made to pass over the mass. Oxygen is given off in abundance and passes along with the current of steam into a refrigerator, where the steam is condensed into water, and the oxygen is afterwards collected in a gasometer. When no more gas comes off the manganate is exhausted. The next operation is to reoxygenise the exhausted manganate. This is accomplished by passing heated *air*, not steam, over it, when the manganate absorbs the oxygen, and becomes as ready as ever for yielding it again to the vapour of water. Thus the two operations can go on for an indefinite time, the air being the source of supply of oxygen. It has been found that carbonic acid gas is detrimental to the production of oxygen, and so the air is deprived of this before it acts upon the manganate of soda.

The manganate of soda which is now furnishing oxygen in Paris is that which was used for the same purpose during the Great Exhibition in 1867. The oxygen gas works are at Pantin, near Paris, where twelve retorts are in operation. The deoxidation of a bed of manganate about an inch thick takes ten minutes, and the reoxidation about the same time. Two of the company's retorts can furnish twenty-five cubic mètres per hour, and the company is *now* ready to supply the City of Paris at the rate of 3d. per cubic mètre, and with larger works the cost could be materially reduced.

This is the kind of comparisons which have been made between the costs of the two modes of lighting named :—A jet burning twenty litres of common coal gas and twenty litres of oxygen per hour, gives as much light as the "butterfly burner" adopted by the City of Paris, which consumes 140 litres of gas per hour. Thus the oxyhydrogen light costing—

20 litres of coal gas, at 15 centimes the mètre	0·003
20 ,, oxygen 30 ,, ,, ...	0·006
	0·009
Against 140 litres of coal gas, at 15 centimes	0·021

showing *fifty per cent. economy* in its use.

One advantage claimed by the advocates of the zirconia cylinders, besides their durability, is that a mixture of *equal* parts of oxygen and carburetted hydrogen can be used instead of a mixture in which oxygen is in excess as is usual. The magnesia for the magnesian cylinders must be *very pure* and free from silica, or they will not be durable under heat. I hope we may have the subject well ventilated in these pages; for my part, I will get all the information I can here to add to the general stock.

The oxyhydrogen magnesian light which produced those advertisement projections on the Boulevards to which I alluded in a recent letter, has been extinguished for several evenings by official order. The crowds of people who congregated to watch these phantasmagoric announcements were not thought desirable whilst Paris was suffering from reaction of election excitement. It is all over now. I trust your correspondent saw enough to convince him he had better be discreet and go home, or it was not improbable that this letter to THE BRITISH JOURNAL OF PHOTOGRAPHY would not have been written; for, after the third roll of the drums on the Boulevards, the orders were to "charge, and catch all you can."

I suppose there are some people in the world who believe anything they see in print; if not, how can it pay to insert this advertisement, which I take from an English daily paper:—"Ozone either bottled or in pills. Few people know the benefit derived from this medicine. An old invalid who bottled a quantity at sea some years since has a few dozens left, and will send sample bottle for"—so much. I hope no one who is a constant reader of your pages will be taken in by this absurd announcement.

That ozone is a powerful agent is allowed, but I was not prepared to find it blamed for the explosion of picrate of potash which took place in Paris a few months ago, and which was recorded in these columns. However, so it is, and an experimenter asserts as a fact—and it can be readily verified by anyone who will take the trouble—that picrate of potash explodes in a mixture of atmospheric air and ozone when the amount of the latter is above a certain proportion. He prepared several wide-mouthed bottles containing the mixture of air and ozone in various proportions, and dropped a few crystals of picrate of potash into each. In some an explosion took place, and the bottle was blown to fragments. It is said also that the daily observations upon the quantity of ozone registered in Paris showed that an *extraordinary* quantity was present in the air on the day of the explosion in the Place de la Sorbonne, and that both before and since it has never attained to such a maximum. If these statements be correct the subject is worthy of attentive study, for we may find that ozone has more to answer for, in the caprices of our photographic chemicals and processes even, than we are aware of. If there should not be an excess in the general air of a town there might be in the atmosphere of a laboratory or room where special operations were being conducted. R. J. FOWLER.

Home.

MINUTE WHITE SPOTS IN PRINTS.

To the EDITORS.

GENTLEMEN,—I observe, from an "answer" in last week's number, that a brother correspondent, "J. C.," has been troubled with spots in his prints, and that you and he attribute the cause to the employment of enamelled mounts.

I am unfortunate enough to be placed in the same category with your correspondent, for I have been *very much* annoyed by the same evil, or what I suppose to be the same evil, viz., myriads of minute white specks all over the print. But as I have never used an enamel card for upwards of twelve months, it is apparent that the cause lies in some other direction. They do not appear until some time after the print is finished, and then, at first faintly but with increasing vigour, they appear all over the surface as thick as snow flakes on a small scale.

If you will give me any hint by which I may prevent this annoying evil I shall feel greatly obliged. I may add that I have looked over several back volumes of your Journal, together with all the almanacs, year books, and manuals on which I could lay hands, without finding any clue as to the source of this annoyance.—I am, yours, &c.,

June 15, 1869. VICTOR CLELLAND.

To the above letter we may attach a second communication received from our correspondent, "J. C.," alluded to above:—

To the EDITORS.

GENTLEMEN,—In looking over my portraits this morning I came across a cabinet picture, which I send you by this post—riddled with the white spots, but mounted on a plain ivory card, clearly showing to me now that the enamelled cards are not the cause of these spots. It was in a specimen book containing cabinet pictures only, and all mounted on plain cards. What can be the cause? I am at a loss to know.—I am, yours, &c., J. C.

June 14, 1869.

[It is probable, from the descriptions above given, that both our correspondents are suffering from a similar cause, although, unless more intimately acquainted with their details of working than we possibly could be by correspondence, we cannot speak definitely concerning this. Looking at the specimen forwarded by "J. C.," and which is otherwise an excellent cabinet portrait—well posed and lighted—we submit for his consideration the following points, to which we also invite the attention of Mr. Clelland. Try the following experiment:—Print two pictures, and, after toning, &c., wash one of them in distilled and the other in plain water. Examine these from time to time, and observe whether the spots appear, and on which print. We are well aware that the quality of the water in which prints are washed exercises an important influence on them. With one kind of water the finest tones disappear and give way to tints conspicuous by a total absence of brilliancy or beauty. Other kinds of water may exercise the spotting influence now complained of. Again: if a chloride of lime toning bath be employed without its having been carefully filtered, minute particles of the lime may settle on the surface of the print, and eventually produce the spots. Further: if there be chloride of lime present in the room in which the prints are kept, the same effect would be produced. Many photographers employ it for more than one purpose, and its presence in a room jeopardises the healthy existence of every photograph in the place. It is well known that carefully-varnished negatives have been spotted by its influence. We submit these considerations to those readers who experience annoyance from the spots described above, and hope that, if they do not precisely reach the source of the spots in the particular cases mentioned, yet that they will be at least suggestive of it.—EDS.]

PINHOLES.—EXPLANATION.

To the EDITORS.

GENTLEMEN,—In a letter on "pinholes" at page 273 of your Journal I said:—"It is simply impossible to generate them (the iodo- or bromo-nitrate crystals) afterwards by drying the film or by any other method that I know."

Major Russell has since then pointed out to me how groups of such crystals may be so produced; and that is by exciting the plate for a long time in the nitrate bath, and setting the film aside to dry. By this method groups of crystals analogous to, but not identical in structure with, iodo- and bromo-nitrate of silver will be formed in the film, and will sometimes attain the diameter of from one-eighth to one-quarter of an inch. I have verified this fact fully, but I have never been able to produce them by this method unless the film, with all the nitrate clinging to it as taken from the bath, has stood in a dry place for several hours.—I am, yours, &c., GEORGE DAWSON.

King's College, June 15, 1869.

EXCHANGE COLUMN.

I will exchange a good half-plate lens by Lerebours, with a good camera and two dark slides, for a good short-focus 12 × 10 landscape lens.—Address, H. M., 18, Winstanley Road, Battersea, Surrey.

A very light pony waggonette, made of pitch pine and ash, varnished, will be given in exchange for a camera for enlargement up to life size.—Address, M. W. JACKSON, photographer, St. Neots, Hunts.

An excellent Horne & Thornthwaite's quarter-plate portrait and landscape lens, with diaphragms, will be given in exchange for about 125 feet of common window glass, for glazing a photo. studio, size 18 × 14 inches.—Address, E. LOCKYER, Ringwood, Hants.

A portrait lens, by Burr, 5 inches diameter, 16 inches focus, fitted with a complete set of Waterhouse diaphragms, will be exchanged for a good double-barrelled gun, a triplet lens by Dallmeyer, a doublet by Ross, or other apparatus.—Address, CHEMIST, 9, Prince of Wales's Road, Kentish Town, London.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—
E. Wormald, Leeds.—*Two Views of Boiler Explosion at Bingley.*

☞ *Correspondents should never write on both sides of the paper.*

J. B. & S.—Try the effect of strong ammonia on the rusty spots.

R.—Thanks for your information. The writer of the article has written to inform us that he, too, has been made aware of the fact.

JOS. GILLAM.—We trust to obtain in a few days the information required by you, but in all probability you will hear from the artist himself.

J. B. F. B.—Let the carbonate of soda be dissolved in water before adding it to your bath, and, after adding it, shake the bottle well up. See that you do not pour in too much.

W. H.—We are unable to give you the required information in the present number, but we shall ascertain in the course of a day or two. If you wish to know before next week send an addressed envelope for reply.

A SUBSCRIBER (Ipswich).—Instead of gelatine you ought to have added gum to the solution of tannin. For many purposes gelatine will answer as well as gum, but not for the one described by you. Tannin converts gelatine into an insoluble body.

T. & G.—From your own statements you have just cause for feeling aggrieved; but we cannot suppose that any manufacturer could be so blind to his own interest as to refuse to change an article supplied by him which was so imperfect as you allege that in question to have been. Write direct to the maker himself and not through the agent, and probably it may turn out to be a fact that he has never heard of the complaint.

H. LORRIMER.—Your lens is too slow for securing children's portraits. To commence with, it is a more than usually slow portrait lens, and you make it still slower by inserting a diaphragm. A triple lens is also unsuited for the purpose. Get a portrait lens of the same diameter as that now in your possession, but with a back focus of from four to five inches instead of eight and a-half. When taking portraits of children remove the stop.

AN INTENDING PHOTOLITHOGRAPHER.—We are aware of some photolithographers of great experience who never mix the bichromate with the gelatine, but who keep in stock a supply of paper coated on one side with the gelatine ready at any time to be rendered sensitive by simply floating it on a solution of the bichromate. In drying it after being sensitised, hang it up in a current of air. If you attempt to dry it before a fire the gelatine will become liquefied.

C. DALTON.—The crackings, markings, and other defects in the front lens of your portrait combination arise from the Canadian balsam with which the elementary part of the lens is cemented. The remedy is very simple. Separate the glasses and clean off the old balsam thus:—Place the lens (previously removed from its brass cell) in water sufficiently hot to soften the balsam; then separate them and clean the surfaces by means of benzole, old collodion, or any other solvent of the balsam. Wipe thoroughly dry, and place in the centre of the concave surface a large drop of clean balsam. Now place upon this the proper side of the crown or convex glass and press the two lenses together, by doing which the balsam will spread and bring all parts of the two surfaces into optical contact.

A NORFOLK PHOTOGRAPHER.—As the law at present stands no person can keep in his possession a still of any kind or for any purpose whatsoever, unless duly licensed to do so. A license to use a still is obtained through the office of Inland Revenue, and costs ten shillings a year. Any person not having a license and yet keeping a still, even for distilling water, is liable to be fined fifty pounds. This does not apply to distillers and rectifiers, who make special arrangements. This is the law as laid down with much minuteness in Act 9 & 10 Vic., cap. 90; but when the Excise authorities are satisfied that the still is kept for merely experimental chemical purposes, they usually make a distinction in favour of the owner. We have thus compressed the Act into a nutshell for you. If you desire further information write again.

REV. RICHARD PHILLIPS.—1. The pictures are very far indeed from being equal to what you may yet achieve by a little care and attention, for (2) the sitters are badly lighted, badly posed, sadly out of focus, the negatives are dirty and stained, and the toning of the print is not superior to the other points detailed.—3. Place the sitters in more elegant and graceful positions, do not use so much top light, focus very sharply, employing a magnifying glass for this purpose, use a collodion of a reddish colour, and give a full exposure. If your developer do not flow evenly over the plate add a few drops of alcohol to it, by which this quality will be conferred. If you do these things you will be surprised and gratified by the superiority of the result obtained.—4. We shall be glad to receive a visit from you when you come to London.

AN OLD SUBSCRIBER.—For such delicacy as you require ground glass is by far too coarse for focussing on. Let your focussing screen be composed of absolutely flat and unground plate glass, and focus by means of a *compound* microscope of low power, previously adjusted by means of delicate scratchings or markings on the surface of the plate.

F. D. B.—Dryness of the film is an essential requisite for obtaining success with plates preserved by coffee. We cannot tell in what respect you have failed to succeed, or at what special point of the operation the fault lies. If you describe your operation more minutely we may be able to discover it. It is one of the most certain and reliable dry processes with which we are acquainted, and during all the time that we have practised it we have not experienced a single failure which was due to the process.

MARY B——S.—The easiest and best method for you to adopt is to thin your collodion very much. Make a mixture of two parts of ether and one of alcohol, and add an ounce of this to each ounce of the collodion. We believe that this will reduce the collodion sufficiently. You must have your negatives so thin as to be quite unfitted for printing on ordinary printing paper. Such a degree of transparency of the film will, however, induce halation or reflection from the back surface of the plate, but this may be obviated by varnishing the back with collodion containing rouge, by gum water containing annatto, or by many other bodies of a similar nature.

PHOTO. (Glasgow)—1. If you again read the articles referred to, and study them more carefully than you appear to have done, you will find that, so far from indulging in a covert sneer at either spiritualists or spiritualism, we have carefully avoided giving any expression of opinion at all. It was only in our last number that we informed another correspondent that we, *as Editors*, held no opinions on religious matters; why, therefore, should we have sought to sneer at a body who is respectable from its large numbers as well as from the talent and social position of many of its members? While we record so much of this growing system of belief as is connected with photography, we studiously avoid offering any opinion on the subject.—2. You are quite mtstaken in supposing that you are probably the only reader of this Journal who hold what you call the "new views;" we are aware of more than two dozen readers who entertain similar "views."

J. D. (Lancaster).—In No. 1, one side of the face is deficient in detail. The vignetting, also, is too abrupt. Nos. 2, 3, and 5 have either been imperfectly focussed, especially with respect to the faces, or your subjects have not had the aid of a head-rest. The backgrounds being so very sharp, it is possible that the lens is not quite correctly adjusted, or that the relative planes of the focussing glass and the sensitive plate do not agree. No. 2 is the most equally-lighted picture; the others are somewhat hard. No. 4 is a pretty subject, but you have not managed your lighting sufficiently well to show all the details. The lighting of a plaster statuette affords scope for the display of much taste. In this case try it again with a dominant side light. Try also this experiment:—Light the statuette by means of two candles, one at each side of the line of vision, but let that on the left side be twice as near to the figure as that on the right, and let it, moreover, be placed higher by many degrees. You will be surprised at the beautiful effects which you may thus obtain. We cannot inform you whether or not you can sell photographs of the statuette. What is the subject, and from whose work was the cast taken? As requested, we have returned the pictures.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.**

SHARPNESS IN THE DISTANCES OF LANDSCAPES.—Some persons are as anxious for sharpness in the distance as in the foreground, and will exhibit a print with the boast that the extreme distance will bear a microscope. As the eye cannot see natural objects in this fashion, it can scarcely be right to depict them so; and when we examine the works of the great masters of landscape painting, we find that, with the power to draw their distances precisely as they pleased, they did not think right to make them sharply cut. We find that, as distance softens down outlines to the eye, so when outlines are softened down the eye infers distance.—*Lea's Manual.*

METEOROLOGICAL REPORT,

For the Week ending June 16th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
10	30 17	61	48	48	56	NE	—	Fine
11	30·16	62	46	48	54	NE	—	Dull
12	29 95	—	48	56	62	SW	—	Fine
14	29 42	63	50	51	52	NNW	0·12	Rain
15	29·61	63	45	53	55	SW	0·06	Dull
16	30 00	—	44	45	51	NNW	—	Dull

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 477. Vol. XVI.—JUNE 25, 1869.

ON THE DEVELOPMENT OF A PIGMENT WITHIN A GELATINE FILM.

In the carbon process, as at present practised, we are always obliged to mix a pigment with the sensitised gelatine in one way or another prior to producing a print. Such arrangement is obviously open to many objections, but the two principal points which can be urged against this plan are—in the first place, the difficulty of obtaining insoluble pigments not merely in an extremely fine state of division, but in such a condition that all the particles are of as equable a size as possible; and, secondly, that the change produced by the action of light on the sensitised layer cannot be watched, since the result of the printing only becomes evident at a stage in the production of the print when it is impossible to alter or improve.

Of the two objections just referred to that last mentioned is obviously the most serious, and probably also that which can be least easily remedied; but yet we are inclined to believe that the study of the best modes of producing a precipitate of pigment within the gelatine film itself is very likely to lead to the discovery of a plan for overcoming the second obstacle, and so producing a perfect carbon process. Of late our attention has been turned to the production of certain dark precipitates within the sensitive gelatine film, and, as some of our experiments have been quite outside the ordinary course, we shall now jot them down.

Our earlier experiments in the direction above indicated were of the usual kind, involving the production of different shades of blue, red, &c., but we subsequently sought to take advantage of the power which common bleaching powder or "chloride of lime" possesses of converting the simple oxides of certain metals into peroxides. An experiment or two will make our meaning evident.

Let us take, in the first place, a few drops of a neutral solution of nitrate or chloride of *cobalt*, place the liquid in a glass, and dilute with a little water. The solution at present is colourless, or has a very faint rosy tint. On adding a little clear solution of ordinary bleaching powder to the cobalt liquid we now obtain a dead black precipitate without the aid of heat. This black precipitate is the peroxide of cobalt, and this result is obtained without the action of any heat. If we treat a solution of acetate of lead in the same way we obtain a deep brown deposit of peroxide of lead when the liquid is warmed.

Again: let us take a little neutral colourless solution of chloride of manganese and saturate bibulous or common blotting paper with the liquid. On now drying the prepared paper and subsequently testing with chloride of lime a deep brown stain of peroxide of manganese is produced wherever the chloride of lime has come in contact with the manganese solution. This brown stain speedily becomes of a deep black colour. This reaction takes place easily without the aid of heat. But we can produce a black peroxide of manganese in another way with equal facility. If we take the neutral solution of chloride of manganese and add carbonate of soda to it we obtain a white precipitate of the carbonate of manganese. When this white precipitate is spread on paper and dried a surface is obtained which becomes black or very dark brown when touched with the solution of bleaching powder. As these reactions are but little known to photographers we have been thus particular in stating them, since in our experiments we have chiefly worked with manganese compounds with a view to obtain the black peroxide when treated with chloride of lime.

Having so far cleared the ground, we will now detail one or two of the experiments made, with a view to determine whether the before-mentioned facts might not be utilised in printing on sensitised gelatine. At the same time, it is but right to say that the object sought to be attained in making these experiments was rather the opening up of a new field of photographic investigation than the arrangement of a definite process for carbon printing.

A quantity of the carbonate of manganese was prepared, and this added in a pasty condition to some strong gelatine containing bichromate of potash in the proportion of six grains to each ounce. The carbonate of manganese was mixed with the gelatine in such proportion that a thick, yellowish-white magnia was produced. Paper and collodionised plates were now coated with the mixture and then dried. When dry the paper appeared darker than usual, owing, probably, to a slight oxidising action of the bichromate on the carbonate of manganese. The tissue was now exposed to light, collodion side next the negative, and a trace of an image obtained after a few minutes' exposure. On removal from the printing-frame it was treated with warm water, which gradually removed the parts unacted upon by light, in the usual way. After washing, the print was developed by treatment with a tepid bath of chloride of lime solution, when the image appeared of a deep brown colour, in many places approaching to black. Considerable care is necessary in making this experiment lest the carbonate of manganese should contain any undecomposed chloride of the metal, since the latter, in the presence of chloride of lime, appears to have the power of rendering the gelatine insoluble in warm water, as is shown by the next experiment.

Some paper was coated with sensitised and chromated gelatine which had been mixed with the solution of chloride of manganese alone. Two prints were now obtained on this paper under precisely similar conditions. One of these was washed in hot water, and the gelatine was thereby easily removed from the parts of the print which had not been exposed to the action of light. After this treatment the paper was plunged into a bath of chloride of lime, but the print scarcely acquired increased intensity. The second print was now taken and plunged into the chloride of lime bath in the first instance; the whole surface became deep brown and the depth of the tint gradually increased. The paper was now treated with tepid water, and, finally, with a hot bath; but the only result was to dissolve out the unchanged bichromate from the film without apparently removing any of the gelatine. At the same time the peroxide of manganese became of a rich black colour and the paper contracted toward the gelatine side; therefore, in the reaction of the chloride of lime in the soluble manganese salt in the film, the gelatine is rendered insoluble over the whole surface. The main point, however, is that a full black compound is obtained wherever the chloride of lime has come in contact with the manganese salt. This compound is a hydrated peroxide of manganese—very dense,

finely divided, and of a rich, warm black colour. By substituting "bleaching soda" solution for the chloride of lime a still more beautiful black compound is obtained.

We have now written enough to introduce the manganese prints, and we shall shortly return to the subject with a view to utilising the manganese in another direction.

PHOTO-CRAYONS.

In our last number we published a paper on this subject, read by Mr. Henderson at a recent meeting of the South London Photographic Society.

The method of producing the particular effect known as "photo-crayon" which was advocated by him differs in some respects from that which we have recently described in connection with the name of Mr. Sarony, and which we stated we had repeatedly tried with unvarying success, even when employing negatives of a scarcely suitable description.

Mr. Sarony's method consists in placing behind a suitable transparency a sheet of drawing or other paper containing appropriate hatchings or crayon lines judiciously drawn, the effect being to impress upon the spectator the idea that he is looking at, not a glass transparency, but a highly-finished work of art executed on drawing paper.

Mr. Henderson proposes to photograph the hatchings on the transparency itself, and thus do away with the necessity for having the crayon paper backing; so that when the transparency is backed up it is impossible to say whether the hatchings are on the paper or on the picture. As the manipulatory details were given in our last number (page 291) we need not here recapitulate them, beyond stating that a "crayon vignetting glass," produced by the method already published, is placed in contact with the negative to be enlarged, and both are thus obtained on the enlargement by one operation.

Since making the communication to which we have referred Mr. Henderson has pursued the subject into a number of ramifications. For example, in elaborating an idea to which effect had been hastily given an hour before the meeting of the society took place—namely, giving a backing of powdered glass and gelatine to the transparency—he finds that the degree of coarseness of the particles of glass exercises a strongly-marked effect upon the finished picture. The transparency or opacity of the backing depends upon their size, coarsely-granulated particles giving an effect like a coarsely-grained paper, and fine particles yielding a smooth, opaque surface. A fine effect has been obtained by depositing a layer of coarsely-pulverised glass in tinted gelatine. The effect of the combination of refraction and reflection thus got from such a number of minute glass prisms is said to be good and brilliant.

Arising out of Mr. Henderson's method of operating is the following:—When a negative is taken with a dark background, which shall be represented by nearly transparent glass, let a view of any particular subject be placed in contact and a transparency taken. The effect will be good. If this be intended for superposition printing one of the films must be removed from the glass.

Again: suppose that a portrait negative have a dirty background, and it be desired to give it one possessing uniformity, the first proceeding must be to make a transparency from the negative of precisely its own size, having, however, previously carefully stopped out the figure. By placing the transparency of the background thus obtained in contact with the negative, Mr. Henderson obtains a uniform background, which, however, would be lighter in the finished picture than in the original negative.

COLLODIO-BROMIDE OF SILVER: A PRACTICAL MODE OF WORKING.

No. IV.

9. Development.—It seems like repeating an oft-told tale to enter into details of the mode of conducting alkaline development; but as this series of articles would be incomplete without such a description, and as there are many little points or "dodges" sometimes overlooked or considered of no importance, although they are often necessary for success, it may be useful to record somewhat minutely my latest experiences.

Considerable latitude is allowable in mixing the developing solutions for bromised collodion films, whether prepared by Russell's rapid process or that of Sayce and Bolton, because a variable amount of soluble bromide already exists in the film which greatly modifies the action of the developer. In the following directions I give what I consider, upon the whole, the best proportions for setting about and continuing the development, while I call attention to indications shown in the course of development, which are to be judged of and provided for as the operation proceeds. Prepare the following solutions:—

A.—Alcohol (common) .... 1 part.
Distilled water .... 1 „

Keep in a stoppered or corked pouring bottle, and use over and over again till the mixture is exhausted.

B.—Bromide of potassium .... 10 grains.
Distilled water .... 1 fluid ounce.

Keep this solution in a dropping bottle.

C.—Pyrogallic acid .... 3 grains.
Distilled water .... 1 ounce.

Filter (if necessary) into a stock bottle, which should be well corked.

D.—Carbonate of ammonia.................... 60 grains.
Distilled water .... 1 ounce.

Filter, and keep in a stoppered dropping bottle.

To prevent mistakes when developing in a very feeble light, I recommend these solutions to be placed in bottles varying in size and shape, so that by the sense of touch the proper chemical can be ascertained. It is desirable, also, before commencing development to range the bottles in the order of use, and always to replace them in their original positions.

First: cover the film with the alcoholic mixture A, and return the excess into the stock bottle.

Secondly: moisten the back of the plate with water, and rub off the pigment with a dabber of tow or any other material, in water. Wash off all the alcohol from the film, either by soaking the plate for a minute or two in a dish of water, or by washing under a running tap. The alcohol is gone when the greasy-looking lines disappear during the draining of the plate. Give a final flush with distilled water.

Thirdly: *In this and all subsequent stages of development, when I mention proportions of the solutions I refer to plates of the size* 8×5 *inches.* It will be necessary to bear this fact in mind, and to make the necessary additions to, or abatements from, the proportions when the plates are larger or smaller.

From the dropping bottle containing the bromide solution B put four drops into a clean developing glass, and add one ounce of pyrogallic solution C. Apply the solution three or four times to the film, while still moist. No image will, at this stage, appear. Pour the mixture back into the developing glass, and add to it four drops of the carbonate solution D, and incorporate with a stirring rod. Apply the developer again to the film, and either keep the solution waving over the surface or pour it on and off for a short time. If the high lights of the image begin to show themselves within about thirty or forty seconds, this shows a well-timed exposure. Continue the development with the same mixture till progress seems to stop. Add a few more drops of carbonate of ammonia (solution D), resume operations, and, if necessary, repeat the dose till the development is completed.

When commencing the development with the same proportions of solutions, should the image flash out quickly, this shows that the exposure has been too prolonged. In that case instantly plunge the plate into a basin of water, or put it under a running tap. With judicious management, a good negative may still be secured by mixing a fresh developer with double or triple the proportions of bromide solution B, and half the original quantity of the carbonate D. Proceed in all other respects as before.

If, on the other hand, while still commencing with a similar developing solution, the high lights of the picture fail to appear after a minute or more, in this case either the exposure has been too short, or a great excess of soluble bromide already exists in the film. Here, again, we have our remedy in the accommodating nature of our developer. Wash the film and prepare a new solution containing no bromide, but a double or larger allowance of carbonate. Unless the exposure has been very much under-timed a fairly good, but not often a finely graduated, negative can thus be secured.

It is advantageous, for many reasons, that an image on bromised films should be fully developed by the alkaline method alone. But sometimes the films turn "sulky," as Major Russell has happily expressed their conduct. They refuse to be pushed beyond a certain stage of insufficient intensity by the alkaline developer, without fogging and committing other vagaries. Here we have a symptom of one or other of several faults in their preparation. Either the collodion was too thick; it was not sufficiently porous; there is too thin a stratum of bromide to convert into an intense image; or, in mixing the collodio-bromide, the atomic equivalent of the nitrate of

silver has too nearly reached, or perhaps exceeded, that of the soluble bromides, and combined with them as far as possible. Yet, excepting in the last cause of failure, in which fogging is unavoidable, we have still at our disposal—provided fogging has not set in to a great extent—the means of getting a good negative, by forcing the development with very alkaline pyrogallic acid. In all cases of the "sulks," we have recourse to coaxing by a supplementary development on the piling-up system, which is conducted thus. Prepare solutions—

A_1—Pyrogallic acid	1	grain.
Citric acid	2	grains.
Distilled water	1	ounce.
B_2—Nitrate of silver	30	grains.
Acetic acid	2	fluid drachms.
Distilled water	1	ounce.

Wash the partially-developed film well, to free it from the carbonate; and, to ensure the complete neutralisation of the alkali, pour on and off the plate, for two or three times, one ounce of pyrogallic solution A_1. Then mix with this four or more drops of the nitrate solution B_2, and proceed to re-enforce the image, just as you do in the wet process, by pouring the mixture on and off the plate till the requisite intensity is reached.

10. *Fixing the Image.*—Use hyposulphite in preference to cyanide. The latter salt has an unhappy knack, when much of the image consists of an organic salt of silver, of dissolving the deposit and weakening the picture before you can stop its action. If, therefore, it is more convenient to employ this fixing agent than any other, let the solution be very weak, and wash it off the instant it has dissolved out the bromide of silver.

Yet this same bad propensity of the cyanide can be utilised in another direction, for the purpose of reducing the intensity of over-developed negatives; and on alkaline-developed images it effects this object with great uniformity, not, as in most cases of acid development, by seizing first on the half-tones and shadowy details, but by surely and equably dissolving out the deposit to any degree of fineness that may be desired.

Although I have been more minute than some might think necessary in describing my mode of conducting the alkaline development of bromised films, yet I am sure I have erred on the safe side. Few know better than I do the difficulty experienced in inducing experts in the wet processes to shake off old-established ideas, and to disassociate two developing operations which are in their principles and practice essentially different. It is, indeed, according to my experience, much easier to impart instruction in the practice of alkaline development to those who are entirely ignorant of photography than to persons who have been long conversant with a different photographic system. George Dawson, M.A., Ph.D.

DECOLOURISING THE PRINTING BATH.

The boiling of a bath of nitrate of silver for printing, with the view of removing the albumen, is a subject on which I should like to offer a few remarks. First of all, let me observe that the method proposed by Mr. England for effecting the decolouration is by no means so new as that gentleman imagines; I, at least, used to practise it about seven years ago, and it is from the experience I then acquired that I am now about to speak.

Great care must be taken in the selection of a proper vessel in which to boil it. An ordinary glazed pipkin or earthenware pot is usually recommended for purposes of this kind, but, in this special instance, it will not answer above once or twice. These pipkins are made of a porous, absorbent clay, and only so long as the glaze keeps on will it be useful. It is usually the case that, after boiling the nitrate of silver bath once or twice, the glazing gives way and cracks, and the silver thus obtaining access to the porous clay a serious waste is caused.

The best way of coagulating the albumen by boiling is to place the bath in a bottle inside a pot of water, taking care, previously, to have a piece of wood placed at the bottom of the pot to prevent contact between the glass and metal, otherwise there is a chance of your glass vessel breaking and the whole contents mixing in the iron pot, of course precipitating the silver. Such an accident once befel me, as I remember to my cost.

I have found, by using some samples of paper, that boiling did *not always discolour* the bath; but on carefully observing it I generally found, when boiling did not not discolour the solution, that it was either *alkaline* or acid *in excess*, and, by neutralising and reboiling, I have seldom failed to decolourise the solution.

But all this is a waste of time and a source of expense. Mix the silver with plain water, and you will find very few samples of paper that will discolour the solution.

About three years ago I came into the room where one of my assistants was engaged in the operation of boiling a bath to precipitate the albumen, and, although the pipkin was perfectly whole, I found that the silver was oozing out. Subsequent reflection upon this led me to abandon this method of decolourising the printing bath, and determine upon the adoption of a paper which would not cause any discolouration. That which I now use never discolours the bath—a property which, if I understand rightly, it owes to the salting materials employed rather than to any steaming or other analogous process of rendering the albumen insoluble. I think, however, that I may lay it down as a rule that those papers which discolour the bath yield very fine tones—in this respect probably superior to those which do not so discolour it. A. L. Henderson.

PHOTOGRAPHIC AND OTHER PATENTS.

Within the last few weeks the subject of patents or no patents has received a passing, and, we trust, only a preliminary, notice in the House of Commons; and, in consequence, a good deal has been written on the subject of the expediency of granting patents at all.

Are they right in the abstract? Are they expedient in practice? and would the balance of advantage to the public be found in the law being permitted still to exist, or in its being quite swept away? Does a patent act as an incentive to invention?

First of all, let us see what a patent is. The principle is this:—A person has invented something which is calculated to be of much benefit to the public. This he will not divulge, knowing that manufacturers and capitalists will at once utilise it under such conditions that he himself, perhaps a poor man, would be unable to cope with. The Government here steps in and in effect says:—"If you describe to us in what your invention consists, and pay us a certain sum of money, we shall secure to you the sole right to manufacture and sell the article for so many years. But you, in return, must make 'a clean breast of it' and keep nothing back, for we shall only protect you in so far as you describe your invention to us; and, after six months, we shall publish to the world the details of what you have specified. Your description must be so intelligible that any workman of ordinary skill and information on the subject may be able, on reading your specification, to perceive the manner in which you effect your invention. You must also be the 'first and true inventor' of all that you claim as yours. Under these circumstances we shall afford you protection in the working out of your invention for a certain period of time, after which it will fall into the hands of the public." The foregoing language is, of course, our own, but it expresses the general idea of patenting better than any laboured detailed statement.

Such is the nature of a patent. Any person who has "an idea," may work at it day after day and night after night until he get it perfected. He knows that if his invention turn out what he desires and expects it to be that his labour is not thrown away; no one can filch it from him without giving him such an equivalent, in the shape of royalty or payment for licence to use it, as he may determine upon.

Those who desire to abrogate the patent law say that the inventor has still his priority—his secret; and from the keeping of which secret he ought to derive all the advantage he can. This kind of reasoning is very foolish. By parity of reasoning authors should also be deprived of their right in their property after its first publication; and so with painters, engravers, &c.

Suppose such a law abrogated, a powerful stimulus and incentive to invention is swept away, and eventually the public become the losers. It would indeed prove a loss to the community were no protection afforded to inventors. The development of thought in *facts* should be protected in a similar manner to that in *words;* and simultaneous with a movement to suppress patents should be one to suppress all copyright.

In photography, as in other branches of industry, worthless patents have been granted; but who shall say that the advanced state of our art-science does not owe much to the protection afforded to those who, under such a powerful ægis, could bring forward their discoveries and proclaim them to the world? It might be invidious to make selections; but we know of some photographic inventions, both practically useful and scientifically interesting, which, without the protection and consequent publicity of a patent, *might* have for many years been worked as secret processes.

There are some inventions the results of which instantly reveal the whole that is desired to be known. A lens, for example, could readily be imitated; so could a camera or any other piece of

approved apparatus. But hand over for the inspection of the most skilful analyst a carbon print, a photo-engraving, a photolithograph, or a photo-enamel, and see if from any one of these he can discover the method by which it was produced.

There may be, and, indeed, are, numerous abuses existing in connection with the patent laws; but the principle is sound, and ought to command respect and approval.

ON PHOTOGRAPHING LEAVES: SELECTION OF SUBJECTS.

My first essay in photographic printing was the printing of leaves upon albumenised paper; and I was so pleased with the results that I printed them every day throughout the whole of the summer and the greater part of the ensuing autumn. I have also since employed many a leisure hour in the same way, and, consequently, have printed some thousands of these "leaf prints;" therefore, the extensive experience and practical knowledge of the subject I thus obtained enables me to say, unhesitatingly, that Mr. Gaffield's statements on this subject [*ante* page 173] are calculated to lead into error those who are not conversant with this fascinating branch of photographic printing.

After saying how much he was pleased with the charming and exquisite photographs he obtained of various leaves and ferns, and how gratified he was with the universal testimony to their interesting character, Mr. Gaffield says that all that is necessary to make these pictures is to gather the leaves and place them as negatives in the pressure-frame, and to expose them until a strong dark print is produced. Experience tells us, however, on the other hand, that to obtain a good print from a leaf is not the easy matter it is here represented to be; for with numbers of leaves it is an exceedingly difficult affair, and with many very beautiful ones it is almost, if not quite, an impossibility.

Mr. Gaffield states:—"After being toned and fixed the print will show, under a magnifying glass, the most delicate veins and ribs of the leaves." Now this statement most assuredly implies that these delicate veins and ribs are not observable *without* a magnifying glass, whereas the fact is that none of them, however delicate they may be, require a magnifying glass to show them, as every detail is perfectly visible without its aid.

I have said that experience tells us that to obtain a good print of a leaf is not the easy matter which it is represented to be. Many a leaf that shows exquisite detail in the multitudinous ramifications of its veins is of soft texture, and has a prominent mid-rib; consequently, it is no easy matter to bring the sensitive paper in close contact with it at the sides of this mid-rib, and more especially so near its base. However, unless this be done, the veins traversing the parts of the leaf that are not in close contact with the sensitive paper will print dim and indistinct—that is to say, they will not print clear and sharp—and we therefore fail in obtaining an "exquisite photograph."

But the difficulty of placing the sensitised paper in close contact with the leaf in such cases is not the only one we have to overcome, for a prominent mid-rib also prevents the parts of the leaf adjacent to it from lying close to the glass of the pressure-frame. Now, any pressure applied to the back of the sensitised paper causes those parts of the leaf to yield, as they have nothing but air to back them.

I have found that a piece of wadding is the best thing to use as a padding behind the sensitised paper when printing *any* species of leaves; but, with such as I have alluded to, it is absolutely necessary to use wool in addition, in order to fill in all the hollows without undue pressure. I have sometimes, however, been obliged to take five or six prints of a leaf before I could succeed in ascertaining how much wool it was necessary to use at particular parts of it to ensure the uniform sharpness which is so essential for the production of a good print. In fact, it requires very great care and much trouble to obtain a good print of those kind of leaves, even when they are young—for instance, such as hollyhocks, and the various tribes of vegetable marrows, &c., &c.—as many of them, from their conformation, cannot be induced to lie flat. Nevertheless, after several failures, I have often been rewarded by succeeding in obtaining prints of those leaves that were sharp in every part—even from those that were more than six inches across; and the numerous ramifications of their veins render them very interesting subjects.

The "leaf prints," however, which I found were the most admired and singled out from all others, were invariably those of the common begonia. In most cases the veins of leaves are more transparent than the other parts, therefore they print darker, and thus show as a more or less black network upon the lighter ground of the leaves; it is not so, however, with the begonia. In the leaves of this plant the bright red colour of their veins almost entirely obstructs the passage of the light; but the other parts of the leaves allow it to pass freely through, although the entire back of them is also red. Consequently the veins show white upon the ground of the leaves, which is more or less dark, according to the time of exposure; and, if this be properly timed, and the prints well toned and fixed, exceedingly beautiful results are produced.

I know of no leaf that is superior to that of the begonia for proving the great superiority in beauty which the negative print of a leaf possesses over that of its positive. I have taken positives of this leaf, and, by the aid of an exceptional toning bath, have obtained the veins of a bright red colour, but the light ground of the rest of the leaf receiving no relief from the light background rendered the prints tame and spiritless—if I may be allowed such an expression—and they were devoid of all brilliancy; whereas the negatives of such leaves, when well done, are exceedingly rich and brilliant, as the leaves are strongly contrasted with their dark backgrounds.

The leaves of the various tribes of geraniums have but few veins, and those they have will not show up well in a print. Nevertheless, those of the numerous species of *variegated* geraniums form very pretty subjects, in consequence of the variety in the shading of the prints produced by the various degrees in which the passage of the light is obstructed by the variegating bands of white, yellow, red, brown, black, and green. Indeed, the generality of variegated and spotted leaves form pretty subjects; for instance, the Arundo donax versicolor (known as the "gardener's garter" of the Scotch gardens, and in England by the various names of ribbon grass, painted grass, Indian grass, and ladies' laces), and the aucuba, or variegated laurel, the spots of which, obstructing the light in a lesser degree than the green parts of the leaves, show dark on a lighter ground.

There is a well-known window plant, viz., the farfugium grande, the leaves of which are dark shining green with yellow spots. These afford good subjects; and by selecting one of these leaves with a few large and conspicuous spots, intermingled with several smaller ones, a pretty and bold-looking print may be obtained without any trouble. The leaves of the various bindweeds and the three leaflets of the common scarlet runner afford pretty subjects, as the ramifications of their veins are very numerous.

It happens that in the leaves of the scarlet runner the ramifications of the veins are not only very numerous, but the veins themselves are exceedingly fine, especially when the leaves are young. Now, the leaves of this plant are very thin, and, consequently, it is impossible to obtain a "dark print" from them without destroying the delicate and minute tracery of their veins. As these veins cannot be printed dark enough to afford much contrast with the other parts of the leaves, in consequence of the thin texture of the latter, it is impossible to obtain the "interesting" prints which Mr. Gaffield tells us we can do, "by using as negatives" the prints obtained direct from the leaves; and this is also the case with those of the bindweeds and thousands of others.

The leaves of the various tribes of variegated geraniums, of the aucuba, farfugium grande, ribbon grass, and many other similar ones, are the best class of leaves for positives that I know of; and they are, perhaps, not inferior to their negatives, as their beauty is not derived from the numerous or peculiar ramifications of their veins, but from the variety in their shading.

No person that has not had experience in this interesting branch of photographic printing can have any idea how difficult it is to obtain a leaf that is free from blemish. I remember very well that one summer I wanted, for a particular purpose, some prints of various-sized leaves of the common scarlet runner; but, upon a wire lattice that was more than two yards square and completely overrun with them, I could not find even a single leaf that was perfect, as they were all more or less bitten by various insects.

However, there are some kinds of leaves that have been bitten by insects the prints of which I have invariably found all my friends were anxious to obtain. These were the leaves of rose trees, out of which the mason bees had cut circular pieces to line the homes which they had made in the brickwork of walls. Sometimes these leaves have several pieces cut out of them—some at the edge and some from various other parts—but all these holes are as perfect circles as if they had been cut out by a circular punch or drawn by a pair of compasses; consequently, I have found the prints of them were asked for and prized as curiosities.

There are numerous and exquisitely beautiful leaves of hothouse plants that will not do for prints, as their brilliantly-coloured markings are merely superficial; hence they only show by reflected light. Not a single vestige of their markings, however brilliant and metallic they may be, can be observed by transmitted light; therefore even

Sol himself, clever and prying as he is, cannot render them in a print, by any variation in the shading, when the pressure-frame alone is employed.

The mid-ribs and stalks of many leaves that are soft in texture are full of sap, which exudes upon the slightest pressure; and in several species it will do so spontaneously. This exudation, wherever it touches the sensitised paper, entirely destroys the glaze of the albumen in some instances, and in others these places present the appearance of burnished gold after the prints are toned and fixed, and their beauty is therefore marred, if not destroyed.

In the case of such leaves it is advisable to submit them to pressure between folds of blotting-paper, and to delay printing from them for several hours after they have been gathered, and sometimes even for days. I have, however, met with leaves so abounding in sap as to resist all my endeavours to destroy its exudation. I have charred the tip of the stalk; have dried it by the fire, and with hot irons; have dipped it in powdered quick lime, resin, and other substances, including melted sealing-wax; have covered it with a coating of gum, and still have been unable to entirely prevent this troublesome and blemishing exudation.

No doubt there are many readers of THE BRITISH JOURNAL OF PHOTOGRAPHY who have never yet tried to produce photographic prints from leaves, and I advise all such to make the attempt during the present summer. I can assure all those who will do so that they will find it a very pleasing way of employing their spare time. I am very certain that, if they are admirers of the ever-varying and beautiful forms of nature, as exemplified in the various veinings, markings, and shapes of different species of leaves, they will be highly delighted with this pleasing and interesting branch of phototographic printing, and, moreover, if they will follow my advice they will speedily be convinced that it is promulgating a very great fallacy to say that, in order to make these charming and exquisite photographs of leaves, "all that is necessary is to gather the leaves and place them as negatives in the pressure-frame, and to expose them until a strong and dark print is produced," for they will find that with very many leaves it is exceedingly difficult to produce a good print. GEORGE PRICE.

FOGGING.*

FOGGING is a trouble that affects different operators very variously; some are very frequently, others almost never, affected by it. The learner may expect to be frequently troubled; the experienced operator will have learned how to avoid it, except, perhaps, when he works under unusual conditions, or with chemicals different from those which he habitually employs.

Before proceeding to the particular sources of fogging, some observations of a general nature may advantageously be made.

General Remarks.—When a case of fogging presents itself, a careful study of the appearance of the plate will often afford a clue to the source of the trouble.

A fogged plate may present a uniform sheet of blank fog all over without a trace of a picture; or an image may come out with more or less strength, but, after showing itself, may presently become covered with a dense deposit of silver; or, finally, the fogging may be very slight, leaving all details of the image perfectly visible, but ruining it by veiling the deep shadows sufficiently to prevent them printing to a full rich black.

The above various cases are alike in this, that the action of the fogging is *uniform* all over the plate. We, therefore, presume that the trouble lies either in the chemicals, the light, or the atmosphere of the dark room, and, if we cannot get rid of the evil by the addition of a little iodine to the collodion, we must commence a series of systematic trials to detect the source of the trouble. We do not, however, in the above, suspect the camera; for, if the camera leaks light, the effect of that light is invariably partial and irregular. The unequal contraction and expansion of the wood round the flange, into which the lenses are screwed, will often produce a crack. This will give a mass of fog somewhat denser in the middle, and shading off towards the ends of the plate. A hole in the bellows body will produce an irregular mass of fog on some part of the plate on which the light falls. If the dark slide does not fit tight, the fogging will mostly be at one end of the plate. A crack in the shutter will produce a bar of fog, lengthwise of the plate and shading off on both its sides. Cracks in the woodwork will send in fanlike masses of light, and so on. These appearances will aid at once in the detection of the cause of the troubles.

Another very valuable distinction is drawn as follows:—

A *superficial fogging*, one that rests *on* the film and not *in* it, and can be rubbed off with the finger, is always attributable to the chemicals, never to exposure to white light, which last always produces an action in the interior of the film.

Therefore, if the fogging be internal and not superficial, it is most probably owing to intrusion of light; this cannot be affirmed with entire positiveness, but is the most likely cause, for faults in the bath, collodion, &c., most generally give rise to superficial fogging. That is, fog from chemicals is *generally* superficial; superficial fog is *always* from chemicals.

1. *Chemicals in Fault.*—Generally speaking, when fog shows itself, and when the presence of white light is not suspected, the first thing done is to treat the bath.

But, in all such cases, the first step should be invariably to try another collodion, or to add a little tincture of iodine to that in use. Iodine tends to make the bath slightly acid. Therefore, the addition of acid to the bath, or iodine to the collodion, is, in each case, a step in a somewhat similar direction. And it would at first seem more correct to add the acid to the bath, as that brings the bath at once to the requisite point of acidity, and stops there; whereas, by adding iodine to the collodion, every plate tends to render the bath more acid.

But, in practice, it is found that the results of the two treatments are very different. Sometimes a very little iodine will effect a cure when acid seems to have no effect. For example: the writer has seen a bath made of fused nitrate of silver absolutely refuse to give a clean picture, even when acidified beyond what is proper, and yet work excellently by adding a very little iodine to the collodion—a collodion which was not new, but had worked perfectly a month before in cooler weather with a nearly neutral bath.

When a neutral nitrate has been used acidulation should not be carried beyond one drop of nitric acid or twenty-five drops of No. 8 acetic acid to every fifteen ounces of bath, and this much is only allowable when the nitrate of silver was free from acid. When the acidifying has reached this point, if the picture is not clean the remedy is most certainly needed in the collodion; and it must never be forgotten that these treatments with acid or with iodine are but necessary evils, and that the more nearly neutral the bath and collodion the more rapid will be the work.

The bath, however, may have been alkaline, and may therefore need neutralising and acidifying. This will be ascertained by introducing a piece of red litmus paper. Alkalinity may arise from having introduced an alkali intentionally, especially if ammonia have been added previous to sunning. Bicarbonate of sodium renders a bath rather neutral than alkaline, and is the only substance that should ever be employed for removing an excess of acidity. Or alkali may have been carelessly introduced when glasses cleaned with caustic soda or other alkali have been insufficiently washed before collodionising.

The use of fused nitrate of silver that has been kept too long in a state of fusion or heated to too high a temperature may tend to produce fog. Remedy: add very dilute nitric acid very cautiously, or try an older collodion.

An old bath highly charged with impurities may lead to fogging. As a palliative add bicarbonate of sodium till a permanent precipitate falls, and then expose for several days to the sun. Filter, and acidify if necessary.

Sometimes an old bath will lead to fogging, not by reason of impurities, but simply by having become too weak by mere exhaustion of the silver. This will be more apt to happen with baths whose evaporation is checked by being covered. Remedy: add crystals or fused nitrate of silver.

Or the *collodion* may be in fault. A very new collodion, especially one containing little or no alkaline salt, particularly if used with a nearly neutral bath, will sometimes refuse to give clean, bright pictures.

In this case, especially if the collodion be very pale, it is well to add to it a little tincture of iodine, and so apply the remedy to it rather than to the bath; or the admixture of a little old (but not too old) and more highly-coloured collodion will be found useful.

The *developer* may be in fault. If, when thrown upon the plate, it becomes almost immediately muddy, more acetic acid is wanted; or a developer that has hitherto worked well may cease to do so in consequence of a change of weather and temperature.

It has been affirmed that *excess of acetic acid* may produce fogging.

If copper be used in the developer (sulphate of copper, blue vitriol), and the plate have been left in the bath for a time insufficient to convert all the soluble iodides into iodide of silver, *brown fog* may be produced by the formation of iodide of copper in the film.

Old specimens of pyrogallic acid used in developing or redeveloping have been known to produce *blue fogging*.

* From Lea's *Manual of Photography*.

2. *White light* will, of course, cause fogging. As already said, a careful examination of the appearance of the plate will generally indicate whether light has been admitted into the dark room, or has made its way into the camera, because, in the first case, its action extends uniformly over the whole plate; in the other it does not, but mostly appears in bars, fans, brushes, or long slanting rays, the positions of which will always aid in tracing out the cause, remembering that the more indistinct the boundary of the fog the farther is probably the opening or leak from the plate.

A few systematic trials will always force out the source of the fault. Develope a plate without exposure and without removing it from the dark room. If no tendency to fog appears the fault was clearly in the camera or dark slide. Then sensitise a plate and carry it into the glass room in its dark slide. Leave it a minute, and develope it again without having exposed it or withdrawn the shutter. If it then fogs the leak is in the dark slide; if not, then it must be in the camera.

Let us, on the other hand, suppose that the plate fogged when developed, without having been removed at all from the dark room. Then the fault is either that white light gets into the dark room, or the chemicals are in fault.

A simple way of deciding this is to try a plate at night. Use only a candle or lamp well protected with yellow glass. Sensitise a plate, lay it on a dark object, put a worthless negative over it, and carry it into another room, in which is a gaslight turned on. Hold the plate a foot from the burner for fifteen seconds, taking care that the back is perfectly protected; then carry and develope by the light of a lamp or candle behind yellow glass. If a clean picture comes out it is a proof that white light gets into the dark room in daytime. If it fogs still when tried thus the chemicals are wrong, and must be changed one after another until the wrong one is detected.

This simple but systematic and exhaustive search will invariably lead the operator straight to the source of his trouble.

If the foregoing examination shows the fault to be with the camera it must be carefully overhauled. Carelessly-made cameras are quite worthless, and a great many such are exposed for sale. The writer dislikes walnut, although this wood is so great a favourite, because it cracks so much, and prefers mahogany, and next to it cherry. Look, therefore, carefully for cracks. Examine if the shutter works close in the dark slide. Notice if a hole has been worn into the bellows body. But the commonest place to crack is the camera front, which often splits at the screws that fasten the flange in. When a crack once appears do not trust to filling it up, but get a new front. A crack slowly widens, and so leaves a space between the edges and the filling. A crack may, however, be neatly mended by a good workman. The front is cut half way through at the crack, for half an inch each side, and a piece set in; then if the crack widens it can do no harm, and another crack is not likely ever to form, as the tension that caused it has been relieved.

When a camera is used in the open air it must invariably be covered with a thick cloth. Strong light, especially direct sunlight, will make its way through almost any camera, unless so protected.

Insufficient blackening of the interior of the camera may also lead to fogging.

3. *Sunlight falling directly upon the lens* may cause fogging, though this result does not necessarily follow.

4. *Atmospheric Causes.*—The sources of fogging may depend upon impurities in the air. These may be of several sorts.

A. *Chemical.*—Fumes of various sorts may cause fogging. Ammonia is especially to be avoided. See that the ammonia bottle has a well-fitting glass stopper—not a cork. Sulphuretted hydrogen arising from exposure of solutions of sulphide of potassium is even worse.

B. *Certain organic substances* have a tendency to cause fogging. The vapour of turpentine and of fresh paint. The smell of kerosene lamps in the dark room does not seem to be hurtful, as might be supposed.

C. *Foulness in the air* is liable to cause fogging. Emanations from drains, cesspools, and the like, or any putrefying or decaying organic matter. Emanations from stables are always ammoniacal, and tend to fogging. It should be borne in mind that immunity from these sources at one time is no proof that they may not be acting at another. *Dampness* acts very remarkably as a vehicle for odours, and emanations may rise in wet weather so as to cause fogging, when they would not at other times. Independently of this, the *state of the barometer* controls currents and movements of air remarkably. When the barometer is rising, a room will be supplied with air from channels quite different from those that act when the barometer is falling. Drafts of chimneys are always worse with a rising barometer. Whether *carbonic oxide*, the gas which flues are intended to carry away from fires, will cause fogging the writer cannot state, but no one is justified in permitting this most dangerous gas to escape into apartments by defective flues. Its danger is not greatest when it asphyxiates, for then the evil is noticed in time, and remedies are applied; but if inhaled continually in small quantities it causes diseases of the brain and spine. Leakage of illuminating gas may cause fogging.

5. *The Water.*—It is affirmed that the use of calcareous or ferruginous water may cause fogging.

6. *Errors of Manipulation.*—Under this head the following are to be classed:—

a. *Plate left too long in the bath.* This, especially in warm weather, is a fruitful cause of bad plates. When the plate is perfectly free from oiliness it is ready for removal.

b. *Too long a development,* rendered necessary by too short an exposure.

c. *Insufficient washing* off of the developer, so that enough remains to act.

d. *Considerable over-exposure with a large stop* will produce fogging, or rather an appearance closely resembling the effect of fog.

In the case of glass positives, fogging, when superficial, may be wiped off carefully with soft cotton-wool.

7. Finally: it may be remarked that *excessive temperature* of the weather may so precipitate the action of the chemicals as to lead to fog; therefore, in very hot weather less iron and more acetic acid must be used than for ordinary summer weather, or the collo-developer may be substituted.

PHOTOGRAPHIC SOCIETIES: ADMISSION OF NEW MEMBERS, &c.

At the present time, whilst popular attention that way tends, it is by no means a difficult matter to assemble together a number of persons who will enthusiastically converse for hours upon such a topic as "velocipede construction." Those most enthusiastic are generally those who have been most recently smitten by the hobby, and have most recently given their serious attention it. The more experienced have less to say upon the subject, and some of them nothing at all. Photography, some few years back, was, if not as extensively, certainly as enthusiastically, taken up as the velocipede is now; and, as there was so much more to learn in connection with it, and so many more experiments to be performed in the study of it, the conversations and discussions which naturally arose amongst its votaries assumed something like a methodical and lasting shape in societies organised with a special view to the elucidation of information connected with the pursuit of photography. To be an active and useful member of a photographic society a man might or might not entertain considerable social feelings; but he *must* take a lively interest in the phenomena of experimental photography, and in a knowledge of many of those conditions under which the said phenomena take place.

Some few years ago, when hitherto-unobserved facts were constantly making their appearance; when first one means and then another by which pictures could be produced were discovered; when the energy by which light is capable of affecting various bodies was ascertained to be confined within certain and now well-known degrees of refrangibility; when new modes of inducing the latent image to yield a visible result were discovered; when gold and sulphur-toning were introduced; and, in short, when discovery after discovery of vital importance to photographic science was made in rapid succession—the societies which had for their special object the elucidation of photographic truths were active and flourishing, interesting papers were read, astonishing experiments were performed, wonderful hopes encouraged, and animated discussions enlivened the members of the photographic societies.

Now, however, when the spirits of professional photographers are damped by the commercial aspect of the profession—when discoveries are comparatively rare, and when the enthusiasm instigated by the marvel of intense novelty has been dimmed by comparative familiarity—the energy and life of the photographic societies, together with much of their interest and usefulness, seems unfortunately on the decline; yet, to men of philosophical mind and scientific inclinations, the more hidden and less startling facts which are gradually being evolved in connection with our art-science are none the less interesting because trade is dull or because photography is less of a fashionable rage, nor are the discoveries of today less useful because they are less sensational than those of yesterday. Photography is now assuming a position amongst our stores of knowledge which will enable it to hold its own as one of the instruments by which are to be effected what is to be done for humanity by the progress of civilisation; and any cause which diminishes the activity or lessens the usefulness of photographic societies is a cause not only to be encountered with regret for its existence, but with earnest efforts for its removal.

Many of the regulations and customs which answered admirably the purposes of photographic societies when discoveries were more frequent and new topics for discussion more accessible, must now be abandoned in favour of other modes of work more suited to the present state of

affairs. The writer of the present article has observed with the deepest regret, from time to time, many causes which diminish the interest and usefulness of the societies; and, with the sincerest desire for their removal, it is his wish to call attention to them during the term of comparative quiescence intervening between the extremes of the season in which notes are compared and discussions held within doors.

Taking the weak points of the societies into consideration in something approximating to an orderly manner, the admission of members, as conducted in many instances, claims early attention. For some reason which is not altogether self evident, the necessity for a proposer, seconder, and a vote by ballot before admitting new members seems to have been generally conceded amongst the founders of photographic societies. Possibly the exclusiveness which such a means of introduction suggests was a luxury which could well be afforded in the earlier days of societies, when, perhaps, it was much easier to obtain a number of papers to read than a number of evenings to read them on. This, however, is certainly not the case now. Three or four general meetings in succession which are destitute of a paper to read or a topic to discuss seem, at the present time, to be occurrences by no means unusual. At the meetings of the Manchester Photographic Society during the past session, apart from the efforts at entertainment made by the writer, there has been but one paper read, and even this failed to excite discussion. Amongst not only provincial but also among metropolitan societies, both during and previous to the past session, papers have been in many instances earnestly and vainly asked for. Surely, therefore, any exclusiveness which tends to bring about such a result amongst gatherings of men called together specially to hear of and speak on matters of photographic interest is to be regretted, and should, without delay, be abolished. For a couple of years before he became a member of the Manchester Photographic Society, the writer was very desirous of doing so; but, being unacquainted with any of its members, except a dealer in photographic goods, who declined to give him an introduction to the Society, he failed for some time to find a proposer or seconder for his coveted place in the assembly. His election, when it did take place, was entirely due to a gentleman to whom he was a perfect stranger. Many others are now and have been in a like predicament; and it will probably be found that the boldness by which total strangers *push* themselves upon bodies of men to whom they are unknown, exists more amongst those who become indolent and useless, if not disorderly, members than amongst those who, having a modest appreciation of their own capabilities, feel that there is something which they can and which they would like to impart for the general good of the whole assembly.

The ballot, experience has shown, does not exclude from any society those who, knowing nothing, talk much; and it has also shown that it does not ensure even the payment of subscriptions. In short, as the proposer and seconder frequently know little or nothing of the person proposed or seconded, and as the system of which they form a part guarantees neither ability, willingness, nor subscriptions, surely it is high time it was once and for all abolished in every society, seeing that in many instances it excludes those who, like the writer, are willing to pay and also willing to work with energy and goodwill to the utmost extent of the ability they possess. If a society be not intended to consist exclusively of working members, surely there is no necessity for any other condition to a gentleman's admission as a member than that he should pay his subscription and sign his name to those rules which have been drawn up for the order and the good of the society.

Since writing the foregoing, the writer has heard with considerable surprise that there are *old* and influential members of societies who not only abstain from reading papers themselves, but positively feel their time is wasted when they listen to papers read by others, unless the material of the paper is as "bran new" as the unexpected appearance of an enormous comet.

I am informed that the gentlemen alluded to consider the meetings of the societies as social, not as scientific, gatherings, and the reading of papers as interruptions to genial conversation. Of course there can be no reason on earth why photographers should not meet together simply for the enjoyment of social intercourse if they are so disposed, but there is an objection to the appropriation specially for social purposes of an institution intended specially for scientific discussions, without such appropriation being duly resolved upon and intimated; and even where this has been done, both for the sake of consistency and the convenience of those outsiders who imagine there is something in a name, would it not be better to call the organisation "the society of the photographers," rather than "the photographic society," of such and such a town?

To such a social body, any suggestions for increasing the scientific usefulness of the meetings of photographic societies must be absurdly superfluous, but there is little necessity to apologise for the present article, inasmuch as those who feel themselves bored by listening to papers which others read for them, are scarcely likely to take the trouble of reading papers for themselves.

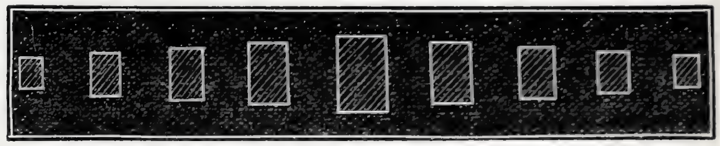
Once and for all, the writer would state that anything he may say upon the management of photographic societies is addressed only to those who wish to see them flourish as instruments for the elucidation and dissemination of photographic truths, and not to those who regard them merely as affording opportunities for "social conversation."

D. WINSTANLEY.

PROFESSOR TYNDALL ON "LIGHT."

My last notice of Professor Tyndall's important and interesting lectures on *Light*, at the Royal Institution, broke off in the midst of the subject of diffraction. It was stated that when a line of monochromatic light from a slit in the electric lamp was viewed from a distance through another slit, a series of rectangular images, with intervals of darkness, was the result. These images were arranged somewhat as in *fig.* 1, but the edges of the rectangles were not abrupt and well defined, as in the cut, which is intended only to give a rough idea of the

FIG. 1.



appearances. When blue monochromatic light is used the rectangles are closer together, and when red light is employed they are further apart. When white light is used the rectangles are consequently prismatic; but in considering the causes of the phenomena, monochromatic light is chosen for the sake of simplicity of explanation.

A simple way to see some of these diffraction phenomena is to cut a narrow slit in a sheet of note paper, and to look at a candle, or a line of light, from a distance. The narrower the slit the further do the images diverge from each other. Tinfoil is better for this experiment than note paper. By nearly closing the eyes, so that the eyelids form a rough slit, and looking at a distant candle, a "tendency" will be seen to the formation of diffraction images right and left of the real object.

Returning to the more perfect experiment with the monochromatic line of light from the electric lamp, and the slit in front of the eye, the fact is that every point of the wave which fills the latter slit is itself a centre of new wave systems, which are transmitted in all directions through the ether behind the slit. We have now to examine how these secondary waves act upon each other.

Let A B, *fig.* 2, be a vastly magnified image of the slit, and E E the retina. The red rays passing straight through the slit will form the central rectangle at C D, and the waves cannot interfere with each other. But at D an interval of darkness will begin, reaching to K. Why is this? Because the ray A D is half a wave length longer than the ray B D, consequently the two interfere with each other in the manner shown in the Journal of May 28, and darkness is the result. Between K and E the crest and sinus of each wave from A and B will again coincide, and another rectangle of light is produced. Afterwards comes another interval of darkness, and so on alternately. When blue light is used the rectangles are closer together, simply because the blue waves are shorter than the red waves. There will not be total darkness at D, because, although the rays A D and B D neutralise each other, a ray falling upon D from the centre of the slit at N will not be destroyed.

FIG. 2.

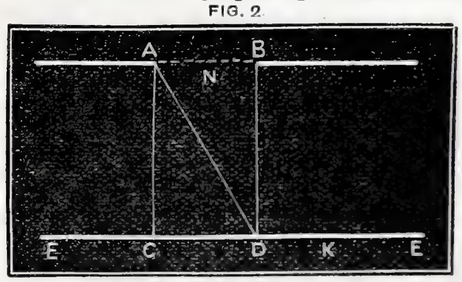
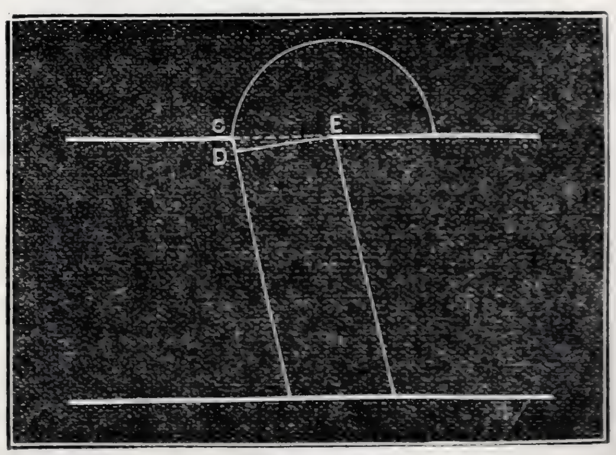


FIG. 3.



In explaining the method of measuring the length of waves of light, Professor Tyndall said:—"The first of our dark bands corresponds, as already explained, to a difference of marginal path of one undulation; our second dark band to a difference of path of two undulations; our third dark band to a difference of three undulations, and so forth. With a slit 1·35 millemeter wide Schwerd found the angular distance of the

first dark band from the centre of the field to be 1′ 38″. (The millimeter is about $\frac{1}{25}$th of an inch.) The angular distances of the other dark bands are twice, three times, four times, &c., this quantity; that is to say, they are in arithmetical progression.

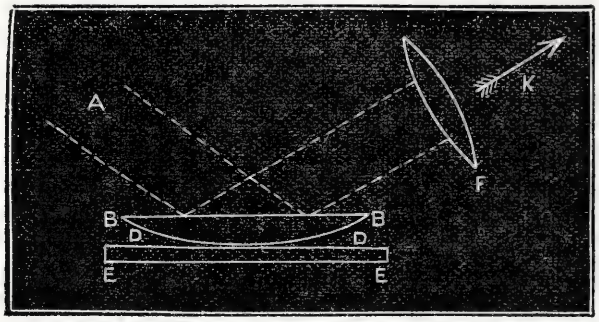
"Draw a diagram of the slit E C (*fig.* 3), with the beam passing through it at the obliquity due to the first dark band. Let fall a perpendicular from one edge, E, of the slit, on the marginal ray of the other edge at D. The distance, C D, between the foot of this perpendicular and the other edge is the length of the wave of light. From the centre, E, with the width, E C, as radius, suppose a semicircle to be described; its radius being 1·35, the length of this semicircle is readily found to be 4·248 millimeters. Now the length of this semicircle is to the length, C *d*, of the wave as 180° to 1′ 38″; or as 648,000″ to 98″. Thus we have the proportion—

648,000 : 98 :: 4·258 to the wave length C D.

"Making the calculation, we find the wave length for this particular kind of light (red) to be 0·000623 of a millimeter, or 0·000026 of an inch."

Professor Tyndall next called attention to the colours of thin plates, and began by showing what are known as "Newton's rings," In this experiment he placed a plano-convex lens of small curvature, B B, upon the flat sheet of glass, E E. A thin film of air, D D, of a thickness gradually increasing from the centre outwards, was thus enclosed

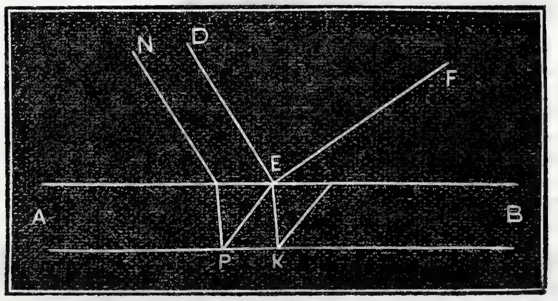
FIG. 4.



between the glasses. This film of air was brilliantly illuminated by parallel rays of light, A, from the electric lamp, and an image of the coloured rings caused by the thinness of the film of air was thrown by a lens, F, upon a screen in the direction of the arrow, K. With monochromatic light Newton obtained rings of the same colour with intervals of darkness between them, and when blue light was employed the rings were closer together than when red light was used.

The colours of the soap bubble and of thin plates may be explained by the aid of *fig.* 5, wherein A B is a portion of one of the films, enormously magnified in thickness. Let D be a ray of monochromatic

FIG. 5.



light falling upon E; part of it will at once be reflected to F, and part will pass through the film to K. Let another ray of light, N, fall at P, it will be reflected to E, and, supposing it to be now half a wave length behind the waves in E F, a tendency to produce darkness is the result. With white light instead of monochromatic light, colour is obtained under these conditions.

The lecturer said that the colours of the soap bubble, of oil or tar upon water, of tempered steel, the brilliant colours of lead skimmings, nobilis metallo-chrome, the flashing colours of certain insects' wings, are all colours of thin plates. In illustration, he projected the colours of a thin layer of oil of turpentine floating on water upon a screen. The colours sometimes seen in the bodies of transparent crystals are, usually, due to vacuous films produced by internal fracture.

He said that Newton measured the diameters of his coloured rings with great accuracy, and determined from its focal length and refractive index the diameter of the sphere of which his lens formed a part. He found that the thicknesses of the film of air corresponding to the diameters of the rings to be in arithmetical progression. He also determined the absolute thicknesses of the plates of air at which the rings were formed. When using the most brilliant rays of the spectrum from between the yellow and the orange, he found the thickness corresponding to the first bright ring to be $\frac{1}{178000}$th of an inch, the second $\frac{3}{178000}$th, the third $\frac{5}{178000}$th, and the fourth $\frac{7}{178000}$th.

In his next lecture, delivered upon the 27th of May, Professor Tyndall spoke of the phenomena of double refraction, and said:—"In air, water, and well-annealed glass, luminiferous ether has the same elasticity in all directions. There is nothing in the molecular grouping of these substances to interfere with the perfect homogeneity of the ether. But when the water crystallises to ice the case is different; here the molecules are constrained by their proper forces to arrange themselves in a certain determined manner. They are, for example, closer together in some directions than in others. This arrangement of the molecules carries along with it an arrangement of the surrounding ether, which causes it to possess different degrees of elasticity in different directions. In a plate of ice, for instance, the elasticity of the ether in a direction perpendicular to the plane of freezing is different from its elasticity in a plane parallel to the same surface.

"This difference is displayed in a peculiarly striking manner by Iceland spar, which is crystallised carbonate of lime; and, in consequence of the existence of these two different elasticities, a wave of light passing through the spar is divided into two—the one rapid, corresponding to the greater elasticity, and the other slow, corresponding to the lesser elasticity. Where the velocity is greatest the refraction is least; and where the velocity is least the refraction is greatest. Hence, in Iceland spar, as we have two waves moving with different velocities, we have double refraction. This is also true of the greater number of crystalline bodies. If the grouping of the molecules be not in all directions alike, the ether will not be in all directions equally elastic, and double refraction will infallibly result."

Professor Tyndall went on to say that in some doubly-refracting crystals, such as ice, the molecules are arranged in the same manner on all sides of a particular direction, and that in Iceland spar they are arranged symmetrically round the crystallographic axis. Consequently, when a beam of light is passed through ice perpendicular to the plane of freezing, or through Iceland spar parallel to its crystallographic axis, there is no double refraction. The lecturer proved this by sending beams of white light through pieces of crystal specially cut and polished for the purpose.

He then proceeded to show some of the properties of Iceland spar, by sending a powerful parallel beam of light through a round hole in the front of the electric lamp, and bringing the brilliant disc to a focus upon the screen by means of a large double convex lens. He next placed between the lens and the aperture a magnificent block of Iceland spar, about a foot long, eight inches broad, and perhaps four inches thick. This block was of excessive clearness and purity throughout, and, I think, was one of a few fine specimens recently exhibited at the French International Exhibition at Paris. The spar of course caused two discs to make their appearance upon the screen. The lecturer said that one ray passed through the crystal, obeying the ordinary law of refraction, having also its angles of incidence and refraction in the same plane. This ray is called the "ordinary ray," and its index of refraction in Iceland spar is 1·654; or, in other words, the velocity of light in air is to its velocity in the crystal in the constant ratio of 1·654 to 1.

The index of refraction of the other ray is not constant, nor is the angle of refraction, as a general rule, in the same plane as the angle of incidence. This ray is called the "extraordinary ray," and its index of refraction varies according to the direction of the beam through the crystal, from 1·483 to 1·654. The lecturer again exhibited the properties of Iceland spar in a pleasing manner, by casting a spectrum upon the screen by means of a prism of this substance, As a matter of fact, however, *two* spectra were thrown by the prism—one, the least refracted and the smallest, being due to the extraordinary ray; and the other, the most refracted and the largest, being due to the ordinary ray. The fact that the ordinary was most refracted was also evidence that the ethereal waves in that ray were more retarded than the ethereal waves in the other ray, while passing through the Iceland spar.

Professor Tyndall closed his description of the phenomena presented by crystals of Iceland spar by saying that, "when on a plate of Iceland spar cut perpendicularly to the axis a beam of light falls obliquely, the ordinary ray, being the more refracted, is nearer to the axis than is the extraordinary. The extraordinary ray is, as it were, repelled by the axis; but Biot showed that there are many crystals in which the reverse occurs, in which, that is to say, the extraordinary ray is nearer to the axis than the ordinary, being, as it were, attracted. The former class Brewster called repulsive or negative crystals—Iceland spar, ruby, sapphire, emerald, beryl, and tourmaline being examples. The latter class he called attractive or positive crystals—rock crystal, ice, and zircon being examples." At this stage of his lectures Professor Tyndall began the subject of polarised light. WILLIAM H. HARRISON.

CHANGING THE COLOUR OF LEAVES—The green colour of leaves, one element of which must be a vegetable blue, has led an American experimentalist to the conclusion that leaves turn red at the end of the season through the action of an acid, and that the green colour could be restored by the action of an alkali. The conclusion has been verified by experiment—autumnal leaves placed under a receiver with vapour of ammonia in nearly every instance lost the red colour and renewed their green.

Our Editorial Table.

Painted Transparencies. By Pumphrey Brothers, Birmingham.

We have heard a good deal about the impropriety of gilding refined gold and painting the lily. We have also heard a good deal about the "shocking" want of taste displayed by those who would colour a photograph or an engraving. Well, "evil be to him who evil thinks." Refined gold—at least, that deposited by means of the electro-metallurgic process, and generally considered to rank as twenty-four carats fine—has often a poor, sickly colour, until by gilding or analogous means it is made to assume the rich tint to be seen on gold watch dials and the finer articles of coloured gold jewellery. We have likewise seen some lilies in Covent Garden market which were *not* so good in their colour as painted imitations. For the sake of a good "old saw" we regret to have to record this, but truth is truth.

Messrs. Pumphrey Brothers, of Birmingham, appear determined to secure within their grasp every branch connected with photo-transparencies, from manufacturing the instruments and printing the pictures down to this, their last essay, viz., that of *painting* photographic transparencies.

From the specimens before us we presume that they have confined their inroad upon artists to small transparencies intended for subsequent enlargement in the magic lantern. Now, we may state that some time ago we were favoured by Messrs. Pumphrey with a plain photographic transparency of a subject which we find among the coloured specimens now before us; and we are, therefore, in a position for instituting a fair comparison between the plain and the coloured prints. Placing such duplicates in the lantern—one immediately following the other—the difference is, indeed, very great, and is wholly in favour of the coloured print.

Iona Cathedral is an unassuming picture with a great deal of green, although well broken-up, foreground. It is a remarkably bright and sunny picture, the green foreground possessing its natural harmony, and not, like a similar view by another artist, which we recently examined, having its grass of a sooty-black colour. We are all acquainted with the difficulty of keeping the tone of grass in a photograph up to the proper standard. This picture strikes us as being exceptionally excellent in this respect. We may say the same of a view from a window in Balmoral, from a negative by Mr. Stephen Thompson. It forms a most pleasing and harmonious picture. We have rarely seen a more effective picture than *St. Michael's Mount*. It is coloured to represent a moonlight view, which it does in an admirable manner—the clouds and the effect on the water being alike excellent. This picture shows what, in the hands of a skilful artist, may be done in the case of a photograph which, owing to over-intensification, is unsuited for a "daylight" scene. In some views of Venice the peculiar qualities of the clear Italian sky and the still water of the canals are represented with nice discrimination. In all these pictures the smoothness and general excellence of the skies (the most difficult item in connection with this branch of art) warrant the highest commendation, while they are quite free from anything that might convey the idea of laboured working. They are both free and effective.

Messrs. Pumphrey have also sent us a couple of specimens of quite another branch of art. The majority of our readers are acquainted with the common "comic" slipping slides for the lantern, usually sold from about two shillings to half-a-crown each. How they are produced to sell retail at this price has proved a marvel to many, for they are drawn and painted by hand, carefully stopped out outside of the figure, and have such effects painted on them as to show, by the aid of a slipping slide, the effects of change or motion. The enterprising firm whose works are now under notice have pressed photography into the service of this branch of industry, and henceforward, instead of the crude drawing which we so frequently find in this department of pictorial art, we may expect to see really superior pictures; for, being photographed from large-sized drawings prepared for the purpose and afterwards coloured by hand, they are necessarily superior to their predecessors in drawing, finish, and uniformity.

Portrait of the Late Sir R. J. Clifton, Bart., M.P.
By Walter Clayton.

The death of few gentlemen has been the source of more sincere grief than that of Sir Robert J. Clifton, late M.P. for Nottingham. A genuine and warm-hearted man, he was exceedingly popular with all classes of society. Although we have never seen the late baronet, the portrait by Mr. Clayton now before us is one that intuitively impresses itself upon the spectator as a good and faithful likeness. It is to be published, we understand, by express permission of Lady Clifton, by whom it is esteemed an excellent portrait of her deceased husband. The position is natural and easy, and the expression of countenance is animated and intelligent.

Correspondence.

Foreign.

Paris, June 21, 1869.

"And still they come." Another process for vitro-enamel photographs is introduced to the public by L. de Lucy-Fossarieu, painter, in a pamphlet of twenty-two pages, which is published for some two shillings, by M. Puech, 21, Place de la Madeleine, Paris. This process has been used by the author since 1863, and he considers it one of simplicity and of practical use. He discards the simple use of bichromates, having found the following preparation always capable of giving *certain results*. It will keep any length of time, gets better by age, and need only be sensitised at the moment of use.

First bottle, containing a pint or more. Put in a quantity of bruised borax, and nearly fill it with water. Let it stand several days, shaking it at intervals till a *saturated* solution of borax be formed.

Second bottle, containing a pint. Put in—

White sugar	2 ounces.
Gum arabic	$5\frac{1}{2}$ drachms.
Water	$\frac{1}{2}$ pint.

Shake frequently during two or three days, till the gum be dissolved, then add half-a-pint of the saturated solution of borax from the first bottle. Shake well together.

Third bottle of one ounce is composed of this solution:—

Honey	96 grains.
Solution of borax	A few drops.
Water	to 1 ounce.

Fourth bottle of one ounce is composed of this solution:—

Bichromate of ammonia	$\frac{1}{4}$ ounce.
Water	to 1 ,,

Make a saturated solution.

The sensitising solution is prepared as follows:—

Boracic liquid, bottle No. 2	6 parts.
Bichromate liquid, bottle No. 4	4 ,,
Distilled water	10 ,,

If the weather be very hot and dry, add three or four drops of the boracic honey solution, bottle No. 3.

Operators are recommended to provide themselves with two little coffee cups with spouts, a little funnel of about two-ounce capacity, some filtering papers to suit, and some pieces of perfectly flat and clean glass plates, about three inches by two. The sensitising liquid is filtered into one of the cups, and the funnel is then placed in the other. The filtered liquid is poured over the clean glass plate like collodion, and the excess drained into the filter. The plate thus prepared is allowed to drain for one or two minutes, placed in an inclined position. The film is then dried, and for this purpose a sheet of iron plate, mounted on feet so that the surface shall be a little inclined, is recommended to be used. A little blotting-paper is placed between the iron plate and the prepared glass, and the latter is dried gently by means of heat applied from beneath, and which may be furnished by a floating night light—a little wick floating in oil. The heat should never be great, and the plates when dried should present a smooth and brilliant surface. Whilst one plate is drying another can be coated. The transparent positives for printing from are recommended to be soft, very transparent, and very sharp. They should have been rapidly developed, and not intensified afterwards.

A few hints on the development of the enamel pictures are useful. It is not to be wondered at if at the first attempt at developing nothing is seen, and it is very important that the image should not come out rapidly; if it should it shows it has *not been exposed long enough*, and it is no use going on with it, as such a picture will never give a good enamel. If, on the other hand, the image is not visible after five or six developments it has been *too much exposed*, and it should be equally rejected, as it would be loss of time to go on with it. The author of this process objects strongly to the plan of breathing on the pictures during their development. A good image takes ten minutes to come out sufficiently. The mode of development recommended for general use is not rubbing the enamel powders after the exposed plate with a brush, but it is the covering of the image with a good quantity of the powder, and shaking the plate so as to spread it in all directions. The weight of the powder replaces with advantage the pressure of the brush, its action being softer and more regular, and they are the finest particles of powder which come in contact with the image. The brush may be used for beginning and finishing the developing operation. It is best to have some half-dozen pictures developing at once, and the practice of printing three or four from each positive is considered good and economical; for it costs comparatively little to print one or two more pictures, whilst time and money may be spent in burning in bad images in the hopes of their turning out good pictures in the end.

The transfer of the image on to the plate of enamel is effected, as usual, with collodion and an acidulated bath. It is stated, as a point of great importance, that every picture which is to be left till the next day before being transferred should be collodionised and put in the acid bath, which, in this case, should be weaker than usual. The bichromate film is more difficult to dissolve perfectly if left without any preparation, and the image comes off in scales. If the pictures are left in pure instead of acidulated water they become covered with a multitude of little bubbles, which are very adherent and produce white spots in the burning in. The least quantity of acid is said to prevent these bubbles. The transferred film should be placed *film downwards* on the enamel plate, and not the image side downwards. This point is much insisted upon; and if, for any reason, a "reversed" picture be required, it had better be printed from a suitable positive rather than formed by placing the developed side of the film on the enamel. The same process may be employed for photographs on porcelain with a few modifications, thus:—The images should be printed rather *lighter*, the enamel powder should be more fusible, and after the transfer and before drying the image some of the saturated solution of borax (bottle No. 1) should be poured over it.

The inexhaustible writer who is known by the *nom de plume* of Timothee Trimm has had an article devoted to photographs and spirits. It has been provoked by the extraordinary trial at New York, reported in your columns. He relates that some years ago a poor peasant woman lost her son, and she wrote to a Paris photographer, saying—"My son has been dead three months. I should like his portrait, for I have nothing left to me of him but his clothes. Be so kind as to let his portrait be made by the sun; for, seeing he can bring up the flowers, he can perhaps restore to a desolate mother the child she has lost." The artist reflected awhile on this singular request; he had a child of the same age, and a sudden idea came to him. He telegraphed to the woman—"Send me the clothes of your son." The clothes came, and the artist set to work; and when the mother came to Paris and asked if the portrait was finished, he replied yes, and showed her a picture representing a little boy with his head hidden in his little hands, joined in the attitude of prayer. The clothes were those of the dead child, the little son of the artist had posed in them for this picture, and the poor mother was delighted, and took the picture with joy to her cottage. "My son," said the photographer, "this rendering a *souvenir* to a desolate mother is to have done good, and it will bring us happiness and fortune." "And today," says Timothee Trimm, "this artist is one of the richest and most medalled of the capital."

This anecdote serves to show how easily persons can be pleased with the most remote likenesses, and that in pronouncing upon the portrait the imagination is largely employed. I should like to try experiments after this fashion in Mr. Mumler's studio. I would take a box of new plates, cleaned and polished by myself; I would take my own collodion, and my own silver bath and developers; I would prepare my plate and expose in Mr. Mumler's camera, and he might do anything he liked during the operation. I would then develope the picture myself, and if a ghost was there I should be astonished, but would repeat the experiment in my own camera, and in the presence and under the "influence" of Mr. Mumler. If the ghost came then I should be still more astonished, but I fancy it would not appear. I am inclined to think that the plates used by Mr. Mumler are not new—have been used before—and that the ghosts are in reality no more like the portraits of the persons they are supposed to represent than that of the little boy in the anecdote of Timothee Trimm.

Les Mondes for the 17th June contains a notice of your experiments on the oxyhydrogen light, and the editor sustains me in my remarks upon them. He says that Commander Caron has studied for three years in a special laboratory the comparative properties of lime, magnesia, and zirconia, and his conclusions cannot be overthrown by one experiment. I am anxiously looking for your new experiments, for I feel sure that your credit of being careful experimentalists will be sustained before all those who are so interested in the subject. R. J. FOWLER.

Home.

DECOLOURISING THE NITRATE BATH.

To the EDITORS.

GENTLEMEN,—At this season time is especially valuable to the photographer, hence a few words on your article of the 18th, regarding the treatment of the printing bath requiring decolouration.

I have had recently a very intractable bath, and, strange to say, it became, in a day or two, the colour of brown sherry after only a few sheets of albumenised paper had been floated on it. I tried Mr. England's plan, which occupied fully half-an-hour, and utterly failed. Now for Mr. Tunny's.

To twenty-five ounces of the said bath I added five drops of liquor ammonia, and about the same quantity of a saturated solution of citric acid in water. The flocculent deposit was serious to look at, but the bath was bright and clear in less than five minutes. The deposit, when washed and dried, weighed only six grains.

As the aqueous solution of citric acid soon decomposes, I keep by me a small bottle of the acid dissolved to saturation in alcohol.

I know of no plan so rapid and efficient as Mr. Tunny's.—I am, yours, &c., CLERICUS.

Clifton, June 21, 1869.

ALKALINE DEVELOPMENT.

To the EDITORS.

GENTLEMEN,—I should be sorry if your readers were led to imagine that I ignore altogether the use of pyrogallic acid in the intensification of dry plates; for, when I find the intensifying slow or difficult, I avail myself of its well-known properties, minute quantities only being added, and the citric acid being always in excess.

By keeping these solutions separate their restraining or intensifying properties can be more carefully noted than when silver is added to a prearranged mixture of pyrogallic and citric acids.—I am, yours, &c.,

June 21, 1869. F. HOWARD.

THE COLLODIO-BROMIDE PROCESS.

To the EDITORS.

GENTLEMEN,—I have no doubt that Mr. Dawson was right when, in his last article on collodio-bromide of silver, he said that in all cases it is necessary that an excess of free bromide should exist in the emulsion. This is, however, decidedly opposed to his own teaching given elsewhere. I myself came to this conclusion when investigating the cause of my total want of success in carrying out his former instructions. I found that collodion bromised with eight grains of bromide of cadmium to the ounce, and *thoroughly* mixed in the tube mortar with eleven grains of nitrate of silver, as he directed, gave a film very sensitive indeed, but producing a thin, veiled image, which fogged instantly on any attempt to intensify it, while an increased supply of bromide in the developer merely retarded the commencement of the development, but did not prevent the fogging when it had once commenced; and it was not until I had established an excess of free bromide in the *film* that I could get a tolerable image. On the other hand, I found that eleven, twelve, or more grains of silver would *sometimes* give a clean picture, if shaken up in a bottle with the collodion (instead of being mixed thoroughly in the tube) and used soon after being made.

But repeated and careful testing and experiment has shown me that in each case there was a surplus of free bromide in the film, notwithstanding the apparent excess of nitrate. It appears that when the nitrate of silver is first added to the collodion something like the following takes place:—The bromide, being in solution and in a state of ultimate division, seizes upon the particles of nitrate, which are comparatively large, and converts their *surface* only into bromide of silver; thus we have, at the same time, three distinct substances—viz., bromide of silver, nitrate of silver, and free bromide—in the emulsion, the proportions of which are constantly changing as the free bromide eats further and further into the particles of silver, until the bromide is all combined, when the preparation becomes useless long before it has began to subside.

This theory, if correct, will explain the cause of many difficulties in working the process, and will account for the discrepancies as to the time during which the collodio-bromide will keep good. I should say that the evil effects of an excess of nitrate in the film were pointed out by Mr. Bolton in his exhaustive article on collodio-bromide, which appeared in your columns in December, 1865, to which nothing can, even now, be added for the better.

We are, however, indebted to Mr. Dawson for clearly enunciating the necessity for an actual excess of free bromide in the film, and for suggesting a method of manipulation by which doubt as to the properties of the constituents is reduced to a minimum.—I am, yours, &c.,

Grammar School, St. Olave's, S.E., ANDREW JOHNSON.
June 21, 1869.

PHOTO-ENAMELLING.

To the EDITORS.

GENTLEMEN,—I have lately been trying the enamel process of Geymet and Alker, as described by your esteemed Paris correspondent, but, failing in two or three of the operations, will it be troubling your correspondent too much to ask him if he will give a little further information on the subject? I would not trouble him were it not that not being a French scholar, the treatise of Geymet and Alker is to me a sealed book.

The transfer of the picture to the enamel is one part of the process wherein I fail, in not being able to get the picture to adhere to the tablet. Will your correspondent kindly give a few of the "dodges" worth knowing that are contained in the chapter on this part of the process?—also, the strength of sugared water, and what part it plays in the success of the operation?

The dissolving of the collodion film is the other operation in which I fail, for, not only does the sulphuric acid dissolve collodion, but it also removes the enamel colour too; and if this did not remove it I imagine the washing in water after would do so, seeing that water is a powerful solvent of the gum.

If your correspondent will enlighten me upon the above points he will be conferring a great favour upon a subscriber from the first.—I am, yours, &c., W. Bayley.

Shrewsbury, June 21, 1869.

[Probably Mr. Fowler or some other friend will kindly reply respecting the difficulties experienced by our correspondent.—Eds.]

SOLAR ENLARGEMENTS.

To the Editors.

Gentlemen,—I am a portrait painter, and for the last two years have been in the habit of having a negative taken at a photographer's and enlarging it by means of the solar camera. The paper I have used has always been Whatman's drawing-paper (not the hot-pressed), and the formula the same I read in your Almanac, by Walter Woodbury, viz. :—

Iodide of potassium	6 drachms.
Bromide of potassium	2 ,,
Chloride of ammonium	1 drachm.
Water	1 pint.

Up to the last three months I have never been bothered, although I know nothing of photo-chemistry; but now, after floating the iodiser on two or three sheets of paper, it turns yellow, and any sheets prepared by it whilst in this state are sure to fog very much indeed. After a few days' rest the iodiser loses its yellow colour, but never acts as at first. I have tried every precaution I can think of, but in vain. Can you assist me? From the kind manner I see so many similar questions answered in your Journal, I know you will, if possible.—I am, yours, &c.,

Oxford-street, Manchester, June 21, 1869. J. Wilkinson.

[Has any reader had similar experience with Whatman's paper?—Eds.]

DISTILLED WATER IN DRY PROCESSES, AND OTHER SUBJECTS.

To the Editors.

Gentlemen,—I shall be glad if, in your next, you will answer the following queries:—

Different writers on different dry processes urge the use of distilled water as a first wash after the plate leaves the nitrate bath, as well as a final wash after the preservative has been applied; while others say they never use distilled water at all in any process. Mr. Mudd says this when he describes his collodio-albumen process; and any one who is at all acquainted with Manchester, where he resides, will say that of all towns even the rain water there must be the most impure. Supposing hard water supplied by the town authorities to contain carbonates, &c., do you consider that there is any action on the film which is injurious to the plate, and which may be avoided by the use of distilled water?

I like to cover my plates, if possible, to the very corners, but cannot of course do so if I hold the plate with my finger and thumb, as I have hitherto done, to the consequent diminution of the size of the picture. Is there any reason why a pneumatic holder may not be used for this purpose?

I dare say many of your correspondents may be purposing to try a bicycle for their tours. All I can say is I tried one in my garden, and on the very first occasion (last Monday) I fell and broke my leg. My advice to all who intend to try such horrid things is—"Don't."—I am, yours, &c., Strike a Light.

The Haunted House, Fishergate-hill,
Preston, June 22, 1869.

[On the subject of the water in which a plate is to be washed there are two opinions, each diametrically opposed to the other. The one is that alluded to in the letter of our correspondent, with whom we sympathise in his untoward velocipede experience. Many of our correspondents allege that the *best* results are obtained only when the plates have undergone a washing in distilled water. On this subject we shall not descant at present. So many experienced dry plate workers find that a washing in distilled water confers decided advantages that we shall not attempt to gainsay what has already been written on the subject. But others hold that the best effect in the preparation of a dry sensitive film is obtained by the immersion in a solution of a salt, the nature of which will best be ascertained from the following extract from a communication by a representative of this class, Mr. C. J. Burnett. We may state that while we thus devote space to them we do not thereby express our concurrence in Mr. Burnett's opinions:—

"We have not generally succeeded in getting any advantage from the combination of oxygen salts with pure collodion on glass or paper, which is not much more readily attained by their introduction at a later stage, the difficult solubility in collodion of so many of these salts being a considerable obstacle; still some of the oxygen salts of the ordinary alkalis are soluble in alcohol, and in collodion made principally with it (as long ago recommended by us for use on paper, &c.), or even in ordinary collodions, so that our system need not break down here. We are only waiting for dark box, &c., to resume our experiments as to suitable salts, times of exposure, &c.; and in the meantime may mention, as among the results already arrived at, that generally, both with the organic acids elsewhere alluded to, and with phosphoric and other oxygen acids, the salts produced with trimethylamine and some of its allies of the same or parallel series, and of various of the complex alkalis, including those formed by the transformation of cyanate of ammonia or cyanates of the compound ammonias, give the best promise. It is necessary, however, that the iodide and bromide in combination with these salts in the collodion should also be an iodide or a bromide (a hydriodate or hydrobromate) of the same or one of the analogous bases, or other bases which shall not be liable to precipitation in the collodion by the oxygen acid. As to the more readily-manageable mode of introduction alluded to, we have only to prepare and sensitise as usual, and then transfer our plates after sensitising, and before washing out free silver, to a bath containing a solution in water (or in water with a little alcohol or ether added) of the succinate, oxalate [?] (in spite of injurious effects which are admitted to be produced by *free* oxalic acid in ordinary circumstances), *fumarate*, *phosphate*, benzoate, citrate, tartrate (carbonate, tungstate, or molybdate?) of soda, ammonia, or potash (solubility in collodion being here unnecessary), till the silver has been all precipitated, and then wash with plain water (or water containing a very little carbonate of soda, potash, or ammonia, to facilitate the adhesion, or to prevent coagulation of albumen to be afterwards applied, and, it may be, to increase sensitiveness), and then coat with plain gum-arabic or other gum, or albumen, or similar protector, and dry. We say nothing about collodio-albumen, the extension of the system to it also being sufficiently obvious, and because we feel confient that the simple process described is the better one. In collodion, both dry and wet, as in albumen (dry and wet), we should gain immensely by thus securing the presence of a uniform and sufficient quantity of *fixed* insoluble silver-oxide in the film. In dry collodion we facilitate and render much more certain the preparation of the plates, and improve in other ways; and we can at any time, before use, to increase sensitiveness, moisten them with plain water or other solutions before named; while as to wet collodion, we get rid of the streaks in the picture and all other inconveniences produced by loose silver-nitrate; we can prepare plates at home and carry them ready washed and wet to the field and expose them there, protected if wished by a coating of gum or albumen (by keeping or dipping in a weak solution of it), or some other substance which will prevent drying during exposure. (Though generally recognised as detrimental along with collodion, the gallic acids might still here, as well as with albumen, have a further trial.)"

—Eds.]

DETERIORATION OF SILVER IN AN EBONITE BATH.

To the Editors.

Gentlemen,—Will you kindly tell me in your next number what can be wrong with my silver bath? I got an ebonite bath to use with a dark tent, but the silver solution turned black, as if it had attracted particles of the ebonite. I filtered it twice through double paper, having previously put a little permanganate of potash in it. I then acidified it, but the result was fogginess and pinholes and comets in abundance. I have never suffered from these before. Can there be anything in the ebonite which would cause this? I shall be very grateful if you can enlighten me as to the source of my trouble.—I am, yours, &c. H. H.

June 23, 1869.

[We have long employed an ebonite bath, but have never found the silver discoloured or damaged. In the above case it probably arises from some sulphurous impurity. Render the solution neutral by means of carbonate of soda, add a small quantity of permanganate of potash until the liquid remains of a pink hue, and place it in the sun for a few hours. Filter and acidify. In the meantime have the ebonite bath carefully cleaned.—Eds.]

SUBSTRATA.

To the Editors.

Gentlemen,—With the view of ascertaining whether there is any special benefit to be derived from a substratum of coagulated albumen, in place of the plain desiccated film which I have hitherto used with all desirable success, I have tried the effect of a preliminary coating of coagulated albumen on one half of a plate and *un*coagulated albumen on the other. *Result:* in no case can I tell "which is which."

The process employed was the ordinary tannin, and the coagulation was effected by immersion in nitrate of silver, followed by copious washing. To me this settles the question, although I should like to hear the result of Mr. Gordon's trials. I have employed albumen di-

luted with about twenty times its volume of water, as recommended by you, with such unvarying success that I am rather surprised to learn that it has in any way failed in the hands of such a skilful photographer as Mr. Gordon.

My coachman goes to town in a few days, and I shall send by him a few negatives taken under the substratified conditions described above, in order that you may examine them in any way you think proper, even to dissolving away the collodion, so as to get at the substrata.—I am, yours, &c., ELIZA.

Southgate, June 22, 1869.

EXCHANGE COLUMN.

A good 10 × 8 portrait lens, by Maugey, will be exchanged for a sewing machine by a good maker, or a Ross's No. 3 *carte* lens.—Address, ASSISTANT, Mr. Fisher, Photographer, Malton, Yorkshire.

For exchange, a first-class Enfield rifle (effective at 1,200 yards), with sword-bayonet and scabbard, all complete, for a whole plate lens, by a good maker.—Address, G. HARRIS, 98, Brearley-street, Birmingham.

PHOTO., of Laurien Villa, Gloucester Road, Cheltenham, is desirous of exchanging seventy to eighty 10 × 8 pressure-frames for large triplet lens, or any other useful photographic *materiél*. Difference in value adjusted.

An excellent triplet, by Vogel, about 7¼ inches focus, for plates 8 × 6, together with a convenient dark box, a new 10 × 8 draining box by Rouch, and a 5 × 4 ditto, will be exchanged for a Ross's doublet or other good wide-angle lens for plates about 7½ × 5½.—Address, W. J. A. GRANT, Rev. Dr. Butler's, Harrow.

Wanted to exchange one of Solomon and Grant's patent magnesium lamps for burning two or four ribbon wires at a time, for a good card or half-plate lens, or first-rate camera that could be used for taking two cabinet portraits side by side, or a double card camera, with sliding front. The difference can be arranged.—Apply to GRANT, C.E., Upper Gloucester-street, Dublin.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

Walter Clayton, Nottingham.—*Portrait of Sir R. J. Clifton.*

G. F. Roger, Dundee.—*Portrait of the Right Hon. the Earl of Dalhousie.*

☞ *Correspondents should never write on both sides of the paper.*

J. W. HIND.—We forwarded the stamps to the person indicated.

A MAN OF KENT.—Add from one to two grains of bromide of ammonium to each ounce of collodion.

IGNORANCE (Waterloo).—The lens is good enough. Keep the camera level—that is, do not tilt it. See reply to "Architectural Photo."

M. E. B.—*Try* to keep a plate for a couple of days. By this experiment you will be able to obtain the desired information for yourself.

AN ENGRAVER.—Try the effect of oxalate of silver rubbed over the surface of the wood block, and print on this. Collodio-chloride or gelatino-chloride of silver will also answer.

ARTIST (Manchester).—The colour for painting the skies of transparencies which we recommended must have been Newman's cyanine. It is the best for the purpose, so far as we know.

A PRINTER IN CARBON.—We are not quite sure of the number of patents that have been obtained by Mr. Pouncy, but up to the present time we believe three have been applied for.

G. F. B.—Immerse a rod or strip of zinc in the old hyposulphite solution and you will find the silver precipitated in the form of a black powder. When the solution emits the characteristic odour of rotten eggs the reaction is complete.

SAMUEL GORMAN.—1. Unless you refer more particularly to the article, we cannot select it from the others.—2. The product is acetate of silver.—3. The negative is by no means a bad one, but the transparency obtained from it is far from being good.

NHOJ NAMEBEF.—1. He is said to be a scamp of the lowest character.—2. The ALMANAC for 1867, like that for 1869, is "out of print."—3. Make a strong solution of chloride of sodium (common salt) and add it to your silver. Wash the precipitate with frequent changes of water.

G. COOPER.—We do not quite comprehend your meaning. With your old bath you say you got good negatives; with your new one you get great inequality. Have you saturated your new bath with iodide of silver? If not, this might indicate a source of inequality in the negative.

LUX (Liverpool).—It is now so many years since we tried the Daguerreotype process that we scarcely remember the appearance described. Dryness of the iodine is, in this process an essential condition of success; and, to ensure this, we usually kept a small vessel containing chloride of calcium in the iodine box.

A DEVON AMATEUR.—1. We thank you for your kind expression of feeling.—2. If Lerebours be still engaged in the manufacture of lenses, we, at any rate, have not for a considerable period heard much concerning his productions. His lenses were well ground and carefully polished, and, on the whole, were of a good class.

PHOTO. (G.S.).—1. In our own practice we have never been troubled with the opaque markings to which allusion is made. If you will describe them more minutely, we may then be able to give a clue as to the cause of their presence.—2. In many instances the questions put are of such a nature as would not, by their publication, tend to the "edification" of the general reader; hence the form in which we answer them.

J. FREDERICK LARKIN.—It requires a certain amount of adroitness to cut a glass positive so as to fit neatly the "box" of a locket; but, with a little practice, you will soon be enabled to cut it with a sharp, clean edge. The best tool to employ is a pair of watchmaker's cutting pliers. If you do not succeed you may depend upon the fact that it is solely owing to your want of skill.

JOHN MACLURE.—You may trust safely to those dealers in second-hand goods whom you find advertising in our columns. If we considered that any of them were acting disreputably we should not insert their advertisements; but, so far as we know, they are honourable and trustworthy tradesmen. Write to the particular dealer concerning whom you inquire, and ascertain what advantages he is prepared to offer you.

SMITH BROTHERS.—Although gallic acid is sparingly soluble in water it dissolves very freely in alcohol. You may make a stock solution by dissolving an ounce of the gallic acid in four ounces of alcohol. The subsequent addition of water does not cause a precipitation of the acid. If half-a-drachm of this mixture be added to two ounces of water, a solution will be obtained which will be nearly equal to a saturated aqueous solution.

W. H. S.—So far as we can gather from your letter and the illustrative photography, your idea is good. It is, however, a subject for a *patent*, not for a registration, which cannot apply to it. Before incurring expenses in "securing" it, you will do well to institute a careful comparison between it and those at present manufactured. Our advice is—do *not* patent it. The several parts show great ingenuity, and we believe that, as a whole, it will be really useful.

OUR ALMANAC FOR 1869.—We beg to inform several applicants, both connected with the trade and amateurs, that we cannot supply any more copies of the ALMANAC. We printed this year a much greater number than we had ever previously done, notwithstanding which the volume is now "out of print." Both editor and publisher are, of course, gratified at having to make this announcement, although they regret that it is followed by disappointment to so many. The type having been long since "distributed," there is now no chance of the work being reprinted.

W. HERBERT.—The lens which you say you have at present will, when worked under the conditions mentioned, prove to be slower than that concerning which you inquire as five is to three; that is to say, the lens you designate No. 1, and about which you seek information, will be *nearly* twice as rapid as No. 2 (which you are now trying) when worked with the stop you mention. We cannot advise you respecting the purchase of any particular lens; indeed we, on principle, invariably abstain from doing so, preferring to refer the intending buyer to our advertising columns; but when the query resolves itself into a simple arithmetical question as you put it, we may say that No. 1, *for your purpose*, is better than No. 2, as three (in point of time of exposure) is to five.

ARCHITECTURAL PHOTO.—The converging lines to which the architect has justly taken exception are caused, not by his lens, but by your own inexperience in architectural photography. Instead of keeping the camera level, you have tilted it so as to get in the upper portions of the structure—a proceeding which is often necessary and expedient, but only so when there is a swingback to the camera; and the converging lines are the result of the sensitive plate not being held in a vertical position when the exposure was being effected. If we are made umpire in the dispute, we shall decide in favour of the architect, and against you, on the foregoing grounds. Take another view with what grace you may, and with all the skill you are capable of bringing to your command.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 29th	Liverpool Amateur............	Free Public Library and Museum.

LONDON GAZETTE, *June* 18.

NOTICE OF SITTING FOR LAST EXAMINATION.

B. WOODWARDS, Trowbridge, photographer. August 2.

METEOROLOGICAL REPORT,

For the Week ending June 23rd, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
17	30·33	58	43	48	53	WNW	0·21	Dull
18	30·10	60	47	50	55	W	0·01	Dull
19	29 98	62	45	48	55	N	0·01	Fine
21	30 04	57	44	50	55	WNW	0·11	Dull
22	30·17	60	50	52	55	NW	—	Dull
23	30·27	70	52	55	60	NW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 478. Vol. XVI.—JULY 2, 1869.

NEW TONING EXPERIMENTS.

In using the sulphocyanide toning bath some time ago we were much struck with the peculiarly-marked rosy hue assumed by the prints when immersed in the toning solution. It is well known that the usual tone afforded by this gold bath is of a rich purple, even inclining to violet under special circumstances; but we never met with an instance in which this peculiar hue was so strongly marked as in that which we have just alluded to. This circumstance induced us to examine the matter more closely than we should have otherwise done, and, as the results obtained throw some light on the office of the sulphocyanide in the toning bath, we now devote a little space to the subject, as it possesses a peculiar interest for us in consequence of the varying estimates which have been made of the value of the sulphocyanide.

After making a few experiments on the subject, it became evident that the cause of an increase in the purple colour of the deposit was the presence of some substance in the commercial sulphocyanide which we used that reacted upon the gold solution in a peculiar way. On going further still with our experiments, we ascertained that the cause of variations in the reaction was a small quantity of a peculiar substance called "sulphur urea"—a body recently discovered and described by one of us. When this substance is present in commercial sulphocyanide of ammonium, it modifies the action of the latter on the gold solution to a certain extent.

We may first state what this sulphur urea is, and then describe our toning experiments with it.

When a quantity of dry sulphocyanide of ammonium is placed in a flask and heated on an oil bath for some time the salt fuses, and if the mass be allowed to cool, and then dissolved in water, two substances are found in the aqueous solution instead of one as before. The two substances are unchanged sulphocyanide of ammonium and a new body much less soluble in water than the sulphocyanide, and which crystallises from the solution in long, fine, feathery crystals. This body is the "sulphur urea," a compound precisely analogous to the ordinary urea, of which an adult each day excretes by his kidneys about one ounce and a-quarter by weight. The only difference between the new urea and the old one is that the former contains sulphur, when the latter includes oxygen. We may even give the chemical symbols representing the composition of the respective bodies, so as to enable our chemical readers to appreciate the relation of the new body:—

$$\left.\begin{matrix}(CO)''\\ H_2\\ H_2\end{matrix}\right\} N_2. \qquad \left.\begin{matrix}(CS)''\\ H_2\\ H_2\end{matrix}\right\} N_2.$$

Ordinary urea. *Sulphur urea.*

This new substance, when quite pure, occurs in fine white crystals, which readily dissolve in water. The aqueous solution can be decomposed with considerable ease; and if heated with a little acid, and the addition of a few drops of gold or silver solution, a brownish-black precipitate of the sulphide of the metal is thrown down. When a solution of chloride of gold is added to a solution of the pure sulphur urea a yellowish precipitate is first thrown down, but this quickly re-dissolves, producing a clear, colourless liquid.

Four grains of the sulphur urea were now dissolved in an ounce of water, and to this a solution of half-a-grain of chloride of gold was added. A yellow precipitate immediately made its appearance; but this cloud speedily vanished on agitating the liquid, leaving the solution not only quite clear but also colourless, as previously stated. When the reverse order of mixing is observed—that is to say, if the solution of the urea be added to that of the chloride of gold—sulphur is quickly liberated, a brownish precipitate of sulphide of gold produced, and the bath spoiled. When properly prepared in the manner first stated, however, no trouble is encountered in using the bath; but it only keeps in good order for about twelve hours after mixing, as it is immediately decomposed by the addition of an alkali—strange to say—or an alkaline carbonate, such as carbonate of soda, a yellow compound and sulphide of gold being almost immediately precipitated on the addition of the alkaline salt.

When in proper order the urea bath works admirably, toning the prints to a rich, warm, purple tint in a few minutes. When the prints were taken out of the bath they were seen to have the peculiar bloom so often obtained when the sulphocyanide toning bath is employed, though it need scarcely be mentioned that, in the present instance, there was no trace of sulphocyanide of ammonium present in the solution. In the case of prints toned in the sulphocyanide bath we have often noticed that this rich bloom is greatly diminished in the hyposulphite fixing bath; the same loss of colour takes place with prints toned in the urea-gold solution.

Having noticed that the toned prints from the urea bath seemed to lose some of their peculiar rich bloom even on standing for a short time in plain water, we left a batch of well-toned prints standing in a little water, after having previously washed them thoroughly so as to free them from any trace of the toning solution. After leaving the prints at rest and in a dark room for twelve hours, we found on examining them that all the bloom had disappeared, each print being of a cold black tone in the shadows, the half-tints being converted into dirty brown deposits of sulphide of silver. The sulphocyanide prints also become degraded in tone on prolonged standing, but not by any means to the extent that those toned in the urea bath do.

When we recollect that the sulphocyanides contain sulphur so combined that it is not easily liberated from these peculiar salts, whereas the sulphur urea gives up its sulphur with comparative ease to metals, we have no difficulty in seeing the bearing of the foregoing toning experiments. A certain rich bloom is obtained in each case when a silver print is plunged into a gold bath containing either a sulphocyanide or the sulphur urea. But the substance to the presence of which the peculiar tint is due is less liable to change when produced by the sulphocyanide than by the sulphur urea, but when the prints toned in either way are placed under similar conditions the result is the same; that is to say, the bloom disappears, and a deposit of a metallic sulphide alone remains to indicate its previous existence, the readiness with which the compound produced by the urea decomposes enabling us more easily to appreciate the change than we could otherwise do in working with the sulphocyanide alone.

We must, then, consider the urea toning bath as only a means for producing a beautiful sulphur-toned print. The sulphocyanide

process yields essentially the same results, and is also a particular mode of sulphur toning. But the ordinary sulphocyanide of ammonium of commerce almost invariably contains some of the sulphur urea, and we may, therefore, expect our prints to take more or less beautiful tones according as the sulphocyanide we employ contains more or less of the impurity; but we must also recollect that the more beautiful and rosy the tone of our print the less stable it is likewise.

COLLODIO-BROMIDE OF SILVER: GENERAL REMARKS THEREON.

No. V.

I will finish this series of articles, as I began them, with some miscellaneous observations, which could not be introduced into my "practical instructions" without diluting the subject and distracting the reader's attention from the main object to which I wished to direct him. In following out my present purpose, I shall observe the order of sequence adopted in my narrative of "a practical mode of working."

In compounding the collodio-bromide emulsion—and this constitutes the main difficulty in this beautiful process—there are several points which must be carefully considered and practically attended to. In previous articles of this series I have laid great stress on the necessity of having an excess of soluble bromide in the completed collodio-bromide. Let me repeat this, if possible, more emphatically than before. By the way, I observe my friend, the Rev. A. Johnson, in his very sensible letter in last number (page 308), is quite right when he says this opinion of mine "is decidedly opposed to my own teaching given elsewhere." Mr. Johnson, from his great experience in, and love for, our art, knows as well as any man how impossible it is to apply any inflexible rule of orthodoxy, or laws like those of the Medes and Persians, to an expanding and progressive science like photography. Mr. Johnson, when he penned the above caustic criticism on me, must have forgotten or not read what I said at page 253 in No. I. of this same series of articles. Let me remind him:—

"My own experience in the collodio-bromide process, up to this date, I have explained with considerable fulness on many occasions in the pages of another journal; but it would be a sign of weakness, or, worse, of obstructive *stand-stillism*, on my part were I to acknowledge that I have always been consistent in my recommendations. *Unless I feel assured of having already found out the best mode of working, I must modify, alter, and perhaps sometimes contradict my previous teachings and practice,*" &c.

Thus much in personal explanation; but there is a practical and more important phase connected with the composition of collodio-bromide where Mr. Johnson and many others run considerably astray. Mr. Johnson is right when he says he has found out that there must be an excess of soluble bromide in the emulsion; but he is wrong when he states in his letter that Mr. Bolton pointed out, in his article at page 605 of your volume for 1865, the evil effects of an excess of nitrate in the film. In that otherwise most excellent article Mr. Bolton does not recommend an excess of soluble bromide, although, by accident, he happens to have an excess. He first slightly miscalculates the atomic equivalents of the chemicals, and says the quantity of nitrate of silver to be used with his formulæ for bromised collodion should be "from nine and a-half to ten and a-half or eleven grains to each ounce, according to the time that it is required to be kept. For general purposes, ten grains will be found to answer best, *as it just leaves a slight excess of silver.*"

The formulæ given by Mr. Bolton for the bromides dissolved in the plain collodion are four grains of bromide of cadmium and three of ammonium, or, in lieu of these, six grains of bromide of ammonium. These proportions are exactly equivalent to $10\frac{1}{2}$ and $10\frac{3}{8}$ grains of nitrate of silver respectively; so that, supposing all the ten grains of nitrate to be converted into bromide, there will still remain a slight excess of soluble bromide, whereas Mr. Bolton states the contrary.

But how comes it to pass, then, that we may add and shake up till our arms ache, twelve, fourteen, or more grains of nitrate of silver with an ounce of collodion containing, say, eight grains of bromide of cadmium, for which the equivalent of nitrate of silver is only ten grains, and yet may have a good working emulsion containing an excess of soluble bromide? The reason is plain to me now, although it was after long experiment and the analysis of good and bad working specimens of collodio-bromide that the truth dawned on me. The fact is, by our clumsy modes of procedure in compounding the collodio-bromide the whole of the silver has not been brought into chemical contact with the bromine. Had the silver by better appliances been led into combination with all the bromine there would have been an excess of the former, and such a state of things is fatal to the production of a photographically useful film.

There is nothing that I have yet found out comparable to the tube-mortar [described and figured at page 288] for bringing the chemicals in the collodion into complete combination. Should we mix them up in a bottle there is always a great deal of uncertainty arising from various causes, such as the fineness of division of the particles of silver, the proportion of water in the collodion, the time and violence of the shaking up, &c.; but in a tube-mortar the ingredients are easily made to combine and intimately mix by the process which I have already described.

I have tried a great many of the alcoholically-soluble bromides wherewith to bromise the collodion, but I do not find that difference in their action, at least immediately, which is alleged by some to exist. Preferably I use a mixture of bromides of cadmium and ammonium in the proportions given at page 288. The bromide of cadmium is a very soluble salt in alcohol, very stable, easily got pure, and has not, like the iodide of the same metal, the property of rendering the collodion too viscid, although it has a little tendency that way. The bromide of ammonium I should prefer to all others because of its stability, general purity, and its adding nothing to the viscidity of the collodion in which it is dissolved; but unfortunately it is not soluble in sufficient quantity unless the collodion is of an aqueous character, which makes the film rotten and produces in it what are called *water-lines*, the characteristics of which I need not describe, as they must be familiar to most photographers.

Bromides of magnesium and calcium would be good if the collodion were used soon after being bromised. They are very soluble in alcohol; but it is almost impossible to get, in commerce, pure samples. They are very deliquescent and, therefore, are not to be relied on when an accurate weight of the bromine they contain is required, and they decompose the collodion very quickly after they are dissolved in it. The great and only advantage they possess is that of making a new collodion, from pyroxyline made in cold acids, workable within a fortnight after they have been dissolved in it.

Bromide of sodium can be purchased very pure, but it is not sufficiently soluble in collodion to render this salt available by itself. Conjoined with bromide of cadmium it answers well.

The bromides of the other metals which I have tried, according to my experience, offer no advantage whatever.

I will conclude this article by giving a table containing the equivalents of some of the more useful bromides and of the nitrate of silver required to decompose them. Recollect, the weights I give of the bromides are those which I consider the best, and they are to be dissolved in seven drachms (fluid) of plain collodion; the other drachm of alcohol to make up the ounce has afterwards to be ground up with the silver (see page 288) before adding the collodion to it.

1. Eight grains of bromide of cadmium are equivalent to 10 grains of nitrate of silver.
2. Six grains of bromide of calcium are equivalent to 10·02 grains of nitrate of silver.
3. Six grains of bromide of magnesium are equal to 11·1 grains of nitrate of silver.
4. Six grains of bromide of ammonium are equal to 10·4 grains of nitrate of silver.
5. Five grains of bromide of cadmium and three of bromide of ammonium are equivalent to 11·45 grains of nitrate of silver.
6. Five grains of bromide of cadmium and three of calcium are equal to 11·26 grains of nitrate of silver.
7. Five grains bromide of cadmium and three grains bromide of magnesium are equivalent to 11·8 grains nitrate of silver.

In every case, when compounding the collodio-bromide in the dark room, keep the weight of silver at least one grain under that indicated above as being equivalent to the various bromides.

With these remarks I must close my fifth chapter.

George Dawson, M.A., Ph.D.

Erratum in Last Number.—At page 301, first column, sixth line, for "very alkaline pyrogallic acid," *read* "very acid pyrogallic acid."

OUT FOR A DAY, AND SUGGESTIONS ARISING THEREFROM.

The Field Club.—Cashiobury.—Atmosphere.—Artists' Errors.—Our Camera.—Distortion Desirable in Stereo. Lenses.—Polarised Light from Vegetation.—How Possible to be Obviated.—The Coffee Process.

Courteous Reader, do not let the principal heading of this article frighten you into the belief that we are about to inflict upon you such

a topographical disquisition on the place visited as would more becomingly form the subject of a sixpenny guide book. Far be this from our intention.

"All work and no play" is generally recognised as an appropriate, if not effectual, means of inducing mental sluggishness; and to obviate this result we generally find ourselves once a month in the country, in company with our fellow-members of the Amateur Field Club—a most estimable society of nearly a score of gentlemen, all of whom are capable of acquitting themselves honourably in the field.

One fine Saturday in the beginning of last month found us *en route* for Cashiobury, the residence of the Earl of Essex. Cashiobury is distant about a mile from Watford, which in turn is situated close to the North Western Railway, at a distance of a few miles from the Euston-square station of that line. The park and grounds are extensive, and the scenery very varied. There are to be found a river, waterfalls, rustic bridges, a ruined mill, a Swiss cottage, beside numerous other things which would gladden the photographer's eye, but which would prove too tedious to recapitulate. To this delicious artistic domain the public appear to have free access.

The exigencies of editorial business prevented us from arriving at Cashiobury until the forenoon was far advanced, and a considerable time after our *confrères* had arrived on the field of action. So extensive are the grounds that but for the courteous guidance of Lady Essex—who, after showing us many of the art-treasures for which Cashiobury is justly famed, indicated to us a spot at a distance of about a mile away where she understood a body of amateur photographers would be found at work—we might not have met with our friends at all.

From a remark made by her ladyship, we were led to note somewhat particularly the delicate gradations of distance in the scene presented to the view. There was a large development of what artists call atmosphere, and, as a consequence, the varied distances were well marked.

This is suggestive of the subject of backgrounds. Why do so many artists paint the backgrounds of their groups and portraits and the distances of their landscapes so smudgily as they frequently do? To keep everything in subordination to the principal subject in the former case, and, in the latter, to get the requisite atmospheric effect. Artists somehow appear to imagine that because an object is distant it must be represented with an impaired outline. If an object situated at a distance of a mile or two be examined with a pocket telescope, it will be found deficient in brilliancy from atmospheric intervention, but the outline will be scarcely impaired. Situated within view of the window at which we now write are some houses in Highgate, which, from their distance, subtend a very small angle indeed. The intervention of the Great Northern Railway, with the numerous trains constantly passing, yields, between steam and smoke, almost any amount of atmospheric effect up to a complete closing up of the view of the houses referred to. Having repeatedly photographed them and examined the results with a magnifier, we know that the outlines, where visible, remain unimpaired in sharpness; but in depicting such a scene many artists obliterate the outline as well as scumble it over to confer distance in a more legitimate way.

Some otherwise talented artists frequently damage their reputation by a want of attention to scientific accuracy. In a very clever political pictorial reproduction of one of Turner's greatest poetical efforts, *The Fighting Temeraire* (for that picture is replete with poetry), the artist, Mr. Matt Morgan, has so far ignored accuracy that he has turned the crescented moon back side foremost; and not only so, but he has totally disregarded the fact that the sun is represented near the horizon, the "horns" of *his* moon indicating a sun not merely on her other side, but one thirty or forty degrees higher than that represented. But we are departing from Cashiobury—to which we now return.

With a still atmosphere, there are few places in the vicinity of London so replete with subjects for the stereoscopic camera. The camera which has been our invariable attendant upon such "field days" as that now referred to is the one so well known as Meagher's $7\frac{1}{2} \times 5$ "new folding camera." It has an extra front for stereoscopic lenses, a division of black fabric serving to divide the camera into two compartments when binocular pictures are taken. We generally adopt a dry process, and on such occasions take with us not fewer than six plates. According to the nature and requirements of the subject, we can thus take either six full-sized or six stereoscopic negatives, a mixture of both, or, if so inclined, we can take two different subjects on one plate, one half being apportioned to each. Our supply of lenses for this camera comprises, for the full-sized plates, two non-distorting lenses of different foci, so as to include a small or larger angle; and two pairs of single view lenses (of long and short focus) for stereoscopic work.

It may appear, at first sight, strange when we assert that distorting or ordinary landscape lenses are those best adapted for stereoscopic purposes. Such, however, is the case; and it will be evident when it is considered that a picture, when examined through a magnifying glass, has its margin distorted, inasmuch as straight lines are invariably bent outwards like a pincushion. Now, as ordinary view lenses distort in an opposite direction—that is, make a square building rather barrel-shaped than otherwise—it follows that the barrel-shaped picture will, when viewed through the magnifying lens of the stereoscope, appear quite square and free from distortion. Still it must not be supposed from the foregoing that we use lenses which distort *much*. The amount of curvature, or indeed its existence at all, can only be perceived when carefully tested by a straight rule.

By accident we had in our pocket on the day of our visit to Cashiobury a capital Nichol's prism, which we had just had repolished; and, in observing the reflected light from the surface of shining leaves, we resolved to put to the test an experiment which had been previously urged upon our notice by two scientific friends, the Rev. J. B. Reade and Dr. Millar, who had given the subject much attention.

To enable the reader to properly understand what is to follow, we should premise that when a photograph is taken of trees, grass, or similar vegetation, a peculiar snowy effect often results from the reflection of the light into the camera from the surfaces of the leaves. Now, as it has been found that the sheen is owing to the polarisation of the light which falls on these leaves, it is obvious that a well-constructed Nichol's prism will have the effect of separating the light which causes the snowy reflection from the diffused light by which the particular object is illuminated. The result, photographically, ought to be that a picture embracing trees and reflecting leaves of any kind should be reproduced in the camera without the offensive reflections which lead to their being pronounced "snowy."

On the day in question we had a fine opportunity of testing this; and we came to the conclusion that, in order to secure the highest and most pictorial effect from a landscape, a Nichol's prism must form part of the fittings of a landscape lens. Let any of our readers try the following experiment:—Examine with some care a landscape containing trees lighted under such circumstances that there will be a white shining reflection from the leaves. Now look at the view through a Nichol's prism. At one place there will be no change whatever; but, when slowly revolved, a position will be found when the sheen on the leaves will have entirely disappeared. There will be no glare, but everything will be soft, sharp, and harmonious. To discuss the principles under which this great change is induced would be quite out of place in the present article—enough that we notice the fact.

We know that our opticians, the first in the world, have a scientific as well as a commercial interest in everything connected with the optics of photography; it would, we imagine, prove a decided improvement if polarising prisms of moderately wide angle could be adapted to photographic lenses, so as to get rid of the evil the existence of which we have here hinted at. We suggest to our opticians to give this subject their consideration. An effective experiment may be tried by the reader as follows:—Let the green Venetian blinds of a window be drawn down, and let each bar be placed in a horizontal position. Now, from within the room, let the bars be examined, and they will reflect such a mass of light as to cause a troublesome glare. Now look at them through a Nichol's prism, and revolve it until the right point is obtained, when the glare will disappear, and the textural detail of the upper and previously shining surface be readily seen. But we must hasten to other topics suggested while "out and about" with our club at Cashiobury.

We had some intention here of entering into elaborate details as to the special properties of the lenses which we employ; but as that would form material for an article in itself, we forbear at present.

Respecting the *process:* for reasons which need not here be entered into we employed on the occasion referred to plates prepared with coffee. Some of them had been prepared six weeks previous to their being exposed, and as they yielded capital negatives—quite as good as some which had been prepared only the previous evening—we must, in their favour, make a note as to their keeping properties, at least to the extent named.

Let us here enjoin on those who purpose trying this process (which is one of the most certain with which we are acquainted) the importance, first, of using a substratum, and, secondly, of washing the plates thoroughly before applying the preservative solution. The substratum we employ is, as nearly as we can guess (for special accuracy in the proportions is not required), about one part of white of egg to sixteen or eighteen parts of water. The tendency of the

film to become loose, so prevalent in the coffee process, is thus entirely obviated. If the plates be not thoroughly washed before applying the preservative a dark stain round the margin is apt to appear.

To test the value of careful washing, we recently prepared two plates in every respect alike. One of these we washed thoroughly, the other more imperfectly. The former gave a clean, bright negative, the other did not. If plate be known to have been much under-exposed, immerse it for a minute in tepid water after removing it from the dark slide, and apply an alkaline pyrogallic developer. In this way a good picture may often be obtained, even when the exposure has not exceeded half that intended to have been given.

As the present article is getting too lengthy we must bring it to a close, and return to the subject at a future time, when we shall speak of the subject of wet *versus* dry processes as practised by our fellow-members of the field club on the excursion. We shall then discuss a proposal which was made to organise a small society to develope the resources of wet-plate photography; the dry processes employed by the members; and other matters which will, we believe, tend generally to the benefit of the photographic public.

THE GLASS ROOM.*

General Remarks.

No subject concerns the professional photographer more deeply than the glass room. Chemicals, lenses, and cameras he can always obtain of excellent quality from dealers of reputation; but in the construction of the glass room he must depend to a large extent upon himself, acting under such information and instruction as he can obtain. It is certain that a very clever operator will occasionally obtain good pictures in almost any glass room; this is not, however, what is wanted. The disposition of light should be such as to facilitate to the utmost the really difficult task of regular success.

If any intelligent observer will place himself in a room lighted from *several* different directions, and, taking a looking-glass in his hand, will observe his own face as he stands in very different parts of the room, with very different illuminations, he will see a wonderful change as regards feature, character, and expression. Now, the object of the glass room is to obtain from each face its best and, at the same time, also its characteristic expression.

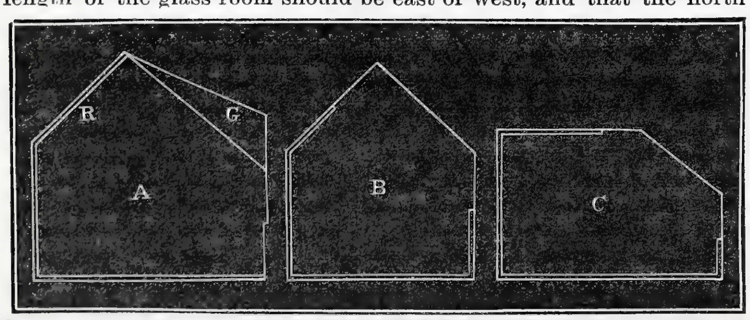
If the observer with his hand-glass carefully notices the effects of different lights upon his features, he will be especially struck with the three following facts:—

1. That a level light, coming directly in front *flattens* all the features.
2. That a light directly from above produces an opposite effect, exaggerating the projection of the brows and nose, rendering the eyes cavernous, and drawing out the cheek bones.
3. That a level light from one side produces a most unpleasant effect, causing what is known as a "hatchet" expression of face.

Pursuing his trials further, he will find that the right light to use consists in a combination of the three into a *front-upper-side* light. To produce this light is the great object of the disposition of the glass room; bearing in mind that for different sitters a variation of light must be at command, and that as the position, strength, and character of the light vary at different hours of the day, the means of compensating for and correcting these changes, must be at hand.

Ridge Roof Construction.

By far the best light for the portraitist is the pure, soft, diffusive light that comes from a northern exposure. An abundant supply of this light is of the highest value. It is best, therefore, that the length of the glass room should be east or west, and that the north



light should be received on one side. The best photographers all over the world are now pretty generally agreed in preferring what is known as the "ridge roof system of construction," a section of which in various forms is shown in the figures. The single line represents the glazed parts; the double line ordinary walls, ceiling, &c.

A is the preferable form; B and C are much less to be recommended. In A the slanting roof may take the position of the line above G, or of that below it, or an intermediate one.

The form A may still be otherwise varied. Loescher and Petsch use a "lean-to" roof—that is, the glass G is continued all the way with the same pitch till it reaches the side wall, which is then much higher, and the roof R is thus superseded.

The dimensions adopted by these are—

Length (east and west)	40 feet.
Breadth (north and south)	20 ,,
Height of south wall	16 ,,
,, north ,,	11 ,,

The pitch of the roof is, therefore, five feet in twenty. All the glass is provided with curtains which can be drawn. These photographers, in their construction, went upon the principle of admitting the chief light always in one direction, but having a complete and most extended choice as to that direction. Their general plan is to open each of the curtains on two-thirds of the north side a little, so as to throw the sitter in a half shade. Taken in this way, a very tame picture would be got. To give it character, a few feet of the top or side curtains are opened, and an upper light is let in, which at once gives relief and boldness to the face.

There can be no doubt that this is an excellent plan. Its idea is to place the sitter in a soft and harmonious but insufficient light, and then, by the introduction of a dominant light from a single definite direction, to produce as much shadow, previously deficient, as may serve to produce the desired relief. Work executed by these gentlemen strongly speaks for their system.

Mr. Henszey, of this city, has adopted a somewhat different system. The greater length of his room is north and south. Not that the design A is turned around, but simply R and G are made very wide, so that the sitter is placed against the south wall and the camera at the north end. The difficulties that will at once suggest themselves in connection with this method of operating are removed by having a large extent of glass completely controlled by curtains and pulleys.

Mr. Wenderoth's skylight is in form somewhat like that of Mr. Henszey, that is, it is figure A widened out. But the sitter has his back to the west wall, and the line from the camera to the sitter has the usual east and west direction. He has, in addition, arrangements for admitting light at the ends, and also a narrow line of opening just at the top of the south wall. This last, without the most careful management, must lead to cross lights, and is probably of no real use.

The particulars of the construction of the glass room of a celebrated Parisian photographer, Reutlinger, have been given to the public. On the north side there is a perpendicular glazed portion twenty-two feet long and twelve high. The glass roof has only fourteen feet of width, protected by an awning controlled by pulleys inside to cut off direct sunlight. The glass overhead is ground glass, and so are the sides as high as the eyes. The entire length of the room is about forty-four feet.

Any one of the forms of glass room which have been here particularly described will, in good hands, give good work. The whole system used by Loescher and Petsch seems that most in accordance with sound principles, and, without meaning in the least to detract from the excellence of the others, is that which is most strongly recommended here.

With respect to the glass employed, the general preference in this country is for using good window glass, and stippling it with blue inside. A broad ground glass is often used; here it is not liked. The use of blue glass is gaining in estimation in Germany.

Control of Sunlight.

An important consideration presents itself with respect to all the forms of roof and glazing just shown in section. Even if the roof looks directly to the north, it is impracticable to give it so high a pitch that the sun shall not shine over the ridge at midday, and it must also shine over the ends morning and evening, unless higher walls abut against them. Various efforts have been made by different photographers to obviate this difficulty. Some select a position where the walls of adjoining houses afford a screen, some run up board screens; others have used awnings moved by pulleys; most trust to excluding the sun by curtains and shades inside. These, indeed, are of course always necessary to regulate the amount and direction of light, independently of direct sunbeams.

Some, indeed, trust so entirely to inside shades to exclude the sun as to prefer a southern exposure, softening the sunlight by shades, and getting it under management as best they may. The solitary

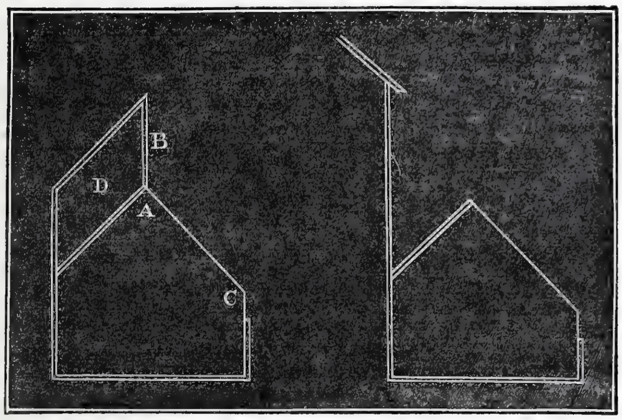
* From Lea's *Manual of Photography*.

advantage that this system possesses is that in dull weather the southern light is stronger than the northern.

Some, in order to get every variety of light, use a ridge roof with equal slopes north and south, both glazed, so that the principal light may be taken from either side, as may be best suited to the weather and the sitter. But this has a most serious objection in the *intense heat* caused by it. The glass room becomes in hot weather a veritable hot-house. The sitters suffer—the chemicals do not work well.

To maintain a moderate temperature in the glass room is at best a difficult matter, even when not complicated by a southern exposure. A brick wall on the south side is a great protection, and there should be, if possible, a space between the southern slope of the ridge and

FIG. 1. FIG. 2.



the ceiling on that side. An excellent arrangement on all these grounds is represented in *fig.* 1. At the upper angle of the ceiling A, a girder supports a wooden studding B. This allows an interspace D on the south pitch of the roof—very effectual in diminishing the heat—the wall B tending to keep off the noon sun from the glazing A C.

It is evident that if the south wall supports a higher building adjoining, as shown in *fig.* 2, somewhat the same result is attained. Such a form of construction requires special care to render it watertight at the junction of the roof and wall. The gutter in the angle must have a rapid pitch from back to front (which cannot be shown in the section) and must be thoroughly tinned by a good workman.

Secondary Lights.

In all these sections the sitter is supposed to be at the far end, and looking towards the spectator. He will thus receive on his left side a powerful light from the glass roof, whilst his right side will be comparatively dark.

Now, a difference in light on the two sides is desirable and even necessary, but this difference must not exceed a certain moderate measure. And the dark side of the face requires a *secondary light*, to give transparency to the shadows upon it. Three different methods are used for this end:—

First, and most common, *reflectors* are used. Generally a large screen covered with white paper, or white cloth, is placed on the side of the sitter, opposite the light. Some have used screens covered with silver paper; others, large mirrors.

Secondly, some have opened a window on the south side, and let in light directly on the dark side.

Thirdly, some object that these methods give false lights, especially affecting the expression of the eye, and, therefore, prefer to keep the south side of the room of a sufficiently light colour to throw back a volume of soft white light adequate to light up the shadows.

The brilliancy of the picture is always aided by excluding all extraneous light. The camera, therefore, should always be under an unglazed portion of the roof, and screens should be so arranged that, if the eye be placed where the lens is to be, it shall see no uncurtained glass. Too much glass is very objectionable, especially toward the direction of the camera. The air of a room always contains dust. The more strongly the dust between the sitter and the lens is illuminated the more it will affect the picture, and always by taking from its brilliancy.

The *tunnel system* is not to be recommended, though it is certain that good work has been done in this form of house; still the system is every way inferior to the ridge roof. In it one end of the room—that in which the camera is placed—is lower than the other, and the vertical space between the two ceilings is glazed. Thus the strongest light is full in the sitter's eyes, at the same time that its quantity is almost always deficient, seriously incommoding the operator in dull, and producing effects inferior to the ridge roof in good, weather.

It has been said that few photographers succeed in their first attempts at building a glass house—that they require the experience of a first failure to attain subsequent success. Failures of this kind are expensive and infinitely vexatious. They are best avoided by obtaining beforehand a clear conception of what are the conditions essential to success, and then carefully and thoughtfully applying them to the position which their glass room is to occupy. Sometimes splendid success comes by mere chance. Mr. Hughes gives an instance in which the portraits produced by a photographer in a country town in England were so excellent as to induce him to travel a long distance to see the maker. He proved to be a man of limited intelligence, who, however, had chanced to erect an excellent room, where an abundance of soft, pure light from the north was received to the exclusion of cross lights. The photographer knew that his work was excellent, and ascribed it all to his personal skill, neither understanding nor appreciating the merits of his room. Encouraged by success he erected a new gallery in another town intended to be far better than his old one, but was confounded to find that in it he could not make anything worth having.

One material difference that will be found between a well and ill-planned glass room is, that in the former work can be continued till a late hour in the afternoon, and even then brilliant and well-modelled portraits can be got. It is, therefore (and this cannot be too clearly understood), *no proof of a good construction that the operator can show a piece of first-rate work made in it.* A glass room can hardly be so badly planned but that in some sort of weather, and at some hour of the day, good work may be done in it. The well-planned room is one that is always in a condition to meet the operator's needs.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

It is reported that a new kind of photographic paper for enlargements and "plain" prints is about to be introduced. One advantage said to be possessed by it is a peculiar hardness of texture, in consequence of which the print does not sink into the body of the paper, but remains on the surface. The tone is also said to be very good. A paper of this kind should command a great sale; for those who have much to do with enlargements know the difficulty of getting a brilliant picture by a development process. I have not been able to ascertain any details concerning this paper, such as where or by whom it is made, when it is to be ready for the public, its price, &c., &c.; but I expect to know more of these points before I make my next monthly appearance in these pages.*

Having some enlargements to do a few days ago, I obtained some good wove writing-paper, and prepared it by the method recommended in these pages by Mr. Davies; but, as I *develope* my prints, I prepared the paper with an iodide and a bromide instead of the chloride recommended. The first two batches of prints were brilliant, and in every respect all that I could desire; but some that I tried this morning are not so good—they have a flat, mealy appearance. So far as I can see I have in no wise deviated from the formula I employed with so much success on the first occasion, and the paper also is the same. The bleached lac was, however, obtained from different sources, and it is probable that there may have been such an excess of chlorine in that last procured as to have induced the effect complained of. One sometimes learns much from a failure; and if Mr. Davies has met with any failure himself it is desirable that he should mention its character, and state how he overcame it. Talking of chlorine in bleached lac, I recently purchased some of the latter, which, when freshly broken across and applied to the tongue, tasted so strongly as to set me expectorating. Query—Is "sunkinativeness" in developed enlargements caused or induced by chlorine?

From some observations made in a paper read before the Edinburgh Photographic Society, as well as from the letter of Mr. Lampray, I notice that the claims of Mr. F. W. Hart to be the first and sole inventor of an invention patented by him are being disputed. Mr. Hart claims as his discovery the employment of albumen as a varnish for a photograph, with subsequent coagulation of the same by means of steam. According to the principles laid down in one of your articles in last number, a thing to be effectively patentable must be new, and must be the invention or discovery of the patentee. Now if there is any value to be attached to evidence, I think the balance is against Mr. Hart; and it is not a little surprising that such a good chemist as he is said to be should not have been aware

* We are more fortunate in this respect than our contributor, for we have both tried the paper in question and in a great measure possess all the requisite information concerning it. After some further trials we purpose issuing a report upon it.—Eds.

that steam and hot water, as well as alcohol and some acids and salts, have all been published as, and are supposed to be well-known to be, agents for coagulating albumen. Cooley, in an old edition of his cyclopœdia, says that albumen is largely employed in the arts as a glaze or varnish, and Messrs. Lampray and Davies affirm that the thing patented is an old acquaintance. I know for a fact that the coagulation of albumen, as applied to photographic prints, has been known for some years, because, on information then received, I applied a varnish of albumen to a photograph more than five years ago, and coagulated it by hot water. Mr. Hart's patent, therefore, will probably put him to some trouble and expense if he attempt to maintain it, which I suppose he will not now do.

Grubb's new achromatic condenser will be a boon to many; but from whom can it be obtained? I have inquired at several opticians' establishments, but no person, at least in London, appears to have it. If Mr. Grubb does not manufacture them himself, it is desirable that he should give us the curves and other working instructions, so that each reader desirous of possessing a condenser could have it made by his own particular lens grinder. It is really too bad both of you and Mr. Grubb to tell us so much to incite the appetite, and then withhold the morsel when we are ready to bite at it.

The photographic societies' meetings are over for a season. The "London" was fairly attended, and wound up triumphantly; the "South London" was also well attended, and wound up still more triumphantly, the *séance* having been kept up till nearly eleven o'clock; the "North London" mustered about its wonted attendance, but, as usual with that body, had neither a paper nor a subject for discussion. With a numerous body of members it is not creditable that only about half-a-dozen consider it worth their while to attend. It is also a somewhat curious fact that many, if not the great majority, of the South London Photographic Society's members reside in the *northern* portion of the metropolis.

The bibliographic incident of the month is the publication of Mr. Blair's book on carbon and pigment printing. It has already received such copious notice at the hands of the Editors that I only mention the fact to place it on record in these gossiping paragraphs.

The new photo-crayon process of Mr. Henderson is worthy of a trial by those who approve of such so-called "artistic" effects as it is intended to place at the command of the photographer. Several years ago one of the Messrs. Sarony took out a patent for a process which, at first reading, I thought was the same as Mr. Henderson's, but which, on more careful study, I find to be different—essentially so in this respect, that the *old* Sarony process had reference to the production of direct prints on paper, whereas the Henderson method is intended to apply to transparencies on glass.

Mr. England has, I observe, communicated a method of precipitating the discoloured albumen from a silver printing bath. He effects the desired end by simply boiling it. I read some years since in your Journal an extract from an American journal—that edited by Mr. Charles A. Seeley, I believe—in which boiling was recommended as a certain cure for a foggy negative bath. Query—On what principle did the latter work? and has any fellow-reader ever tried it?

Apropos of the Mumler spirit photographs, a good many absurd things have been said *pro* and *con* on the subject. But a writer in the latter category who asserts that anything that is visible to the eye of the camera, and thus capable of being depicted by photography, must, therefore, necessarily be visible to the human eye, is surely ignorant of that important branch of physics popularly known as fluorescence. Many things are capable of being photographed which to the physical eye are utterly invisible. Why, for the matter of that, a room may be full of the ultra-violet rays of the spectrum, and a photograph might be taken by means of that "dark light." Objects in a room so lighted would be plainly visible to the lens of the camera; at any rate, they could be reproduced on the sensitive plate, while, at the same time, not an atom of luminousness could be perceived in the room by any person possessing ordinary human vision. Hence, the photographing of an invisible image, whether that image be of a spirit or a lump of matter, is not scientifically impossible. If it reflect only the fluorescent or ultra-violet spectral rays it will be easily photographed, but it will be quite invisible even to the sharpest eye.

COLOURS IN PHOTOGRAPHY.

The following article, by M. Ducos du Hauron (from *Le Moniteur*), must be read in connection with the observations made at a meeting of the Photographic Society of France which will be found reported in our number for June 11, page 283:—

I have said on a previous occasion that I employ the bromide of silver. I have now to add that it is important that it be used with a more active salt. As regards negatives on paper, the following is the way in which I obtain them:—

I float the sheets for four or five minutes upon the following solution:—

Distilled or rain water	100 grammes.
Bromide of potassium	5 ,,

When perfectly dry I sensitise them as they are used, making each of them float for five minutes upon a bath composed thus:—

Distilled or rain water	100 grammes.
Nitrate of silver	20 ,,
Tartaric acid	2 ,,
Citric acid	0·5 ,,

I dry the sheets when taken from this bath without removing the excess of nitrate of silver, and I place them in a box where they are subjected to ammoniacal fumes. They are then ready to be exposed in the camera, where it is necessary to keep each sheet pressed between two glass plates, in order to prevent the moisture of the air from injuring the preparation. This preparation is liable to be affected on account of the excess of nitrate of silver in the paper, which has the effect of quickening the luminous impression.

The negative furnished by the violet glass may be obtained in a superior manner with a paper prepared with chloride of silver. It will suffice, for this negative only, to replace the bromide of potassium of the first bath by an alkaline chloride of the same strength.

The coloured glasses should have exactly the intensity necessary to give results sufficiently marked, for, though little darkened, they absorb a large quantity of light and require a long exposure.

The green-coloured glass should be of such a shade that under its influence the images of yellow, green, and blue objects become equally black on the bromide of silver.

The violet glass should not be precisely violet, but of a violet-blue. The blue glass generally obtained in the trade is of the desired shade. This is rendered necessary because in this particular instance there is a physical fact which does not accord with the theory. If, for example, another shade of violet were employed, such as that under the influence of which red, violet, and blue objects produce an equal blackening of the silver salt employed (bromide or chloride), it would produce a negative in which the yellow would be printed black as well as the red, violet, and blue, and which, consequently, would furnish a yellow proof in which yellow objects would be represented no better than the red, violet, and blue objects. The phenomenon is thus explained:—Objects which appear to us of a pure yellow emit, outside the yellow light, a great proportion of red light. If this red be but slightly apparent it is because the yellow, by the effect of its greater brilliancy, destroys much of its brightness.

Ducos du Hauron.

THE COPYRIGHT ACT.

Although we have from time to time presented our readers with very able and reliable "opinions" concerning this Act—among which we may specially instance those of Andrew Mure, Esq., Sheriff of Shetland, and Peter Le Neve Foster, Esq., Barrister-at-Law, and so well known as the Secretary of the Society of Arts—some of our readers have reminded us that we have not yet published the Act itself, and that in the prospect of immediate changes being made we should now place it on record in our pages, so as to be easily accessible for reference. To this request we respond with pleasure. The Act, we may state, was passed in July, 1862:—

An Act for Amending the Law Relating to Copyright in Works of the Fine Arts, and for Repressing the Commission of Fraud in the Production and Sale of such Works.

Whereas, by law, as now established, the authors of paintings, drawings, and photographs, have no copyright in such their works, and it is expedient that the law should in that respect be amended: be it, therefore, enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1. The author, being a British subject, or resident within the dominions of the crown, of every original painting, drawing, and photograph which shall be, or shall have been, made, either in the British dominions or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, and his assigns shall have the sole and exclusive right of copying, engraving, reproducing, and multiplying such painting or drawing, and the design thereof, or such photograph and the negative thereof, by any means and of any size, for the term of the natural life of such author, and seven years after his death; provided that when any painting or drawing, or the negative of any photograph, shall for the first time after the passing of this Act be sold or disposed of, or shall be made or executed for, or on behalf of, any other person for a good or a valuable consideration, the person so selling or disposing of, or making or executing the same, shall not retain the copyright

thereof, unless it be expressly reserved to him by agreement in writing, signed, at or before the time of such sale or disposition, by the vendee or assignee of such painting or drawing, or of such negative of a photograph, or by the person for or on whose behalf the same shall be so made or executed, but the copyright shall belong to the vendee or assignee of such painting or drawing, or of such negative of a photograph, or to the person for or on whose behalf the same shall have been made or executed; nor shall the vendee or assignee thereof be entitled to any such copyright, unless, at or before the time of such sale or disposition, an agreement in writing, signed by the person so selling or disposing of the same, or by his agent duly authorised, shall have been made to that effect.

2. Nothing herein contained shall prejudice the right of any person to copy or use any work in which there shall be no copyright, or to represent any scene or object, notwithstanding that there might be copyright in some representation of such scene or object.

3. All copyright under this Act shall be deemed personal or moveable estate, and shall be assignable at law, and every assignment thereof, and every license to use or copy by any means or process the design or work which shall be the subject of such copyright, shall be made by some note or memorandum in writing, to be signed by the proprietor of the copyright, or by his agent appointed for that purpose in writing.

4. There shall be kept at the Hall of the Stationers' Company, by the officer appointed by the said company, for the purposes of the Act passed in the sixth year of her present Majesty, intituled, "An Act to Amend the Law of Copyright," a book or books, entitled, "The Register of Proprietors of Copyright in Paintings, Drawings, and Photographs," wherein shall be entered a memorandum of every copyright to which any person shall be entitled under this Act, and also of every subsequent assignment of any such copyright; and such memorandum shall contain a statement of the date of such agreement or assignment, and of the names of the parties thereto, and of the name and place of abode of the persons in whom such copyright shall be vested by virtue thereof, and of the name and place of abode of the author of the work in which there shall be such copyright, together with a short description of the nature and subject of such work, and in addition thereto, if the person registering shall so desire, a sketch, outline, or photograph of the said work, and no proprietor of any such copyright shall be entitled to the benefit of this Act until such registration, and no action shall be sustainable, nor any penalty be recoverable in respect of anything done before registration.

5. The several enactments in the said Act of the sixth year of her Majesty contained, with relation to keeping the register book thereby required, and the inspection thereof, the searches therein, and the delivery of certified and stamped copies thereof, the reception of such copies in evidence, the making of false entries in the said book, and the production in evidence of papers falsely purporting to be copies of entries in the said book, the application to the courts and judges by persons aggrieved by entries in the said book, and the expunging and varying such entries, shall apply to the book or books to be kept by virtue of this Act, and to the entries and assignments of copyright and proprietorship therein under this Act, in such and the same manner as if such enactments were here expressly enacted in relation thereto, save and except that the forms of entry prescribed by the said Act of the sixth year of her present Majesty may be varied to meet the circumstances of the case, and that the sum to be demanded by the officer of the said Company of Stationers for making any entry required by this Act shall be one shilling only.

6. If the author of any painting, drawing, or photograph in which there shall be subsisting copyright, after having sold or disposed of such copyright, or if any other person, not being the proprietor for the time being of copyright in any painting, drawing, or photograph, shall, without the consent of such proprietor, repeat, copy, colourably imitate, or otherwise multiply for sale, hire, exhibition, or distribution, or cause or procure to be repeated, copied, colourably imitated, or otherwise multiplied for sale, hire, exhibition, or distribution, any such work or the design thereof, or, knowing that any such repetition, copy, or other imitation has been unlawfully made, shall import into any part of the United Kingdom, or sell, publish, let to hire, exhibit, or distribute, any repetition, copy, or imitation of the said work, or of the design thereof, made without such consent as aforesaid, such offender shall forfeit to the proprietor of the copyright for the time being a sum not exceeding ten pounds; and all such repetitions, copies, and imitations made without such consent as aforesaid, and all negatives of photographs made for the purpose of obtaining such copies, shall be forfeited to the proprietor of the copyright.

7. No person shall do or cause to be done any or either of the following acts; that is to say:—First, no person shall fraudulently sign or otherwise affix, or fraudulently cause to be signed, or otherwise affixed, to or upon any painting, drawing, or photograph, or the negative thereof, any name, initials, or monogram. Secondly, no person shall fraudulently sell, publish, exhibit or dispose of, or offer for sale, exhibition, or distribution, any painting, drawing, or photograph, or negative of a photograph, having thereon the name, initials, or monogram of a person who did not execute or make such work. Thirdly, no person shall fraudulently utter, dispose of, or put off, or caused to be uttered or disposed of, any copy or colourable imitation of any painting, drawing, or photograph, or negative of a photograph, whether there shall be subsisting copyright therein or not, as having been made or executed by the author or maker of the original work, from which such copy or imitation shall have been taken. Fourthly, where the author or maker of any painting, drawing, or photograph, or negative of a photograph, made either before or after the passing of this Act, shall have sold or otherwise parted with the possession of such work, if any alteration shall afterwards be made therein by any other person, by addition or otherwise, no person shall be at liberty during the life of the author or maker of such work, without his consent, to make or knowingly to sell or publish, or offer for sale, such work or any copies of such work so altered as aforesaid, or of any part thereof, as or for the unaltered work of such author or maker. Every offender under this section shall, upon conviction, forfeit to the person aggrieved a sum not exceeding ten pounds, or not exceeding double the full price, if any, at which all such copies, engravings, imitations, or altered works shall have been sold or offered for sale; and all such copies, engravings, imitations, or altered works shall be forfeited to the person, or the assigns or legal representatives of the person, whose name, initials, or monogram shall be so fraudulently signed or affixed thereto, or to whom such spurious or altered work shall be fraudulently or falsely ascribed to as aforesaid: provided always, that the penalties imposed by this section shall not be incurred, unless the person whose name, initials, or monogram shall be so fraudulently signed or affixed, or to whom such spurious or altered work shall be so fraudulently or falsely ascribed as aforesaid, shall have been living at or within twenty years next before the time when the offence may have been committed.

8. All pecuniary penalties which shall be incurred, and all such unlawful copies, imitations, and all other defects and things as shall have been forfeited by offenders, pursuant to this Act, and pursuant to any Act for the protection of copyright engravings, may be recovered by the person hereinbefore, and in any such Act as aforesaid, empowered to recover the same respectively, and hereinafter called the complainant or the complainer, as follows: In England or Ireland, either by action against the party offending, or by summary proceeding before any two Justices having jurisdiction where the party offending resides; in Scotland, by action before the Court of Session in ordinary form, or by summary action before the sheriff of the county where the offence may be committed, or the offender resides, who, upon proof of the offence or offences, either by confession of the party offending, or by the oath or affirmation of one or more credible witnesses, shall convict the offender, and find him liable to the penalty or penalties aforesaid, as also in expenses; and it shall be lawful for the Sheriff, in pronouncing such judgment for the penalty or penalties and costs, to insert in such judgment a warrant, in the event of such penalty or penalties and costs not being paid, to levy and recover the amount of the same by poinding: provided always, that it shall be lawful to the Sheriff, in the event of his dismissing the action and assoilzieing the defender, to find the complainer liable in expenses, and any judgment so to be pronounced by the Sheriff in such summary application shall be final and conclusive, and not subject to review by advocation, suspension, reduction or otherwise.

9. In any action in any of Her Majesty's Superior Courts of Record at Westminster and in Dublin, for the infringement of any such copyright as aforesaid, it shall be lawful for the court in which such action is pending, if the court be then sitting, or if the court be not sitting, then for a Judge of such court, on the application of the plaintiff or defendant respectively, to make such order for an injunction, inspection, or account, and to give such direction respecting such action, injunction, inspection, and account, and the proceedings therein respectively, as to such court or Judge may seem fit.

10. All repetitions, copies, or imitations of paintings, drawings, or photographs, wherein, or in design whereof, there shall be subsisting copyright under this Act, and all repetitions, copies, and imitations of the design of any such painting or drawing, or of the negative of any such photograph, which, contrary to the provisions of this Act, shall have been made in any foreign state, or in any part of the British dominions, are hereby absolutely prohibited to be imported into any part of the United Kingdom, except by or with the consent of the proprietor of the copyright thereof, or his agent, authorised in writing; and if the proprietor of any such copyright, or his agent, shall declare that any goods imported are repetitions, copies, or imitations of any such painting, drawing, or photograph, or of the negative of any such photograph, and so prohibited as aforesaid, then such goods may be detained by the officers of Her Majesty's Customs.

11. If the author of any painting, drawing, or photograph, in which there shall be subsisting copyright, after having sold, or otherwise disposed of such copyright, or if any other person, not being the proprietor for the time being of such copyright, shall, without the consent of such proprietor, repeat, copy, colourably imitate, or otherwise multiply, or cause or procure to be repeated, copied, colourably imitated, or otherwise multiplied, for sale, hire, exhibition, or distribution, any such work, or the design thereof, or the negative of any such photograph, or shall import or cause to be imported into any part of the United Kingdom, or sell, publish, let to hire, exhibit, or distribute, or offer for sale, hire, exhibition, or distribution, or cause or procure to be sold, published, let to hire, exhibited, or distributed, or offered for sale, hire, exhibition, or distribution, any repetition, copy, or imitation of such

work, or the design thereof, or the negative of any such photograph, made without such consent as aforesaid, then every such proprietor, in addition to the remedies hereby given for the recovery of any such penalties, and forfeiture of any such things as aforesaid may recover damages by and in a special action on the case, to be brought against the person so offending, and may in such action recover and enforce the delivery to him of all unlawful repetitions, copies, and imitations, and negatives of photographs, or may recover damages for the retention or conversion thereof: provided that nothing herein contained, nor any proceeding, conviction, or judgment, for any act hereby forbidden, shall affect any remedy which any person aggrieved by such act may be entitled to either at law or in equity.

12. This Act shall be considered as including the provisions of the Act passed in the session of parliament held in the seventh and eighth years of her present Majesty, intituled, "An Act to Amend the Law relative to International Copyright," in the same manner as if such provisions were part of this Act.

PHOTOGRAPHIC SOCIETIES: REPORTING THE MEETINGS.

"Report me and my cause aright."—*Hamlet.*

Between the time at which anyone is admitted as a member of a photographic society and that at which the first subsequent report is published, there is necessarily a meeting held and something done to report upon. Hence it would be more orderly to direct the reader's attention to the proceedings of a meeting before giving any attention to the reporting of one. For sundry reasons, however, which will be understood hereafter, this strict order is scarcely possible at present; therefore the writer will, in the present instance, say a few words upon the subject of reporting.

There would seem to be great differences of opinion as to the nature of the matter of which a photographic society's report should partake. Some seem to think it should be a sort of summary of the laudable deeds performed by the members. This, however, where various opinions are entertained and expressed, is almost impossible. If no member ever opened his mouth except to mention and demonstrate, beyond the possibility of a doubt, some new scientific fact, then such a summary would certainly be quite possible, and, as the briefest of brief reports, desirable. A report written upon this principle would have its principal items set down in something like the following style:—"Member No. 7 asserted and demonstrated the fact that A+X is exactly equivalent to C+Z." At the meetings of the Royal Society and other eminent scientific bodies new facts are frequently stated in a manner similar to this, for instance:—"Sir John Herschell discovered that a solution of hyposulphite of soda possesses the property of dissolving chloride of silver." Such positive affirmations to be worthy of respect, demand absolute demonstration, and when demonstrated are collected together under the various heads of experimental and mathematical science.

In the reports of the meetings held in the House of Commons—or "parliamentary proceedings," as they are termed—we see that progress is made not by demonstrating scientific facts, but by ascertaining, through debate, the probabilities of success likely to attend some proposed social experiment. Both these styles of proceeding have been, and may be, adopted alternately or otherwise by photographic societies, and to both we are largely indebted for progress. The positive demonstration of a fact leaves no room for discussion or debate; but the advancement of a proposition or suggestion of some new treatment, or of the cause of some hitherto unexplained phenomenon, is exactly the kind of thing upon which a number of gentlemen may, to their mutual advantage, exchange opinions. Here are examples:—

At one of the meetings of the Manchester Photographic Society the writer demonstrated that the flame of burning phosphorus might, by certain means shown, be rendered practically continuous. This fact is beyond the province of argument. It is demonstrable—it has been demonstrated. The suggestion by which the demonstration was accompanied—that the phosphoric light might be commercially utilisable—is one which may or may not be shown to be well founded. There is plenty to be said *pro* and *con;* there is room for discussion; there is material for debate. So in respect to the horizon line. That it is to be found in nature on a level with the eye of the observer is a fact admitting of proof. That a picture is spoiled inevitably when the horizon line is shown on or about the same level as the head of the figure represented is a debateable question.

At the present time the ascertained facts of photography are sufficient to enable us to produce exquisite results, and a large number of the important points which remain to be settled admit extensively of debate. Papers read at the meetings of societies frequently, if not generally, assume the form of argument in favour of a particular advocated course, and the discussion assumes the form of other arguments in support of or in opposition to the paper. Where this, however, is demonstrative of some given fact or number of facts it is a complete thing in itself, and when printed in the photographic journals does not need to be gone over again in the society's report; but where the paper consists of argument in favour of some proposed course, as has been the case in several of the able compositions read during the past session before members of the Edinburgh Photographic Society, then the report of the meeting should certainly furnish us with the opposing and supporting arguments also; for, in a case like this, "all must full or not coherent be." When less than this is done the contribution to the advancement of photography afforded by any particular meeting is but indifferently utilised.

Upon one occasion—the only one of which he has any remembrance in connection with the Manchester Photographic Society when an animated and prolonged discussion took place, of which the official report gave scarcely the faintest idea—the writer took the liberty of reporting the meeting himself through the columns of a contemporary journal, by way of giving a sort of suggestion as to his own idea of what reporting should be. Of course this report was non-official, and, being unauthenticated, could only be taken for what it was worth. Some amount of annoyance, however, was occasioned by its publication—an annoyance which the writer scarcely thought called for, inasmuch as the report, through appearing in a journal never seen by most of the members of the Society, would not be contrasted by them with the official one, and, even if so contrasted, should have indicated rather that the unpaid Secretary had more to do than could reasonably be expected from him than that he failed to do it in a satisfactory manner. Be this as it may, however, the writer was asked to produce the reports of some of the subsequent meetings for the official organ, namely, The British Journal of Photography.

Having no desire to usurp the Secretary's post, he consented to *assist* that gentleman by writing a sketch of the proceedings of some of the following meetings, which was accordingly done, his sketch being sent in to the Secretary with a special request that he would subtract from it anything which he thought it undesirable to retain, or add to it anything desirable which had been omitted. These reports consequently appeared in the pages of this Journal, but with fewer amendments than perhaps might have been desired. The reluctance of the Secretary to interfere greatly with the sketch under these circumstances furnished to him was probably owing to a somewhat mistaken feeling of kindness towards the writer, who, as a rule, does not object to his literary productions being subjected to any pruning operations by which they may be improved. In this particular instance, as the writing was merely done by way of sharing the work somewhat unjustly (shall I say?) devolving upon one individual, and it must be confessed done with less than usual care, any alterations would have been even less objectionable than in an article bearing the writer's name and claiming his responsibility.

Amongst other useful purposes to be gained through the report of a society's meeting merit may be encouraged by the recognition thus afforded to it, and further results may not unreasonably be expected from such encouragement; whilst failings may be corrected and abuses eradicated by faithfully reporting them when they take place. Few gentlemen would attempt to raise a laugh by interrupting a speaker for the purpose of giving vent to an absurd remark, and few dealers in photographic materials would, even on extraordinary occasions, give quotations from their price lists to members at the other end of the room if they knew that such liberties would be duly reported. It may be said, and truly, that the Editors of The British Journal of Photography do not care to have the space occupied by such nonsense as would with this style of reporting occasionally find its way into the columns of the Journal. But this need be no reason for cutting out from the official report such remarks as those alluded to; for the very few lines it would require to afford an individual publication of abuses would not only prevent their repetition in the Journal, but also their continued repetition at a society's meeting, where sometimes they are emphatically a nuisance. From what has been said it will readily be guessed that the writer advocates both a full and a truthful report of what takes place at a society's meeting.

There is still one more purpose which may, and which the writer thinks should, be served by a society's report, and that is, of giving to members not present, and to the photographic community at large, a correct idea of what took place at a meeting from which they were absent. In short, the writer is of opinion that the report should, in reference to the meeting, bear a relation similar to that which is borne by the reflection from the surface of a common mirror to the body which is reflected; in fact, that the report should "hold, as t' were, the mirror up to nature," uniformly dimmed if you like, but in no particular deformed.

The *Proceedings of the Societies* are to the writer—and, doubtless, to many others—amongst the most interesting portions of the Journal; and so they ought to be, for when a discussion is contained therein they are really articles written not by one, but by a score or so of men whose best thoughts on a given subject are briefly and pointedly embodied. The publication of accurate and full reports, whilst it tends to encourage merit, to stimulate exertion, to correct abuses, and to suppress idle conversation in the particular society furnishing them, also thus adds to the general enjoyment of photographers, and enriches our photographic literature.

That such reports really do the good service here indicated, will be shown in the writer's third article on *Photographic Societies.*

D. Winstanley.

MULTUM-IN-PARVO CAMERA.

Mr. J. L. Lane has left at our office, for the purpose of examination, two of the small "satchel" cameras recently introduced by him.

The essential feature of the instrument is comprised in the fact that the plate-box is so constructed that it packs inside of the body of the instrument. In the first place, however, we may state that there is no dark slide; the sensitive plate is slipped into a suitable recess in the back of the camera, and by means of a spring, which is revolved so as to press against it, is kept firm in its place. But the light would act on the back of the plate were it not protected. The means adopted to meet this difficulty we shall presently explain. The body of the camera is composed of two frames, as it were, one of which slides on the base board, close up to the other, the joint depth of the two being such as to hold the plate box, which, as we have said, packs inside. When the camera is expanded by the separation of the frames the plate box is lifted out, and is hung by suitable means on the tailboard. The camera has no body, strictly speaking, but this want is supplied by a dark cloth, or hood, which envelopes the camera and plate box, preventing light from falling upon either the face or the back of the sensitive plate. The tailboard folds up when not in use.

The manipulation attendant upon the taking of a picture would appear to be something like the following:—The camera is expanded and the plate-box is lifted out and attached to the base board by the appropriate hooks, the lens is screwed on the front, and the bag, or dark cloth, is thrown over the whole. The ground glass is now lifted by the right hand out of the plate-box, the lid being first thrown open for that purpose. A sleeve with an elastic band provides for the admission of the hand. By means of a small hole or eyepiece in the back of the bag the view is perceived and the focus ascertained. The lens is now capped, the ground glass is replaced in the box, and a sensitive plate is substituted for it. When the exposure has been effected the plate is removed, and the apparatus repacked, ready to serve again when occasion requires or a suitable view has presented itself.

One of the cameras left with us for examination had a solid body; but as the length from front to back is insufficient, save for lenses of extremely wide angle, an adapting or extending brass tube is required between the lens and the camera.

The sizes of the cameras now before us are for plates respectively $4\frac{1}{4} \times 3\frac{1}{4}$ and $3\frac{1}{4} \times 3\frac{1}{4}$; but we presume that they may be constructed of any size. The cameras submitted to us were very light and the workmanship excellent. Those readers who desire further information as to the "satchel" camera should consult the announcement in our advertising pages.

Contemporary Press.

TROUBLE IN THE PRINTING AND TONING ROOM.

[Photographic Mosaics.]

As a grand and beautiful arch results from the careful placing of a well-finished keystone, so will bright and beautiful prints be secured if care and judgment be exercised in the use of good negatives. Negatives, however, are just as different as the people whose images are caught upon their creamy films, and it is just as great a mistake to suppose they are all alike, and to be treated the same, as it is to expect every one of your sitters to be amiable. In fact, negatives possess some of the very qualities of man, good and bad. Some are weak and some are strong; some are dark and some are light; some are harsh and coarse and some are fine; some are clean and some unclean; some bad and some good, &c., &c.

It is a mistake, then, to place your paper under a promiscuous lot of negatives and stand them out in the sun, without first studying their nature. If you do, you will get a promiscuous lot of prints, our word for it. The first thing, then, is to know a good or bad negative when you see it, and how to print it. Suppose we select *three* from an imaginary lot, examine them, and then chat awhile over the treatment they should have in printing them.

Fortunately these three are the very ones we want, representing the three classes we desire to treat upon, and which are the most common in practice.

If you have read the report of the gentlemen who examined the negatives sent to compete for the fifty dollar prize in the November issue of the *Philadelphia Photographer*, you will probably be struck with the number of negatives that are reported as under-exposed. It seems to be a mania with some to see just how short an exposure they can make and get any sort of an excuse for a picture—like a little boy standing on the track and seeing how near he can let the locomotive come to him without running over him. It is well enough to be able to work quickly, to have sensitive chemicals, a quick-working lens, and all of that, but not habitually undertime your negatives. A good, generous exposure is best, though not so great as to produce fogging, for that is as bad the other way.

Let us take first the most common class—the *under-exposed* negative. You observe the high-lights are opaque and the darks are almost clear glass, lacking in half-tone, and that it is somewhat on the ambrotype order. It is a defective negative, and to get anything like fair prints from it you must use judgment with it. Print it in the sun, placed at such an angle as to receive the direct rays of the sun. This will secure the greatest amount of half-tone in the high lights, and the blacks will not be so intense as when printed less rapidly.

Do your best, however, and prints from an under-exposed negative will usually be more or less harsh—a fault very, *very* common in much of the everyday work we see.

The next negative has been properly exposed, and is as nearly perfect as possible. The flesh tints are more transparent, and even the white parts of the clothing are not entirely opaque, but relieved by delicate shades here and there. It is full of gradation, there scarcely being a streak of *intense* black in it. Now, if we print this negative in the sunlight, as the other, we shall have prints grey, flat, and insipid. It must be laid flat, in the shade, and print slow, or we may use it under one, two, or three thicknesses of tissue paper, according to its density.

Now the third negative is of a class more rare, and is right the reverse of the first. It is decidedly *over-exposed*, even to fogging. You may print this in the sun all you like. It will print slow, and in summer time will get very hot. To prevent the sticking of the varnish to the paper, turn over the negative occasionally, and let it cool off. Of course with all of these you watch the progress of printing, turning aside from the light, opening the frame, first one end and then the other, and examining them. Print considerably deeper than you desire the tone to be when finished. Guide yourself by the half-tones in the face and white parts. Tone as soon as you can after printing, a few at a time; keep them in motion to tone quickly, and avoid unequal toning, which is shown by red patches; watch the toning, and remove them before they are as quiet a tone as desired, as they dry out less warm in tone than they appear in the toning bath. Always use a fresh fixing bath if you desire stable prints, and wash the prints well. Also wash your hands after each operation.

Now, having carefully rehearsed the manipulations necessary to secure good prints, let us see what, in common practice, seem to be the reasons why good prints are not the general rule.

The *light* mottled appearance often observed when taking them from the pressure-frame is caused by insufficient and uneven silvering—one or both.

Red marbled lines and red specks appearing after toning are the result of air-bubbles in the albumen, or caused by paper badly albumenised.

The *dark* mottled appearance seen when viewing the prints by transmitted light is caused by imperfect fixing or a weak hypo. solution.

The marbled appearance on the paper is caused by dust settling on the silvering solution. Even when this solution is kept covered it is best to filter it frequently.

In toning, red patches often appear, caused by the prints sticking together, by air-bubbles forming between them, and by their rising to the top of the solution, and being allowed to remain without stirring them about.

Insufficient toning creates red prints; over-toning cold, blue ones. The latter become very red in the hypo., and the toning solution has been obviously too strong.

Care should be had not to allow the prints to remain too long in the fixing bath. It will cause them to be yellow.

Yellow patches and stains are also caused by finger-marks on the paper, unclean dishes, hypo. on the fingers while toning, silver in the tank when the prints are put in from the hypo., and by hypo. in the wash water.

Too weak a silvering solution, or an excessively alkaline one, destroys the albumen surface. Prints will refuse to tone if kept too long after printing in hot water. Mealiness is caused by weak negatives, weak silver, too strong a toning bath, too much acid in the toning bath, too little gold in the toning bath, and too fresh a one. Washing the prints too long before toning also causes this common annoyance.

The remedy, in most cases of photographic trouble, is made apparent by the disease. Learn, then, to be a doctor of photography. Keep clean hands, a clear head, and watchful eyes. Edward L. Wilson.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 2nd ult.,—M. Teisseire in the chair.

After the minutes of the previous meeting had been confirmed, several interesting communications were read from MM. Marion, Ducos du Hauron, and De Constant Delessert.

M. Marion's letter was accompanied by some very fine carbon proofs (portraits and still life) obtained with different colours—black, grey, red, and blue, all of a softness and tone most remarkable, and modelled to perfection. These new specimens afford an evident practical proof that carbon printing is most thoroughly adapted to the representation of portraits and other images where the half-tints are so essential. In those of M. Marion there were not only the half-tints on a very extended scale, but what constituted their most important quality was the extraordinary transparency of the blacks and other shaded parts—the abrupt transitions from the clear to the sombre being admirably accomplished

and rendered exceedingly soft thereby. The harmony of the tones of these pictures was so extraordinary, that if it be necessary to criticise a work so perfect, one would, perhaps, wish for a little less softness, and thus reproach the producer with the excess of its good qualities. The corrective in this case is not difficult to find, for hitherto we have had rather to complain of the hardness of carbon proofs. M. Marion, with his presentation of proofs, sent several sheets of gelatino-carbonised paper, which were submitted to the examination of the members of the Society.

MM. Jacquemet and Vidal, who had made some trials of the paper before the meeting, showed the proofs they had obtained, and communicated the result of their observations. M. Vidal particularly appealed to his colleagues, and entreated them to make similar trials, affirming that the question as to the printing of stable proofs is now practically and satisfactorily settled. It was necessary (he said) by practice to acquire an aptitude for this process, as was the case in any other work. Photography was no exception to the general rule, and, however easy carbon printing might be, some preliminary instruction and study were necessary, and first experiments might be unfortunate, while those that followed would be more and more satisfactory. The great advantage of M. Marion's paper was that it rendered the operation very simple, as it was only necessary to sensitise, expose, and develope.

The Chairman thanked M. Marion, in the name of the Society, for the zeal he had exhibited for the success of the carbon process.

The Secretary laid before the meeting some specimens of heliochromy, together with a pamphlet thereon, by M. Ducos du Hauron. It was, in substance, an application of the carbon processes similar in result to that of chromo-lithography in regard to monochromatic lithography. The practical applications of this ingenious idea, which does honour to its inventor, are not yet known. It may be that printing by light, in colours, and without the aid of pencil or brush, may one day become a great industrial pursuit; and that is why the Marseilles Photographic Society was happy to receive and give publicity to his communication, which is full of interest, and thank him for his important researches, and the discoveries in regard to heliochromy in which they have resulted.

The Secretary also presented a series of proofs which he had received from M. De Constant, with a letter explaining the special process for printing positives and negatives respectively. The comparative examination of these different proofs demonstrated how attentively M. De Constant had studied all the ways of obtaining photographic images, with the view of arriving at the most perfect process.

After some private business, interesting only to members of the Society, the meeting separated.

Correspondence.

Foreign.

Paris, June 29, 1869.

I am not sure whether the photo-vitrotype process of Herr Albert, of Munich, has been described in your pages. I expect it has; but its importance and the beauty of the pictures produced will warrant me in referring to it again. It is the only serious rival, I think, to the process of M. Tessie du Mothay, which is successfully worked by a firm in Paris for the production of first-class illustrated publications. The process of Herr Albert is a *press* process. The impressions are produced by the aid of a printing-press, and may be printed in black or in colours, on paper or cardboard.

The outlines of this process are as follow:—Dissolve seventy-two grains of gelatine and thirty-six grains of bichromate of potash in three ounces of water. Beat up this solution with an ounce and a-half of white of egg till perfectly fluid and well mixed. A little heat can be used in dissolving the gelatine. This solution is spread upon any transparent medium (which should be at least one-third of an inch thick), and is allowed to dry in a warm and dark place. Great care must be taken that this film be spread with uniformity, and that it is not thicker in one place than another. The *dry coated surface* of the glass or transparent plate is covered with a piece of dark cloth, and the uncoated side is exposed to the action of the light. This operation produces an important result—the bottom part of the film nearest the glass is made to adhere perfectly to it, and the upper portion of the film acquires adhesiveness enough to enable it to retain a *second* film of a mixture composed of—

Gelatine	5 ounces.
Bichromate of potash	800 grains.
Distilled water	30 ounces.

The plate thus prepared is exposed under a negative for periods varying from half-an-hour to two hours, it is stated. It is then taken to the dark room and washed with plenty of water. The parts which have been acted upon by the light are not dissolved by the action of the water, and are in relief upon the plate. From this plate, when dried, from 500 to 1000 prints can be obtained, and, to avoid breaking the plates, they are placed upon an elastic pad whilst being inked ready for the press.

M. Perrot, of the Ecole Normale, publishes a process for obtaining photographs in oxide of chrome and sulphuret of lead. Those in the chrome oxide are of a pretty green colour, which suits some subjects very well. They are very easily obtained, as will be seen from the following description of the process:—A sheet of ordinary albumenised paper is sensitised upon a concentrated solution of bichromate of potash and dried in the dark. It is then exposed in the pressure-frame under the negative, and after about twenty minutes' exposure to the sunshine the sheet is well washed in distilled water, and whilst damp is suspended in a partially-closed box, at the bottom of which is placed a little capsule, containing burning sulphur. The sulphurous acid gas reacts upon the chromic acid of the exposed bichromate of potash, and reduces it to the state of oxide of chromium, which thus forms the image. The picture is again washed, and, when dry, may be kept unchanged for an indefinite period. The author does not say whether the immersion of the exposed bichromated sheet in a *solution* of sulphurous acid would be equally efficacious for the production of the chromic oxide pictures. The same paper may be used for producing brown-black prints in sulphuret of lead; but they cannot be recommended as being so permanent as those in the green oxide of chromium. The sheet of exposed bichromated paper is immersed in a solution of neutral acetate of lead, and the image appears of a pale yellow colour. After sufficient washing, the print is put into a solution of sulphuret of sodium or potassium, when the image tones to a blackish brown, which varies in tint according to the degree of concentration of the sulphuret bath. I have no doubt some of your readers will try to produce the green-coloured photographs, and I hope they will report the result of their trials in your pages.

I went down to MM. Geymet and Alker yesterday evening to get some information from "head quarters" for your Shrewsbury correspondent, Mr. W. Bayley. With their usual courtesy, these gentlemen furnished me with the following information, which I trust will not only be of assistance to your correspondent, whose difficulties have been the cause of this portion of my letter, but to many more readers of your Journal. MM. Geymet and Alker were good enough to put their remarks upon paper in the form of a letter to me, so that I might, at leisure, transcribe them to your pages. They say:—

"Sir,—We will reply in the first place through the medium of your esteemed Journal to the letter of Mr. Bayley, and we will afterwards add some information which we believe will be of general photographic interest. The transfer and the destruction of the collodion film (in the enamel process) do not offer any difficulties and never occasion accidents, but operators should not deviate from the method which we indicate in this letter. After coming out of the bath of acidulated water, which should contain five to ten per cent. of hydrochloric acid, and which loosens the film, the picture is washed in a dish full of pure water in order to get rid of *all the acid*, and it is then put into a bath of sugared water containing fifteen or twenty per cent. of ordinary loaf sugar. Before being used this bath of sugared water should be boiled for about a quarter of an hour, and it should be of a slightly syrupy consistence. When quite cold it is ready for use, and can be employed for a long time. After each immersion of an enamel picture in the sugared water it should be filtered to get rid of all powdery particles. The organic particles which get in between the enamel and the film are destroyed in the acid bath, and they give rise to white specks. As soon as the sugared water becomes acid it should no longer be used. The transfer is made in this way:—The collodion film is supposed to be floating on the bath of sugared water, which should be at least an inch deep, picture *downwards*. It need not remain in this bath. A plate of enamel well cleaned is placed upon a little piece of thin copper bent at right angles, and is put under the floating film. The plate is lifted towards the film, and when the two surfaces are in contact, and the picture well placed upon the enamel, the whole is lifted from the bath. The enamel plate is then taken by the fingers, and the edges of the film are clipped off with a pair of scissors. The film is then drawn on the plate in every direction in order to avoid wrinkles, the fingers being kept on the back of the enamel plate as much as possible. When this operation is ended the plate is put on a sheet of thick blotting-paper to absorb all the water underneath it. A piece of tissue-paper is then put over it, and made to adhere by the breath, and this, repeated three or four times, takes away all excess of water. After this, the film is well pressed with a tuft of cotton wool, a piece of tissue-paper being always upon its surface, the pressure being directed on to the edges especially. This operation is finished when the paper is not moistened. Should any air-bubbles form, care must be taken to burst them with a fine needle, and press them out by means of the paper and cotton wool as described above.

"*Destruction of the Collodion Film.*—Before destroying the collodion film in sulphuric acid, it is very necessary that it should be *perfectly dry*. To be sure of this try it at the back of the enamel; if dry, it should crackle under the finger nail. The enamel cannot dry spontaneously; it must be deprived of moisture by degrees from some source of heat. The collodion film must not be *burnt* either; the picture upon it, once dry, should be brilliant, and the film should keep its lustre. After drying, the picture, still warm, is placed upon the little copper support, and lowered into the dish of sulphuric acid, where it should remain twenty minutes. This time is sufficient to destroy the film. The plate is then taken out, and is put *perpendicularly* into a vessel of water, where *underneath* the water it is moved about with a tremulous motion, and rinsed in the same way in three fresh lots of water. It is important that every trace of acid be washed away if a fine enamel be desired.

"Do not fear disturbing the image in these washings. The enamel powder adheres so firmly to the enamel, that it will remain attached to it, even under a tap of water, and it is under the jet from a tap that we practice the *last* washing. The plate is then put up against a sheet of blotting-paper to drain, and to get ready for the vitrification.

"Our manufacture of the enamel plates, and the manipulations which we

see practised by your workmen, have taught us that the enamel once in the furnace does not require any special management."

I am sorry that the post is about closing. I must send about a mile to get this off in time, and I am, therefore, compelled to leave the remainder of the valuable communication of Geymet and Alker until my next. R. J. Fowler.

Home.

AN OLD EVIL READILY CURED.

To the Editors.

Gentlemen,—Now that out door operations are in a measure stopped by the extraordinary weather we are having in the shape of fog and a curtain of dark clouds shielding the sun's light from us, thereby rendering the landscape flat and tame, those who are compelled to take negatives have to resort to what are called "dodges" to obtain pictures combining detail and density.

Long exposures, and a collodion containing bromine and iodine—the latter slightly in excess—will give all that is needed, viz., a good creamy film, which, backed up in the plate-holder with red blotting-paper, in optical contact with the glass, will ensure the absorption of every ray of light refracted from elm trees and similar dark objects, and great will be the delight of those who have so succeeded.

But here steps in the "old evil," which I propose to readily cure by showing its cause and the remedy for a host of other troubles often unaccounted for, viz., on varnishing such a plate, prepared with an old sample of collodion, or that described as above, a circular streak makes its appearance, or, what is worse, the detail of the image is wholly destroyed, owing to the alcohol in the varnish (I am speaking of a varnish made with pure spirit) having dissolved or eaten out the iodine in the collodion which forms the image. A weaker varnish, or, still better, diluting the collodion (which, by-the-bye, should be made with pure spirit, not methylated), in the proportion of half-an-ounce of plain to every four ounces of iodised, makes it work satisfactorily and well.

This also is the remedy for dipper marks, which were much spoken of a few years ago, and which were then discussed in the journals. This is, further, a remedy for many of the supposed imperfections in the collodions sent out by many of the manufacturers, plain collodion added to a bromo-iodised sample in this proportion being quite sufficient during the summer weather to make such work satisfactorily. The free use also of the refrigerator, suggested by me in a series of papers last spring in your Journal, and which may be made at a cost of 1s. 9d., will ensure not only the production of fine negatives but secure such comfort in working as will at all times keep a careful operator in "thorough good temper."—I am, yours, &c.,

Ross, June 25, 1869. Wm. Harding Warner.

DAVIES'S PRINTING PROCESS.

To the Editors.

Gentlemen,—Mr. Davies has conferred a great benefit on photographers by his new preparation of paper by his French polish, &c. May I be allowed to add my share?

I enclose a print on paper, prepared by a varnish which I think does very well. It is made of white shellac melted in soft water by the addition of a little borax, and a little common salt added. The mixture is simple and easily made, quick in printing, and the results not bad for a first trial.—I am, yours, &c., S. M'Watters.

Grahamston, Falkirk, June 28, 1869.

[The specimen enclosed is very good indeed.—Eds.]

Miscellanea.

Banquet to M. A. Poitevin.—On Thursday, the 24th ult., a banquet was given to M. A. Poitevin by the Marseilles Photographic Society, on the occasion of his taking up his residence for some months in the town of Marseilles. M. Teissiere, the Chairman, having enumerated the various claims which entitled M. Poitevin to be regarded as one of the glories of the photographic world, concluded by offering him an honorary membership of the Society, which M. Poitevin accepted with suitable expressions of gratitude for the kindness accorded to him.

Spirit-Photographs.—It appears from the *Spiritual Magazine* that the author of the letter signed "W. D. L." (a misprint for "W. D. G."), which appeared in our number for June 18, page 292, is Professor Gunning, a gentleman of note in the geological world. Our contemporary admits that The British Journal of Photography on the whole has treated the subject with commendable fairness, but, in alluding to our article on spiritual photography in our number for January 29, it further says that our explanation concerning the printing of ghostal images, such as the *Apollo Belvidere* and the *Greek Slave* is based on a misconception of the subject. We are then told wherein lie the points of difference between our spirits and those of Mumler. Our Strand contemporary is probably not aware that we have published, and may therefore be supposed to know, the various points of the recent trial.

Pleasant Prospects for Photographers.—*Fun* says "it is rumoured that the Clerk of the Weather has followed the example of the clerk of a certain gas company, and levanted from his duties. We understand that he has left his accounts in a very confused state, and that large arrears of bad weather due last winter will have to be realised this summer. We shall be glad when the accounts—and the weather—become settled."——"The weather-glasses at present manufactured are not quite adapted to the requirements of the English climate. We understand Messrs. Negretti and Zambra meditate introducing a new feature in their glasses—'Set Change'—which will be invaluable in England."

Albumen.—It frequently happens that among the dried albumen met with in commerce a variety is met with which is soluble in water, but not coagulated by the application of heat. Dr. Monnier, at Lyons, has succeeded in preparing this modification, and has studied its properties. When white of eggs is slowly evaporated by exposure to the heat of the sun, or rapidly evaporated to dryness on a water bath, after having been previously exposed to strong daylight for a considerable length of time, a modification of albumen is obtained, non-coagulable by heat. A dilute aqueous solution of this non-coagulable albumen is not precipitated by addition of acetic, formic, or tartaric acid, but the addition of these acids (a few drops) restores its coagulability by heat. In order to restore to 0·20 grm. of this dry albumen dissolved in 10 c.c. of water its coagulability by heat, it was sufficient to add 5 m.grs. of solid crystalline acetic acid, dissolved in 0·5 c.c. of water. If as much ammonia was added as exactly suffices to neutralise the acid, the albumen thereby again lost its property of becoming coagulated by the application of heat.—*Deutsche Industrie Zeitung.*

J. Gostick and Company (Limited).—With the connection between photography and the business of the confectioner, tobacconist, or toy merchant, we are all well acquainted; but our art-science is yet destined to find its way to the public through more varied ramifications than these, as witness the following extract from the "memorandum of association" of a newly-projected company under the above designation, and which bears the names of two "directors" and six other persons who subscribe for one share each. Among the subscribers we find the names of Messrs. Edmund Dring, John William Green, Jesse Gostick, and five others. According to the memorandum of association, "the company has been formed for the employment of Mr. Jesse Gostick as an accountant, auctioneer, valuer, and agent, and the purchase, acquisition, or taking on lease of premises necessary for the above businesses. The carrying on the art, profession, or businesses of accountants, auctioneers, valuers, agents, and *photographers*, and any other art, profession, or business connected with or incidental to the same in all their branches, and the practice thereof in England, Ireland, Scotland, Wales, the British Colonies, and in all foreign countries, and the doing all such other things as are incidental or conducive to the attainment of the above objects;" and we are told that "every shareholder may derive a good permanent income by accepting an appointment as a representative of the company." As *permanency* is the "one thing needful" in photography, it is pleasant to be assured that it can be secured in connection with this new company.

Patented Inventions.—Respecting the motion which was recently introduced to abolish the patent system, the Inventor's Institute appointed a committee to wait on the Attorney-General for the purpose of presenting to that officer their views of the importance of the patent laws to all the industrial interests of the nation. The committee submitted to the Attorney-General the following cogent reasons why the motion of Mr. Macfie should not prevail:—1. It is the duty of the state to encourage invention by every legitimate means, in order to enable this country to maintain its supremacy in mechanical and chemical arts. 2. That the inventor is entitled to reasonable remuneration for his labour, expenditure, and skill, equally as much as the author or the artist is entitled to copyright for his book or work of art. 3. That the patent system, though defective, is the best practical method of remunerating inventors yet devised, inasmuch as under it those persons only who use inventions, and to whom, therefore, they may be assumed to be of service, pay for their use. 4. Experience shows that no system of rewards from the state could ever be made to work satisfactorily, either in the interests of inventors or the public. 5. The inventor, as distinct from the manufacturer, has a right to be heard before the patent laws are abolished or materially altered. 6. Inventors—and specially those belonging to the working classes, to which classes the great majority of inventors belong—are entirely opposed to the abolition of the patent laws, though they earnestly desire their amendment. 7. That by a good system of patent law the progress of the trade and industry of the country would be largely benefited, as the whole inventive talent of the nation will be thereby incited to strenuous and continued efforts to maintain our industrial position against the very active pressure of foreign competition now affecting our commercial prosperity. 8. That working men, who are largely represented by the present deputation, are especially anxious to find themselves in a position, under an amended patent law, in which they can not only safely exhibit their inventions in public, but be enabled to reap the fruits of improved education and increased application of invention. The Attorney-General expressed himself as opposed to the motion which had been introduced by Mr. Macfie.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I wish to exchange a whole-plate lens (portrait), by Jamin, and an excellent half-plate lens (portrait), by Shepherd, for a whole-plate portrait lens (rather short focus preferred), by Ross, Voigtlander, Lerebours, or any other similar maker.—Address D, 20, Holford-square, Pentonville, W.C.

A studio pedestal and about 400 stereoscopic slides, comprising views in Egypt, the Holy Land, London, and various others, will be given in exchange for a good glazier's diamond, or a water-tight whole-plate bath, or a studio chair or table, &c.—Address, J. B. North, 1, Kemp-street, Rochdale.

In exchange for a background (out-door scene) twelve bottles of Dr. Jacobsen's aniline transparent colours for colouring photographs will be given. Mahogany cabinet, also revolving stereoscope (new), containing 102 choice slides, will be given in exchange for a first-class sewing machine.—Address, J. C., Grape Cottage, Sleaford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Juvenis.—You may use the bath as soon as it has been made.

J. S. L.—So far as we can ascertain, the person about whom you inquire has left this country.

R. J. F. (Paris).—We have received the valves and have had them carefully tried. The other matter shall receive attention.

George.—The blisters are caused by the albumen not adhering with sufficient tenacity to the surface of the paper, which appears to have had a very hard surface.

J. Falshaw.—Mr. Rowlinson, of Windermere, has taken panoramic views embracing the whole circle, but we do not know what kind of camera he employs.

Tyro.—In orthographic projection the eye or point of sight is supposed to be at an infinite distance from the object. In common perspective the lines must converge to a point.

A. Meeze.—1. For the particulars you require we must refer you to Mr. Blair, whose address is Rosewell Cottage, Bridgend, Perth.—2. You will find the desired information in the book.

Chas. Whitley.—The simplest test for starch is iodine. Make a weak solution of the starch, and add to it a weak solution of iodine. You will observe that a rich blue colour will be immediately formed.

Transparent (Glasgow).—Thanks for the cuttings. Some of them, you will have seen, have already been given to our readers. The subject is a singular one, but in the meantime we have dropped it.

P. Conway.—1. "Charles Martel" was a *nom de plume* adopted by a gentleman (now deceased) who contributed to photographic literature.—2. The divulging of a secret of this kind is a course which no honourable journalist would adopt.

Geo. T. Smith.—First of all wet the film with water, and then pour over it the solution of iodine. If it be strong the deposit will become converted into iodide of silver in a few seconds. You may then wash and apply silver under the circumstances proposed.

T. O.—Although a good deal can be said in favour of rock crystal lenses, they are not so good as those made of glass and properly achromatised. We have some in our possession, and make this statement having a perfect knowledge of the relative merits of the results of both descriptions of lenses.

"Photo."—Whether the fault lie in the collodion or the in bath we cannot say, but it is very certain that it is either the one or the other. Organic matter in the bath will probably be the cause of the markings. Try the effect of sunning it; and, if that fail, then try another sample of collodion.

George S. Buckland.—Several years ago chloride of platinum was suggested for toning prints in lieu of chloride of gold, but it never came into general use. We are aware of one or two who tried it, and who professed themselves as being well pleased with it; but, for all that, they now use gold, possibly from the fact of its being more readily obtained than platina. We cannot give you a reliable formula, but, by making a few trials, you will soon arrive at one for yourself.

M. Pelliot.—Your informant is in error. The size of the stop will not influence the distortion in the margin of the picture. Had he said that the distortion was caused by the *position* of the stop, there would have been more accuracy in his statement. A quarter-of-an-inch stop may be either large or small, according to the focus of the lens. The meaning of the symbol $\frac{F}{8}$ is this:—Suppose that your lens is eight inches in focus, and you employ a stop of an inch aperture, the aperture compared with the focus is represented by by $\frac{F}{8}$; that is, the aperture of the diaphragm is one-eighth of the focal length. $\frac{F}{40}$ indicates that the stop of an eight-inch focus lens is one-fortieth of eight inches. A half-inch stop with an eight-inch focus lens will be represented by $\frac{F}{16}$.

W. M'C.—The mixture consisted of two parts of nitrate of potash and one part of nitrate of silver.

J. C.—Wooden accessories may be stained black by treating them first with an infusion cf logwood, followed by a wash of common crude sulphate of iron or copperas. It may also be rendered of a dead black by painting it over with glue and lampblack.

Geo. Brown.—1. The best process for you to employ on your tour is the wet. You *must* have an instantaneous shutter, otherwise you will never be able to secure breaking waves of the character you indicate.—2. Treat the surface of the prepared plate with strong ammonia. If the salt dissolve, it is bromide; if not, it is iodide. Iodide of silver is so sparingly soluble in ammonia that for your purpose you may estimate it as being insoluble.

Sambo.—The sliding tube of your lens may be made to look quite as good as when new by polishing it with rotten-stone and oil applied by means of a woollen material, such as cloth. You must rub it lengthwise. To remove the lacquer or varnish from the other portions of the brass work, make a very hot solution of common washing soda and immerse the lacquered brass. In a minute or two it will all have been denuded of its covering; if not, it indicates that the soda solution has either been too weak or too cold.

Subscriber.—It is impossible, from your description, to say in what respect you have failed. If the lens be a genuine production of the maker you name, the chemical and visual foci will coincide, and you must attribute the want of sharpness to the dark slide or the holders being misfitted. Focus an object sharply on the ground glass, and then remove it and insert the dark slide containing a piece of ground glass. Now draw up the front shutter, open the back door, and examine the focus. If it be as sharp as it was on the focussing screen the camera is right, and you must conclude that the lens does not work to focus.

W. Jaques (Harrogate).—We should willingly have printed your letter *in extenso*; but we confess to not being quite able to decipher your caligraphy, or, so far as we can do so, to appreciate your argument. What is meant, for example, by the following passage in your communication:—"I should not be surprised if one of the Mumler school were to walk into my studio and at once with my apparatus &c. produce a photograph of myself accompanied by a spirit accompaniment. If so I should assume that it was due to the manipulation of some optical law with which I was unacquainted and fatify myself with the reflection that the beign who studied the sidreal with innumerable suns each the controling center of revolving orbs some of which again are circled by attendant satellites infulencing swaying and reswaying each the other in complications almost too intricate and sublime for mortal comprehension that he likewise governs disembodied spirits in harmony with the wisdom which he so promoutly displays in all his works and dealings with man leaving them neither to giber in the streets of Rome when Ceasar die or play preposterous antics in Mumlers studio." Until we received your communication we were not previously aware that a certain entitity, not usually named in polite society, used, in the middle ages, to "come at the beck and call of every swash buckler" (what is that?) "who chose to circumscribe himself with a circle," &c., &c.; but we presume that you do not make your statement without having made yourself well acquainted with the matter, and upon what you may consider good authority. As respects ourselves, we have no knowledge either of the power or subject referred to, and shall offer no comment on it.

☞ Editorial Communications should be addressed to "THE EDITORS."—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York-street, Covent Garden, London, W.C.

LONDON GAZETTE, *June* 25.

Bankrupt.

James Wesley Miell, Salisbury, photographer.—July 8, at 2, at the Bankrupt's Court, London.

METEOROLOGICAL REPORT,

For the Week ending June 30th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

June 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
24	30·17	68	47	52	55	NW	—	Fine
25	30·19	70	52	55	57	NE	—	Fine
26	30·14	75	52	61	66	NE	—	Fine
28	30·31	66	50	53	61	NE	—	Fine
29	30·26	65	47	51	55	NE	—	Dull
30	30·25	—	49	55	58	NE	—	Dull

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 479. Vol. XVI.—JULY 9, 1869.

A FEW WORDS ABOUT THE GALLIC ACID AND GUM PROCESS OF MR. RUSSELL MANNERS GORDON.

The gallico-gum process of Mr. Russell Manners Gordon has attracted a large share of the attention of those using dry plates for field work during the present season. This process yields very beautiful results, and, though the plates are a little more troublesome in preparation than some others with which our readers are familiar, still the small amount of additional labour involved in their preparation is more than compensated for by the negatives obtained.

We have been lately surprised to find that but very few appear to be aware of the curious reaction involved in the working of Mr. Gordon's gallico-gum process, and we will, therefore, now offer a few explanatory remarks upon the subject, as some of our readers will, no doubt, be glad to know that, when using this process, they are essentially dealing with an old friend in a new dress. While this circumstance in no way detracts from the originality and value of Mr. Gordon's process, it tends to increase confidence in the results to be obtained with it. Having said so much, we ought now, probably, to go farther, and add that the dry-plate process of which this is *in principle* but a modification is the well-known tannin method.

When tannin or tannic acid is allowed to decompose in the presence of a vegetable ferment, gallic acid and a variety of sugar are produced. This reaction is employed on the large scale in the manufacture of gallic acid; but it is not generally known that when a solution of gallic acid is mixed with common gum arabic tannin appears to be re-formed. An experiment or two makes this quite clear. If we take a bright solution of gelatine made in the ordinary way, and, without any special precaution, add to it a solution of gallic acid (a saturated aqueous solution) no precipitate is produced. If we now add to another portion of the gelatine a solution of tannin an abundant precipitate makes its appearance, and to this precipitate the singular name of "amorphous leather" has been given, as the manufacture of leather depends on the production of this compound when the tanning solution acts upon the hide. We thus see that there are strongly-marked differences in the acid of gallic acid and tannin respectively on gelatine.

Let us now return to our gelatine solution, and, instead of adding to it plain solution of gallic acid, add a "gallico-gum" solution—that is to say, a mixture of gallic acid and gum arabic. We now find that a precipitate is produced with the gelatine which is almost identical in appearance with that thrown down by plain tannin. The inference clearly is, then, that gum and gallic acid mutually react and produce tannic acid.

If we now go a little farther we shall find that this change is not only a possible but an extremely likely one to take place. When the extractive matter of gall nuts is allowed to ferment for a month or so, the tannin which the mass contains yields, when water is present, gallic acid and glucose, a variety of sugar allied to gum. This change is most easily represented in symbols as follows:—

$$\underbrace{C_{54}\,H_{22}\,O_{34}}_{\text{Tannic Acid.}} + 8\,HO = 3\,\underbrace{(C_{14}\,H_{6}\,O_{10})}_{\text{Gallic Acid.}} + \underbrace{C_{12}\,H_{12}\,O_{12}}_{\text{Glucose.}}$$

In treating gallic acid with gum it would appear that we reverse this reaction, and so reconvert the gallic acid into tannin or tannic acid, thus:—

$$3\,\underbrace{(C_{14}\,H_{6}\,O_{10})}_{\text{Gallic Acid.}} + \underbrace{C_{12}\,H_{11}\,O_{11}}_{\text{Gum.}} = \underbrace{C_{54}\,H_{22}\,O_{34}}_{\text{Tannic Acid.}} + 7HO.$$

This reaction is now very interesting to us, since by its aid we can readily understand that, in using the gallico-gum dry process of Mr. Russell Manners Gordon, we are essentially dealing with tannin plates.

Now, though there can be little doubt that the tannin process and Mr. Gordon's method are identical in principle, the similarity stops here; for our readers well know that gum itself is a most useful preservative, and has been long used for this purpose. When gum is used in other dry-plate processes it tends greatly to the production of clean plates, with rather too great a tendency to contrast and diminished sensitiveness; but, when the gum is used in the presence of gallic acid, the sensitiveness and the details of the negative are preserved, while we have the satisfaction of obtaining plates free from veiling in the shadows, and yet possessing their full share of half-tone.

There can be little doubt that the presence of the gum also improves the mechanical condition of the film, and retains it in an "expanded" condition, so that on removal of the gum by washing the collodion film remains in a condition in which it is more than usually permeable to the developing and fixing solution. In this respect, however, gum is much less useful than sugar, which (as Mr. M. Carey Lea has shown) excels in this power of retaining even the dry film in a condition in which it is readily permeated by liquids.

PRINTING ON CANVAS.

Accompanying the report of the meeting of the Edinburgh Photographic Society, which will be found in another page, we have received specimens of the productions referred to in the report. Those on the drawing board or paper are exceedingly bold and forcible—in one case much more so than we have ever seen on a similar material. The canvas, too, is well impressed, and is just in that state in which the oil-colourist would feel provokingly desirous of attacking it with his brush.

We may fairly congratulate the Edinburgh Photographic Society, now that their working session is over for a brief period, for having materially contributed to the settlement of a really important problem—the application of photography to canvas. It will be remembered that the process was recently brought before that body by their able Secretary, Mr. W. H. Davies.

IMPROVEMENTS IN PHOTO-PRESS PRINTING.

Since the discovery of Poitevin that an exposed film of bichromated gelatine when damped and inked might be used in the same manner as a lithographic stone, and impressions taken therefrom in printing-ink, numerous have been the suggestions for utilising this principle. But where the printing has been done from the gelatine itself, that substance, from its nature, while damp, has prevented a sufficient number of impressions being taken from it to render it practical in a commercial sense. Where this property is used to transfer to stone much of the sharpness and delicacy of the print is lost.

The prints exhibited by M. Tessie du Mothay during the Paris Exhibition were certainly very fine; but it transpired that but a small number of impressions could be obtained without the aid of further exposures of the negative. This can be easily understood when we consider the amount of wear and tear the soft wet film of gelatine must undergo during the pressing of the usual lithographic printing-press; the delicate surface of the gelatine would directly be destroyed. Again: where elastic pressure is used the same result would follow.

That the inked surface of the gelatine will deliver a delicate impression has for a long time been known; the question, then, is how to obtain the greatest number of impressions from this delicate surface. The method by which I propose to obviate these difficulties I will now proceed to explain.

For my process of photo-relief printing I was obliged to invent a special press, in which two absolutely mechanically true surfaces could be brought together in such a manner that an uniform and perfectly true pressure could be brought to bear on whatever was interposed between them, and that when this pressure was once adjusted it could afterwards be regularly obtained. I therefore propose to apply my press, or a slight modification of the same, to the original process of Poitevin, as described in his patent, and I believe by this means a very much larger number of impressions may be obtained than hitherto; and as so much more delicate a pressure can be given, much finer results would be obtained.

A sheet of plate glass should be evenly coated with a solution of gelatine and bichromate, and, when dry, exposed under a negative. If necessary, this plate may be kept a considerable time—much longer than if required to dissolve the insoluble portions, as its other properties (those in question) remain unimpaired much longer.

The plate, having had the proper exposure, is now placed on the bottom plate of the press, which has an universal motion by which it adjusts itself accurately to the top part of the press, which is solid. The press having been bolted down, the bottom plate holding the gelatine printing surface is lifted by a screw underneath until it comes in even contact with the top of the press. It is then fixed in this position, and the usual operations of damping, inking, &c., are proceeded with. The paper is laid on the gelatine, and the top of the press brought down and bolted on it—the thin film of gelatine between the two non-resisting surfaces having just the amount of elasticity necessary. To receive the image a much finer paper than has been used is necessary, otherwise half the delicacy is lost.

In what I have here described it will be seen that there is little of novelty, excepting the application of a special press to a well-known process, by which I believe much finer and a much larger number of proofs may be obtained than has hitherto been done.

WALTER WOODBURY.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER I.—BEING INTRODUCTORY AND SOMEWHAT DISCURSIVE.

It does not appear to be such a *very* long time since we devoted some articles to the subject of photographic lenses; and yet, short as the intervening period has been, so many improvements have been made in this department of our many-department-ed art-science, that a more complete, although, perhaps, somewhat supplementary, series of articles is called for at our hands, in which the subject shall be brought up to the present time.

In what position does this country stand among other nationalities with respect to that department of applied science, photographic optics? "Each crow thinks her own chick the whitest," says the old proverb; and each nation thinks its own opticians the best. *We* believe that the productions of the opticians of this country stand unrivalled, because, first, we find that they are used *nearly* exclusively by all the best photographers in the three kingdoms; secondly, because they are used by many of the leading continental and American photographers; and, thirdly, because the comparative results of trials made by ourselves establish this position. For cheapness, coupled with an occasional "lucky hit," the French have undoubtedly the advantage; but for genuine excellence, it is now beginning to be admitted by even the rival makers of all countries, the leading photographic opticians of Great Britain and Ireland stand unapproached. If imitation be the sincerest form of flattery—and who doubts it?—English makers have recently been much "flattered" on the other side of the Atlantic; for, less than a month since, we received the catalogue of a dealer there in which we find the confessed imitations of the lenses of a London maker. From these remarks the reader will be at no loss to draw his conclusions respecting the part of the world from which the best photographic lenses emanate. And this leads to the consideration of the following question:—

What are the qualities of a good photographic lens? These may be summed up in the following:—Good definition, a flat field, and plenty of light. The mention of these characteristics should be accompanied by a few explanatory words. Good definition depends upon the lens being properly corrected for spherical and chromatic aberration; flatness of field depends upon the shape of the lens. Let us suppose the case of a single landscape lens. This was the first form used by Daguerre, for in an old pamphlet on the Daguerreotype, and in a description of the instrument employed by Daguerre, we find an engraving of what we should at the present time call a deeply-curved achromatic meniscus. Were we, therefore, called upon to contribute to a history of the single achromatic landscape lens of the ordinary as distinguished from the aplanatic form, we should say that Daguerre was the first to use an achromatic meniscus, and Goddard among the first to point out the fact of a lens of that shape giving a flatter field than one of a plano-convex form. We are quite aware that others have claimed the honour of being the first to point out the advantages, in respect of flatness of field, which result from the meniscus; but the communications made by this optician, more than ten years since, shows that he had long ago given the subject his mature deliberation.

The tyro in photography who uses a landscape lens with a stop in front of it will naturally ask—"Why is such a stop necessary? Would it not be as well, if not better, that the lens should at once be made of a small diameter?" This introduces the subject of spherical aberration, which, in passing, we may define.

If a single landscape lens have its flattest side turned to the view, the picture on the ground glass will not be sharp, because rays passing through the centre of the lens are not brought to a focus on the same plane as those which pass through the edge. In the case of the lens now being described, the direct or axial rays which fall upon the centre of the lens are brought to a focus at a greater distance away from it than those which are transmitted nearer the margin of the lens, and this is known as *positive* spherical aberration. If the lens be so corrected as to have its centre of shorter focus than its margin it is said to possess *negative* spherical aberration—a popular illustration of this latter kind being easily found in the back combination of a portrait lens, the centre of which will be seen to magnify much more than the margin.

But the spherical aberration of a single landscape lens can be practically corrected by the stop in front, by which means the centre of the picture is formed only by the direct rays passing through the centre of the lens, the sides of the picture being similarly formed by the *oblique* rays passing through the margin of the lens, and which come to a focus on nearly the same plane as the central rays—flatness of field being the consequence. When thus used—that is, with a stop in front—a meniscus lens will give a flatter field than one of a double convex, or even plano-convex, form; but for some purposes the latter form may prove more advantageous, viz., a narrow angle of view requiring great rapidity. Other things being equal, a plano-convex lens will for a limited angle of view permit of a larger-sized stop being used than one of the meniscus form; but while asserting this it is also requisite here to state that upon the interior configuration of the lens a great deal also depends.

A lens may have its achromatism corrected by having either the flint or the crown glass to form the convex surface of the lens in its cemented and completed form. The front lens of a portrait combination is pretty nearly plano-convex, and when used as a landscape lens it answers, on the whole, very well; but it is quite different from one of Grubb's aplanatic lenses of even the same external form and focus, for the latter will be found to be composed of a plano-convex lens of crown glass cemented by its curved surface to a concavo-convex lens of flint; whereas the former will prove to be a double convex of crown glass and a plano-concave of flint. Externally the same, inside they are very different. The aplanatic lens gives good definition with a wider aperture than one of the other description when made of the form, and mounted in the manner, described; in other words, its spherical aberration is better corrected.

Before leaving this branch of the subject, we may state that the lens which we have described as the aplanatic forms at least one, and in some instances two, of the components of the best compound landscape and architectural lenses with which we are at the present time acquainted. The details of these we shall discuss when we come to speak of "actinic doublets" and "rectilinear lenses."

To save recurrence to the subject in future chapters, we may here annex a few explanatory definitions in connection with photographic lenses in addition to, as well as in some cases altered and abridged from, those we wrote for our ALMANAC of 1857, which volume has been long out of print.

The fact that the chemical focus of an ordinary uncorrected meniscus lens differed from its visual focus was first pointed out by Mr. Towson (now of Liverpool), who communicated to the *Philosophical Magazine* the fact that, when focussing with a non-achromatic lens of twelve inches, a much sharper and better picture was obtained when the lens was pushed in about a quarter of an inch towards the sensitive plate. The late M. Claudet also communicated in 1844 to the same magazine a paper on the differences of correction even in achromatic lenses, showing that achromatising of a certain kind was requisite in lenses intended for photographic purposes.

The term "aplanatic," as introduced by Sir John Herschel, conveys the idea that a lens is corrected for spherical aberration, just as the term "achromatic" implies that a lens is free from the aberration of colour. A lens may possess the one quality without the other, but a good photographic lens should have both. Being aplanatic, it will define with a large aperture; being achromatic (or actinic), it will have its visual and chemical foci practically coincident.

In an extract we recently gave [*ante* page 147] from Dr. Towler's book, *The Silver Sunbeam*, we observe that he does not apply to the term "angular aperture" the same meaning attached to it by the opticians of this, and also by many even in his own, country. Dr. Towler applies the phrase to signify the amount of subject which can be embraced on a given plate by a lens. For example: if there are two lenses of similar focal length, and one include more well-defined subjects than the other, the former, according to Dr. Towler, has a greater angular aperture. The angle of view is really meant in this case, and not the angular aperture; for although there is a certain similarity in the phrases, the things signified are quite different. If one lens embraces more subject than another, that lens may be said to cover or include a larger angle of view; but the angular aperture of a lens is the relation existing between the focus of a lens and its acting diameter. As we said in our ALMANAC *Cyclopædia*:—

"If there are two lenses of exactly the same focus, but of different diameters, that one having the largest diameter has the largest *angular aperture*. A lens only one inch in diameter may have a much larger angular aperture than one four times its size, provided its focus, relative to its diameter, be shorter than the other. The acting angular aperture of a lens varies with each different stop that is employed. The angular aperture of a portrait lens is, in practice, much greater when worked 'open' than when a stop is used. The larger the angular aperture of a lens the quicker, *cæteris paribus*, will be its action. Lenses for instantaneous work should possess this requisite in a large degree."

We conclude the present chapter with a paragraph devoted exclusively to those who know nothing whatever about lenses:—

A *double convex* lens has two rounded or convex sides; a *plano-convex* only one. A *double concave* and *plano-concave* have surfaces just the reverse of the foregoing—the former lenses magnify, the latter diminish; the former bring an image to a focus, the latter do not. A *meniscus lens*, whether it be simple or achromatic, has a rounded and a hollow side, one being convex and the other concave. The radius of the concave curve is greater than that of the convex; hence it is a magnifying glass. The majority of landscape and architectural lenses are composed of lenses of the meniscus form. When the radius of the concave curve is less than that of the convex it is designated a concavo-convex lens; it has a thick edge, and is a diminishing lens.

CARBON PRINTING.

WE regret that we have not received a full report of Mr. Beattie's remarks made at the meeting of the Bristol Photographic Society, so that we could have ascertained his reasons for coupling with Mr. Blair's name that of Mr. Pouncy as the introducer of a mode of carbon printing upon which "the methods now in use" depended for their origin more than upon any other.

Mr. Pouncy's process is quite as much sealed up and "fettered from general use" as the processes of other carbon inventors; for, although he considered it advisable not to complete his first patent, he has paid the £50 fee on his second, and it is, in consequence, still "fettered from general use" as much as those of the other patentees named by Mr. Beattie.

We certainly do not share the opinions expressed by Mr. Beattie, referred to above; because we cannot recognise the services conferred by Mr. Pouncy upon photography as bearing in any degree upon the processes of carbon printing practised at the present day. Take the case of the processes of Swan, Johnson, or Edwards, and we think that they scarcely share anything in common with those of Mr. Pouncy, a description of which we give in another page. They employ pigmented and bichromated gelatine. Mr. Pouncy's speciality consists in bitumen of Judæa associated with such fatty bodies as eventually constitute "printers' ink," the designation adopted by Mr. Pouncy himself.

It is not contended, we presume, that the most recent patent of this gentleman can in any way have had an influence upon carbon printing, for only a brief period has elapsed since it became accessible for public inspection.

We have long held it to be a sound and just principle that each inventor has a right to protect himself by patent, and on this score we have no fault whatever to find with Mr. Pouncy; but, in common justice to other carbon workers, we must take exception to the strong claim put forward on his behalf by his able advocate, Mr. Beattie.

PHOTOGRAPHING ON WOOD BLOCKS.

IN TWO PARTS.—PART I.

THE successful application of photography to the purposes of the wood engraver has been a long-felt desideratum which all previous efforts have failed to supply.* The ordinary mode of silver printing on the surface of the block is inadmissible for two potent reasons. In the first place the silver and other solutions materially injure the cohesion and closeness of fibre of the wood, rendering it rotten and totally unsuited for the delicate touches of the graver. Secondly, the picture, if taken direct from a negative, is in its natural position of right and left, instead of being reversed, as it ought to be.

I have tried the Wothlytype and collodio-chloride processes on wood blocks with some small success; but I never could induce engravers to take kindly to them, even in those cases where it was of no importance to have a reversed image. Both these photographic processes require a considerable thickness of collodion on the block in order to give sufficient density of image, and this collodion pellicle, when dry, I am told, often causes the graving tool to *slip*, more especially when cutting out the finer lines. Moreover, when the engraving is finished it is necessary to dissolve off the adhering collodion with ether and alcohol. This clearing up process often blocks up the fine lines, and renders a second retouching with the graving tools absolutely imperative.

I have succeeded better by rubbing on to the surface of the block finely-divided carbonate of silver, brushing off all loose particles with a camel's-hair brush, and printing for a long time under a negative. A little rinsing in warm water is all the fixing that is required, provided the block is to be engraved immediately. But here, with the best that can be done, the image is very feeble, showing only the outlines of the drawing. The skilled labour, therefore, of the draughtsman is still required to fill in details from another photographic print before the engraver can set to work. Moreover, the picture is in a reversed position for a wood block.

It struck me, some time ago, that the carbon process by a single transfer could be advantageously employed for such purposes. Accordingly I set to work, and, after a few preliminary attempts, have succeeded far beyond my expectations; in fact, I do not see how anything could be a more perfectly reliable guide to the engraver than the simple process which I am about to describe. Mr. C. L. Cockburn, of London, who kindly sent me blocks on which to experiment, has engraved several of them, and says that nothing could be more satisfactory. He is at present engaged in cutting out the illustrations for a new work on surgery, all these being laid down on the blocks from photographs taken from nature or life by myself. It is astonishing to notice with what precision and fidelity every detail of the *case* is reproduced in the engraving, and all this without a single touch from the draughtsman, who, indeed, could not possibly have made the drawing so perfect.

For the benefit of those photographers who may be inclined, or may find it to their advantage, to practice this new branch of photographic industry, I purpose giving full working details, by following which no one accustomed to the ordinary photographic manipulations should experience any great difficulty in commanding complete success.

1. *Preparation of the Pigmented Gelatine.*—It is much to be regretted, and to me a matter of surprise, that some one or more of our enterprising manufacturers of albumenised paper do not undertake commercially the preparation of gelatinised paper. They would assuredly find it to their advantage to do so, besides, at the

* We are not a little surprised at this statement, as we know there are several engravers in London who make a speciality of this branch of industry. We have seen many blocks with the subject photographed on them ready for the engraver. In 1865, we published a full page portrait of Herr Voigtlander, respecting which we said, at the time (Vol. XII., page 650):—"The portrait has been engraved from a photograph, by Angerer, in the possession of one of the Editors of this Journal. *It may be interesting to our readers to learn that it was re-photographed on the block ready for the engraver.*"—EDS.

same time, conferring a great boon on photographers; for we cannot go on everlastingly in the old worn-out rut of silver printing, and continue our wailings over faded photographs. No, no! let that disgrace be wiped from our art, and then professional photographers will assuredly find their lines falling in more pleasant places. There is no restriction on the manufacture of pigmented and gelatinised paper, and no valid patent connected therewith to prevent anyone from making it.

The preparation of the gelatine is an easy affair. I take four ounces of the finest Scotch or Russian glue, which I find answers very well, and is more to be relied on, as not containing alum, than the patent or other gelatines usually sold in the shops. The glue is broken into small fragments and soaked in cold water for, at least, twelve hours. The water is then poured off, and the glue dissolved in twenty-four fluid ounces of hot water to which has been added one ounce of sugar (or, preferably, treacle), a little kreosote (about a drachm) to keep the solution from moulding, and a sufficient quantity of lampblack, Indian ink, or other desirable pigments ground very fine.* Experiment alone will indicate how much and what proportions of the various pigments should be added to give the required tint. Keep the solution heated up to about 180° Fah., with constant stirring for ten minutes or more; then filter through two or three folds of fine muslin into the stock bottle for future use.

2. *Preparation of the Tissue.*—This is rather a more troublesome operation than the former one, but not more so than the albumenising of paper. If it be carried out on the jack-towel system, with a long web of paper revolving round rollers, and just touching the surface of the warm pigmented gelatine placed in a trough below, no difficulty whatever is experienced in giving the paper an even coating. But on a small scale I know no plan better than that described by Mr. Blair in his recent work on carbon printing. I may, however, premise that for the transfer process which I use for printing on blocks, the gelatine may be spread on almost any kind of paper, provided it be not repellent of water, and be sufficiently porous to allow the gelatine to take a good hold of the fibre. In my own practice I have been using up an old stock of very thick, plain Saxe paper, which was good for nothing else, but serves well for temporarily supporting the pigmented medium. I consider it very useful to take the precaution of pouring the warm gelatine from the stock bottle on to the paper through a plug of cotton wool placed loosely in the neck of a warmed funnel. This stops the grosser particles of pigment, gelatine, or of any other body. In all other respects I now strictly follow Mr. Blair's most lucid instructions, which he has kindly given me leave to reproduce:—

"The bottle with the pigmented gelatine is placed in a dish of warm water, and a jug of water of nearly the same temperature is also placed close at hand. The jug should have a convenient spout for pouring out the water in a gentle stream. Now take a slab of patent plate glass, a little larger than the paper to be gelatinised, and lay it on a table. Then take a sheet of the paper (which should previously have been steeping for a short time in water), and lay it on the slab in such a position that the right hand *off* corner will coincide with, or rather slightly overlap, the same corner of the glass. This is the corner that the gelatine is afterwards to be run off by, if necessary, into the bottle. Next lay two or three plies of dry blotting-paper above the wet paper, and rub in all directions, so as thoroughly to level the paper on the glass, and absorb all surface moisture. Now take a broad soft brush, dip it into the warm water jug, and bring it over the whole face of the sheet, leaving only a small margin of about a quarter of an inch all round untouched, drawing only the narrow edge of the brush across the margin at the off right-hand corner, so that any fluid can be easily run off at that part. The next operation is to lift the slab in one hand by the near left-hand corner; pour some warm water from the jug on the centre of the paper, tilt the glass, so that the water will flow over all the wet portion of the paper within the margin; flow it off at the off corner into the jug. If any air-bubbles have been started from the paper pour on a little more water; flow it off again, and then the glass may be suspended in the hand to drain for a few seconds. Next take the bottle with the pigmented gelatine, flow it on and off in the same manner as the water until you see that all air-bubbles that may have sprung out of the paper are carried away, and then flow it on in sufficient quantity to form the tissue; and as soon as it has spread over the paper, which can be assisted by the movement of the glass in the hand, lay it carefully and horizontally down on a large slab of plate glass which has been properly levelled beforehand on a stand, and answers for a sort of table. Of course, any level support will do; but I prefer a glass support, as one can place a light underneath and judge of the uniformity of the coating and its density. Other papers may follow and be treated in the same way till the glass table is full, by which time the first may probably be ready to be lifted from its glass plate and laid on a board to be pinned up to dry, and the rest may follow in their order. It is easy to know when the gelatine has set or consolidated by noticing the reflection of the light on its surface. It loses the extreme liquid appearance which it has at first, and becomes slightly irregular across the surface, and sometimes little dimples break out upon it from causes that I cannot well explain, unless it be the escape of air; but unless these dimples are of large size and go to a considerable depth, they don't show much afterwards on the pictures taken from it. It may be as well, however, not to use those parts in which these shallows are very marked or prominent.

"These sheets with a white margin all round are very convenient afterwards for handling, and should be made of about the size of the pictures afterwards to be taken, unless, of course, the pictures are to be very small, when it would be troublesome to make separate sheets of tissue on such a small scale.

"When cool and the gelatine sufficiently congealed the papers are lifted from the glass plates, as before stated, and laid on their backs on a large flat board—a drawing board, or old door or window shutter, or any such article, will do very well. They are then pinned to the board at their upper ends by two, three, or four pins, according to their weight, and the board is raised and leaned against a wall or other support at an angle of 70° or 80°, when the papers will drop forward and hang clear of the board, except where retained by the pins, and in this position, by obtaining free evaporation on both sides, they soon dry. If in course of drying the lower corners should show a tendency to curl up much, and there is danger of their coming in contact with any part of the gelatine surface before it is dry, narrow slips of wood or cork may be pinned across the lower ends to keep them stretched. When dry they should be kept in a book or blad to level them down and keep them even, so as to be ready at any time for floating on the bath. Should they show a tendency to curl up when about to be laid on the bath, and thus create a difficulty in laying them gently on the surface, a slight breathing on the gelatine will generally make it quite pliable."

I do not find the papers thus prepared liable to go wrong, if kept in a dry place. They may be stored away sheet over sheet, and a flat heavy board placed on the top to keep them from curling up. If they crack after a time, when dry, in all probability the film of gelatine was too thick, or possibly sufficient saccharine matter has not been dissolved in it to give the film the requisite pliancy. But an excess of sugar must be avoided.

3. *To Sensitise the Tissue.*—I plunge it into, in preference to floating it on, a strong solution of bichromate of potash. The solution I employ was made thus:—Having made a saturated solution of bichromate of potash in sixty ounces of distilled water, I added thereto thirty ounces of water, and filtered. This solution has been in use for more than a year, and is still as good as ever. Of course it is filtered each time before being used. The tissue is allowed to soak in it for not more than forty seconds in summer and sixty seconds in winter, removing bubbles in the meantime with a brush from the back of the paper. There is little danger of their forming on the pigmented side. If left in longer the paper is apt to get so rotten that it will be found almost impossible to hang it up to dry, and no advantage whatever is gained by a long soaking, except *perhaps* slightly-increased sensitiveness. If the sheets are of a moderate size—say about 12 × 10 inches—they may be hung up to dry by the two upper corners with two broad-pointed wooden clips; but if they are of a larger size, then the upper end should be turned over and pinned along a lath in various places. The lath is then suspended between parallel bars in the drying room. The sensitive tissue should not be used till quite dry; and it is most important to exclude it from white light, as it is many times more sensitive than silvered paper.

In hot weather, such as we had to endure last summer, the bichromate solution will sometimes get so warm as to dissolve off the gelatine from the paper in the course of sensitising, or to soften it, so that it slips off the paper when hung up to dry. The only remedies I know for this are either to wait for a cooler day or to place the sensitising dish for some time on a pan of broken ice.

The sensitised tissue will keep in good condition for two days, and probably for a longer time in winter.

George Dawson, M.A., Ph.D.

* I break down the Indian ink by first smashing a large stick into small fragments in a mortar, putting these into a bottle, and covering them to the depth of an inch or more with cold water. In this the ink is allowed to soak for some days, with occasional shaking up, and the bottle afterwards placed for some time in a pan of warm water. Sometimes the latter operation is not necessary. By these means the ink is reduced to a state of fine division in thick—almost viscid—solution, and may be added to the gelatine in any proportions that may be deemed desirable. Rubbing down the ink on a porcelain slab would be almost an interminable operation.—G. D.

Nitro-Gelatine Developer.—Mr. Stephen Thompson has shown us some very charming views taken in Venice and other continental cities, the negatives of which were developed by a solution containing nitro-gelatine.

EDWARDS'S CARBON PROCESS: A RECLAMATION.*

At the last meeting of the Society Mr. Edwards, of London, presented some carbon proofs transferred upon paper prepared with gelatine and alum, which he called "transfer matter." In the two preceding meetings I had made the same communication to the Society; and I have to thank M. Aimé Girard for having had the kindness to make that remark in my absence.

I have never heard any one speak, nor have I read in any journal, that this paper had been employed prior to the date of my communication; but in case it had been employed within six months, as Mr. Edwards stated, that would be long after the date of the patent I took out in October, 1863, for the employment of coagulated gelatine as a base for the carbon sensitive layer. I then coagulated the gelatine with bichromate and exposed. Some months later I coagulated with bichloride of mercury, after that with alum, and now I coagulate the gelatine with lactic acid.

I take advantage of this opportunity of explaining my new mode of operating:—

I dissolve one hundred grammes of gelatine in four hundred grammes of water, and when the gelatine is almost entirely dissolved I add to it six hundred grammes of milk. I stir it, and continue to dissolve by means of a hot-water bath. I then add thirty or forty grammes of sugar candy, in order to render the gelatine more glutinous. A very thin layer of this solution on the surface of a sheet of paper, cloth, or wood, &c., becomes sufficiently insoluble for the transfer of carbon proofs when it is dry—that is to say, on the next day. It suffices then to plunge it into cold water for a few seconds, or expose it to the vapours of a kettle of boiling water.

I therefore thank Mr. Edwards for his presentation, which has given me the opportunity of making this brief communication to the Society, and I thank him quite as much for the evidence he has given of the facility of obtaining, and at a low price, carbon proofs made by this process; but I could not rest under the suspicion of having appropriated an application in which I had been forestalled.

M. Despaquis.

South Kensington Museum.—The public are now admitted to see the prize works of the Schools of Art of the United Kingdom submitted in national competition. These works will be found to contain many designs for manufactures, which producers may consider it useful to consult. The works are exhibited in the galleries overlooking the Horticultural Gardens, for want of space in the South Kensington Museum itself.

Hemostatic Collodion.—Signor Carlo Pavesi has formulated a very useful collodion for dressing wounds. It consists of—

Officinal collodion	100 parts.
Phenic (carbolic) acid	10 ,,
Tannin	5 ,,
Benzoic acid	3 ,,

It instantly coagulates blood and white of egg. It is applied with a painting brush or on linen bandages.

The Multum-in-Parvo Camera.—In our notice of Mr. Lane's camera, in last week's number, we omitted to describe the tripod stand. This is so excellently constructed to secure rigidity and firmness that we deem it necessary specially to refer to it. It is constructed upon the principle of those used with surveying instruments, having three legs, which are four feet long and one and a-half inch when folded. On the top of these is screwed a conical brass tube, one foot in length, which makes the height of the stand, when in use, five feet. When the legs are folded, the tube is slipped on at the bottom and secures them closely together, Mr. Lane also makes them on the same principle, except that the legs are four feet six inches long and the tube only six inches. This stand can be used either with or without the tube, and is sufficiently strong and rigid for a whole-plate camera, for which several have been used.

Greek Cowardice and the Magic Lantern.—We extract the following anecdote from the *Life of Thomas, Lord Cochrane, Tenth Earl of Dundonald, G.C.B.*, just published:—"An amusing instance of the worthlessness of the Greek sailors, whom, from first to last, he tried to make useful, may here be given. On one occasion, following his invariable habit of taking every possible occasion of trying to win the confidence and friendship of those underhim, he was exhibiting a magic lantern to the crew of the Hellas. At many of the dissolving views they manifested a childish delight, but at length one unfortunate picture was brought before them. It depicted a Greek running from the pursuit of a Turk, and then melted into a view of the Turk cutting off his captive's head. At that sight every Greek on board took fright. Some ran into the hold of the ship, others jumped overboard, and many hours had to be spent in bringing them together again and dispelling their frivolous and superstitious fears."

* Read at a meeting of the Photographic Society of France, June 4 1869.

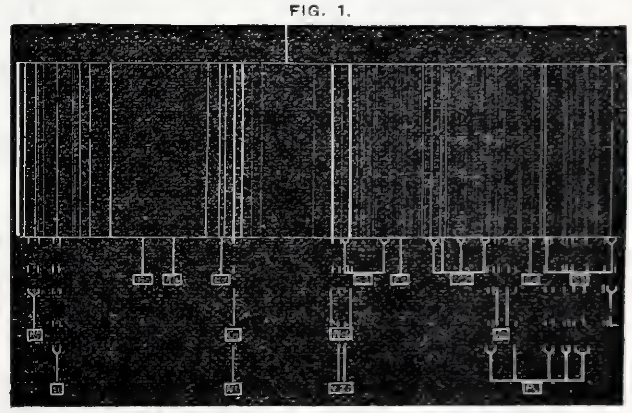
DISCOVERIES IN SOLAR PHYSICS.*

Mr. J. Norman Lockyer, F.R.S., gave, on the 28th May, at the Royal Institution, one of the best Friday evening lectures of the session, in the presence of a large audience. The subject of the lecture was *Recent Discoveries in Solar Physics Made by Means of the Spectroscope.*

Mr. Lockyer began by saying that in 1865 a discussion arose as to the nature of the spots on the sun, Messrs. Balfour Stewart, De la Rue, and Loewy expressing the opinion that the spots were probably caused by the downrush of a comparatively cool absorbing atmosphere, whilst M. Faye, and other leading French philosophers, held that a sun-spot was a hole in the photosphere. To settle this question the lecturer, on March 4th, 1866, attached a spectroscope to his telescope, and examined the feeble light from the sun-spot therewith. He then saw abundant evidence of absorption, but not the bright lines which would be given by radiation, thereby ascertaining that the English idea was the right one.

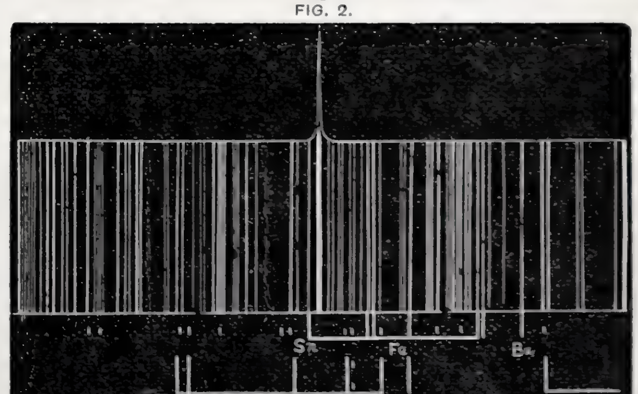
The successful results of this application of the spectroscope led to the question whether the instrument would not answer other questions relating to the sun. It was thought to be highly probable that the red prominences seen during total eclipses were huge mountains of flaming gas. From 1866 till last year, while astronomers in India were viewing the red prominences with any eclipse, Mr. Lockyer tried to see them in England without an eclipse, and he at last succeeded by means of a spectroscope giving very great dispersion, by the interposition of a very large number of prisms. The continuous spectrum given by the light near the limb of the sun was thus spread out till it became very feeble; but, as gases give a spectrum of bright lines, the light from the prominences was very slightly enfeebled. In this way the difficulty of getting rid of the overpowering light near the limb of the sun, without losing the light from the prominences, was overcome. It became known that Dr. Janssen had made the same discovery in India at the same time that Mr. Lockyer solved the problem in England, as already described in these columns.

FIG. 1.



When examining the prominences in this way two of the known bright lines of hydrogen, C and F, are seen without difficulty. A third line of hydrogen can only be seen in the spectra of the prominences when the weather is unusually fine, and then but faintly. A brilliant yellow line is also seen, corresponding with no dark line in the solar spectrum. The position of this line is shown in *fig.* 1, and its origin is at present a mystery; but Professor Frankland and Mr. Lockyer are trying to find out the cause of its presence. Two hydrogen lines in the violet are also visible by this method of examination. In looking through the instrument at the limb of the sun and the adjacent solar atmosphere two spectra are seen—the one the solar spectrum, the other consisting of bright lines from the gaseous prominences. The higher the prominences, of course, the longer are the bright lines.

FIG. 2.



* We are indebted to the *Engineer* for this article, and have also to acknowledge the kindness of the publisher of that excellent periodical for the use of the wood engravings by which it is illustrated.—Eds.

Soon after Mr. Lockyer received his perfected apparatus from Mr. Browning, the optician, he discovered that all round the sun, outside the photosphere, there is a sea of flaming gas, principally hydrogen, about 5,000 miles high. The prominences are merely waves or storms of this sea. This gaseous atmosphere has since received the name of the "chromosphere."

The next fact discovered was that the F line of hydrogen took the form of an arrow head, the Fraunhofer line of the continuous spectrum forming the shaft of the arrow. It was broad close to the sun's edge, and tapered off to a fine point. This appearance, which was not seen in the other lines, is shown in *fig.* 2. After a great many experiments, the conditions of which Mr. Lockyer did not describe in his lecture, he and Dr. Frankland came to the conclusion that this widening out of the F line is due to pressure, so that the thickening of the line is a measure of pressure of the atmosphere of the sun at different elevations.

Having determined that the phenomena presented by the F line were phenomena depending upon and indicating varying pressures, they were in a position to determine the atmospheric pressure operating in a prominence, in which the red and green lines are nearly of equal width, and in the chromosphere, through which the green line gradually expands as the sun is approached. With regard to the higher prominences, they had ample evidence that the gaseous medium of which they are composed exists in a condition of excessive tenuity, and that at the lower surface of the chromosphere itself the pressure is very far below the pressure of the earth's atmosphere. The bulbous appearance of the F line observed at times may be taken to indicate violent convection currents or local generations of heat, the condition of the chromosphere being doubtless one of the most intense action.

FIG. 3

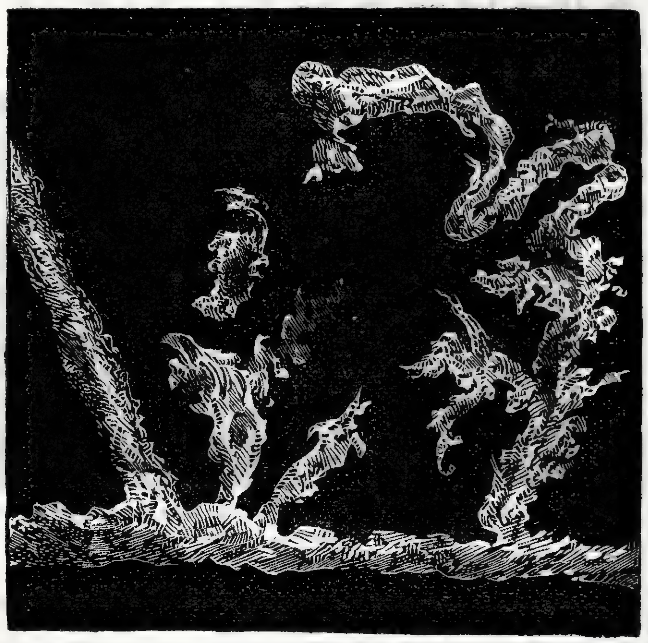
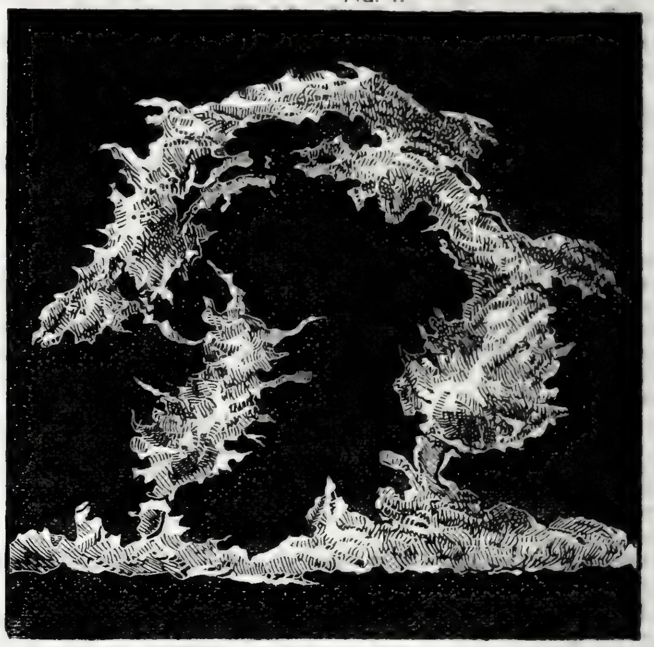


FIG. 4.



A STORM ON THE SUN.

The atmosphere of the upper parts of the prominences being of such extreme tenuity, it is improbable that the sun has much atmosphere above their summits. In such case the "corona" seen during total eclipses is not due to the atmosphere of the sun. The "cool absorbing atmosphere," believed to cause spots on the sun, has thus very little height.

As a rule the chromosphere rests "conformably," as geologists say, on the photosphere, but the atmosphere is tremendously riddled by convection currents, and where these are most powerfully at work the upper layers of the photosphere are injected into the chromosphere. Thus the lines due to the vapours of sodium, magnesium, barium, and iron may sometimes be seen in the spectrum of the chromosphere, appearing there as short and very thin lines, generally much thinner than the black lines due to their absorption in the solar spectrum.

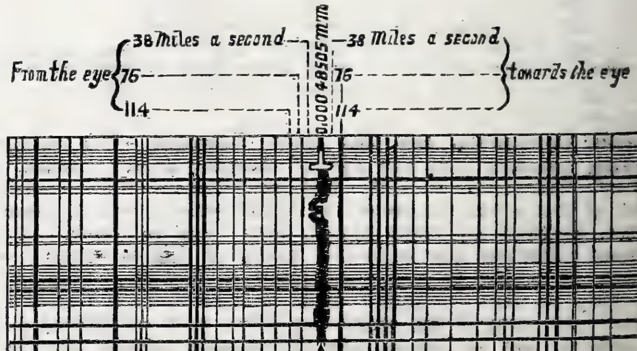
Mr. Lockyer said that "hearing from Mr. De la Rue, on February 27th, 1869, that Mr. Huggins had succeeded in anticipating me by using absorbing media and a wide slit (the description forwarded to me is short and vague), it immediately struck me, as possibly it has struck Mr. Huggins, that the wide slit is quite sufficient without any absorptive media; and during the last few days I have been perfectly enchanted by the sight which my spectroscope has revealed to me. The solar atmospheric spectra being hidden, and the image of the wide slit alone being visible, the telescope or slit is moved slowly, and the strange shadow-forms flit past. Here one is reminded by the fleecy, infinitely delicate cloud-films, of an English hedgerow with luxuriant elms; there of a densely intertwined tropical forest, the intimately interwoven branches threading in all directions, the prominences generally expanding as they mount upwards, and changing slowly, indeed almost imperceptibly. By this method the smallest details of the prominences and of the chromosphere itself are rendered perfectly visible and easy of observation.

"With regard to seeing the prominences, I find that, when the sky is free from haze, the views I obtain of them are so perfect that I have not thought it worth while to remount the oscillating slit. I am, however, collecting red and green and violet glass, of the required absorptions, to construct a rapidly-revolving wheel, in which the percentages of light of each colour may be regulated. In this way I think it possible that we may in time be able to see the prominences as they really are seen in an eclipse, with the additional advantage that we shall be able to see the sun at the same time, and test the connection or otherwise between the prominences and the surface phenomena.

"Although I find it generally best for sketching purposes to have the open slit in a radial direction, I have lately placed it at a tangent to the limb, in order to study the general outline of the chromosphere, which in a previous communication I stated to be pretty uniform, while M. Janssen has characterised it as '*à niveau fort inégal et tournamenté.*' My opinion is now that perhaps the mean of these two descriptions is, as usual, nearer the truth, unless the surface changes its character to a large extent from time to time. I find, too, that in different parts the outline varies. Here it is undulating and billowy; there it is ragged to a degree, flames as it were darting out of the general surface, and forming a ragged, fleecy, interwoven outline, which in places is nearly even for some distance, and, like the billowy surface, becomes excessively uneven in the neighbourhood of a prominence.

"According to my present limited experience of these exquisitely beautiful solar appendages, it is generally possible to see the whole of their structure; but sometimes they are of such dimensions along the line of sight that they appear to be much denser than usual; and as there is no longer, under these circumstances, any background to the central portion, only the details of the margins can be observed in addition to the varying brightnesses.

FIG. 5.

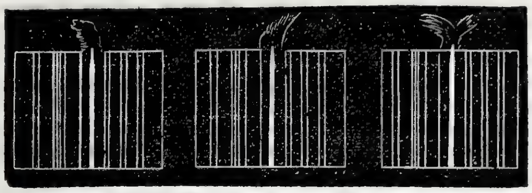


"Moreover, it does not at all follow that the largest prominences are those in which the intensest action, or the most rapid change is going on—the action, as visible to us, being generally confined to the regions just in, or above, the chromosphere, the changes arising from violent uprush or rapid dissipation, the uprush and dissipation representing the birth and death of a prominence. As a rule, the attachment to the

chromosphere is narrow and is not often single; higher up the stems, so to speak, intertwine, and the prominence expands and soars upward until it is lost in delicate filaments, which are carried away in floating masses.

"Since last October, up to the time of trying the method of using the open slit, I had obtained evidence of considerable changes in the prominences from day to day. With the open slit it is at once evident that changes on the small scale are continually going on; it was only on the 14th March, 1869, that I observed any change at all comparable in magnitude and rapidity to those already observed by M. Janssen.

FIG. 6.



"About 9h. 45m. on that day, with a tangential slit, I observed a fine dense prominence near the sun's equator, on the eastern limb. I tried to sketch it with the slit in this direction; but its border was so full of detail, and the atmospheric conditions were so unfavourable, that I gave up the attempt in despair. I turned the instrument round 90° and narrowed the slit, and my attention was at once taken by the F line; a single look at it taught me that an injection into the chromospere and intense action were taking place. These phenomena I will refer to subsequently.

"At 10h. 50m., when the action was slackening, I opened the slit; I saw at once that the dense appearance had all disappeared, and cloud-like filaments had taken its place. The first sketch, *fig.* 3, embracing an irregular prominence with a long perfectly straight one, which I called A, was finished at 11h. 5m., the height of the prominence being 1′ 5″, or about 27,000 miles. I left the observatory for a few minutes, and on returning, at 11h. 15m., I was astonished to find that part of the prominence A had entirely disappeared; not even the slightest rack appeared in its place. Whether it was entirely dissipated, or whether parts of it had been wafted towards the other part, I do not know, although I think the latter explanation the more probable one, as the other part had increased, as shown in *fig.* 4."

Mr. Lockyer then projected the photograph of a sun-spot spectrum upon the screen, as shown in *fig.* 5. The black band running across the ordinary spectrum indicates the general absorption which takes place in a sun-spot. Owing to selective absorption, it will be noticed that the Fraunhofer lines widen as they cross a spot. They put on a sudden blackness and width in the case of a spot with steep sides, but expand gradually in a shelving one. In all our cuts except *fig.* 5, we have engraved the spectrum lines white on a black ground, instead of black on a white ground, for the sake of clearness, thus reversing their natural appearance.

The lecturer then proved that the thickening of the absorption lines can, as discovered by Dr. Frankland and himself, be produced in the laboratory by experiment. He accordingly cast a spectrum upon the screen, and in front of the slit of the electric lamp he interposed in the path of the rays a sealed test tube filled with hydrogen gas, with a lump of sodium at the bottom. The heat of a Bunsen's flame was then applied to the outside of the tube, so as to raise the sodium to the state of vapour. This vapour was, of course, densest at the bottom of the tube, and more attenuated at the top. It caused a dark absorption line to appear in the yellow of the continuous spectrum upon the screen—which line was thickest where the densest sodium vapour was interposed, but very thin where the rays had passed through the upper part of the tube. There is some danger of bursting the tube in this experiment, and it is necessary to use hydrogen, because oxygen would cause the formation of opaque white oxide of sodium.

Suppose a hydrogen flame to suddenly project from the sun in the direction of the earth, the waves of light will be shortened, and the hydrogen lines of the spectrum be shifted nearer the violet. If the flame travels from the earth, the waves will be lengthened, and the lines shifted nearer to the red end of the spectrum. If the waves are shortened only the ten-millionth of a millimetre the motion can be detected.

The line F undergoes strange contortions when seen near the centre of the sun's disc. It is seen, in fact, stopping short of one of the small spots; swelling out prior to disappearance; invisible in a facula between two small spots; changed into a bright line, and widened out two or three times in the very small spots; becoming bright near a spot and expanding over it on both sides; and so on. The Fraunhofer lines may therefore be looked upon as so many milestones, telling the rapidity of the uprush and downrush. Thanks to Angström's map of the wave-length of the different parts of the spectrum, it is known that the shifting of the F line a ten-millionth part of a millimetre nearer the violet means a velocity of uprush towards the eye of thirty-eight miles per second. The observed alteration of wave-length is such that twenty miles a second is very common.

Towards the close of his very interesting lecture, Mr. Lockyer showed the accompanying diagram (*fig.* 6) of a cyclone on the sun, observed by him on March 14th last. Although the slit used in his spectroscope is only about $\frac{1}{500}$ inch in breadth, yet as the image of the sun thrown by the object glass is only ·94 inch in diameter, the slit lets in to be analysed a strip of the sun's surface about 1800 miles wide. Therefore, when a cyclone of incandescent hydrogen some 15,000 miles wide is tearing along with a rapid rotatory motion, it is clear that all this cyclone falls within the slit. The spectroscope then separates the approaching from the receding waves, and there is an alteration of wave-length both towards the red and violet, showing a motion of something like forty miles per second.

Another curious discovery made by Mr. Lockyer is that it is now almost impossible to observe the sun for an hour without seeing the hydrogen lines every now and then bright upon the sun itself. It would appear that strongly luminous hydrogen is carried up by the tremendous convection currents at different pressures, and under these circumstances the bright line is seen to be expanded on both sides of its normal position.

Upon one occasion Mr. Lockyer's observations were confirmed by a photograph of the sun taken at Kew Observatory, and the fact was thus described by the lecturer:—"By the kindness of Dr. Balfour Stewart I am able to exhibit to you some of the Kew sun-pictures which show you how these spectroscopic changes are sometimes connected with telescopic ones. On the 21st April there was a spot very near the limb, which I was enabled to observe continuously for some time. At 7.30 a.m. there was a prominence visible in the field of view, in which tremendous action was evidently going on, for the C, D, and F lines were magnificently bright in the ordinary spectrum itself, and as the spot-spectrum was also visible it was seen that the prominence was in advance of the spot. The injection into the chromosphere surpassed anything I had seen before, for there was a magnesium cloud quite separated from the limb, and high up in the prominence itself. By 8.30 the action had quieted down, but at 9.30 another throb was observed, and the new prominence was moving away with tremendous velocity. While this was going on the hydrogen lines suddenly became bright on the other side (the earth's side) of the spot, and widened out considerably—indeed to such an extent that I attributed their action to a cyclone, although, as you know, this was a doubtful case. Now, what said the photographic record? The sun was photographed at 10h. 55m. a.m., and I hope you will be able to see on the screen how the sun's surface was disturbed near the spot. A subsequent photograph at 4h. 1m. p.m. on the same day shows the limb to be actually broken in that particular place; the photosphere seems to have been absolutely torn away behind the spot, exactly when the spectroscope had afforded me possible evidence of a cyclone."

MR. POUNCY'S NEW PROCESS.

As the name and processes of this gentleman appear in the present number in connection with the influence they have exercised upon the present state of carbon printing, we think it better to preface the publication of his latest patent with a brief summary of those previously taken out by him.

Mr. Pouncey's first patent is dated April 10, 1858, and is entitled "Improvements in the Production of Photographic Pictures." Paper was coated with a composition of vegetable carbon, gum arabic, and bichromate of potash; and on this surface the negative was placed and exposed to light, by which certain parts were rendered insoluble, and of which parts the finished pictures consisted—the other, or soluble portions, having been removed by water. Bitumen, or other colouring matter, could be substituted for the vegetable carbon. This patent received provisional protection only.

His second patent, dated Jan. 29, 1863, is entitled "Improvements in Obtaining, Transferring, and Printing from Photographic Pictures or Images, also in Preparing Materials for the same," and consists in the employment of a sensitive ink consisting of "fat, tallow, or oil, bichromate of potash or bitumen of Judæa, or both of such last-mentioned substances, and benzole, turpentine, or other hydrocarbon or analogous solvent." The surfaces used for the reception of the pictures "may be paper, silk, linen, cotton, or mixed fabrics, leather, wood, ivory, glass, porcelain, stone, metal, or metallic alloys." To print a positive from a negative, the latter is placed on the uncoated surface of a transparent material coated with the above sensitive mixture. The parts not acted on by light remaining soluble, are dissolved off with benzole or other solvent; the picture, therefore, remains in printers' ink, or something nearly akin to it. This patent is still in force.

His last patent is dated Dec. 17, 1868, and is now open to the inspection of the public. It is entitled "Improvements in the Production of Plain or Coloured Photographic or other Pictures," and is described as follows:—

The first object of my invention is to produce a picture on the reverse or obverse side, before transferring the same to canvas or to the surface of any other material where it is to permanently remain.

The second object of my said invention is to produce a picture in any transparent substance, or in a substance rendered transparent for the purpose of producing such picture, such substance to be afterwards restored to its original character as to opacity, which can be effected by treating such substances as paper in a solution as hereafter described, and afterwards washing out the solution, as also hereafter described, whereby a picture can be produced capable of permanent existence as an incorporation with the texture of the material in which the picture is so produced as aforesaid.

Further: when and where desirable, the picture produced may, however, be transferred to any other material, whether transparent or opaque, both before and after development; that is to say, as to the first object of my invention, I produce a photographic or other picture by any available means, in any colouring matter, being carbon or pigments, or other material, mixed and prepared in oil, spirit, or water, or in any similar solution, and made sensitive according to any of the known methods (as well as those described in the provisional specification of my application for letters patent No. 780, A.D. 1858, and the specification of my patent No. 267, A.D. 1863). The colours required are laid on over the surface of the several parts of the photographic or other picture, on the reverse or obverse side, before transferring the same to canvas or to the surface of any other material, thus saving much time and labour in colouring and preserving the whole of the detail of the photographic or other picture, which has hitherto been partially obliterated by the application of colours in the manner heretofore adopted.

As to the second object of my said invention, monochrome pictures not required to be transferred are to be printed on a transparent material—paper, glass, silk, or other surface—and if intended to be finished on the same material, the medium of making the said material transparent is to be applied after the colouring matter, and removed by means in accordance with the nature of that material, and so that the picture may finally appear on the said material in its original purity. Hence the picture is in the fibre of and becomes part of the paper or fabric on which it is produced, which hitherto has not been accomplished.

Pictures may, when required, be obtained on transparent or opaque material directly on to the transparent or opaque surface, or transferred to the same, and there left impressed on the same, or be transferred, if required. Thus, by means of my invention, I produce photographs in carbon or pigments, either in oil, spirit, or water, or similar solution, preserving and restoring the original condition of the material on which such pictures are produced; and I colour photographs or other pictures so produced in oil, spirit, or water-colour pigments, before or after transferring the same.

In order that my invention may be fully understood, I will now state the details of the method of procedure I prefer to adopt, although I do not limit myself exactly to such details.

The course I adopt is to first apply the required monochrome colour all over the surface of the material on which the picture is to be produced, and the negative is then to be applied to the prepared or non-prepared surface, when the light hardens the colouring matter, the parts not acted upon by light remaining soluble, and are to be dissolved off either by spirit or water, or both, according to the nature of the preparation of the paper or surface on which the picture is produced.

The solution to be adopted for giving transparency to the paper or other material used consists of oil or matter, such as oils, wax, and glycerine, turpentine, naphtha, paraffine, and benzole, or anything of like nature, it not being necessary always to use all these ingredients.

The means for restoring the opacity of the paper and fully developing the picture is by boiled water, and by finally finishing it by immersing the same in turpentine, naphtha, or benzole, or any other solvent for greasy or oleaginous matters.

Having now particularly ascertained and described the nature of my said invention, I hereby declare that I claim the "Improvements in the Production of Plain or Coloured Photographic or other Pictures," consisting in the methods of production described, and the preparation and application of the various materials required for such production of such the above-mentioned oil-colour or water-colour pigment pictures.

"TAKE THE ADDRESS."

THIS is the title of a pamphlet which we have received from Messrs. J. Gostick & Co. (Limited), and in which we find some maxims applicable to matters of everyday life worthy of Benjamin Franklin. But as each person in this advanced age thinks himself nearly as wise as Franklin, we shall omit a detailed mention of these (merely premising that they indicate the possession of good common sense and shrewdness on the part of the writer), and cull from the compendium an item of photographic interest. The company above named have, it appears, purchased from Mr. Pouncy his patent for printing photographs in pigments, and the intimation of the fact is thus conveyed, the eulogistic language being, if we remember aright, that employed in connection with Mr. Pouncy's carbon process three years ago:—

"We have to announce to the world the greatest discovery of modern times, which has been talked over for months, and learned papers have described it, but in only the photographic world is there any knowledge of this event. Mr. John Pouncy, of Dorchester, a house painter and decorator, has discovered that photographs may be made in printing-ink, in oil-colours, and in any pigments, on canvas, stone, wood, paper, or any other material; and he has made other improvements in photography. As he was unable to work his patents so as to supply the world with the advantages of his useful discovery, he has sold his patents for a large sum of money, and for a further *annual* payment his abilities will remain with the patents, and as long as they are worked his descendants will have an annuity from the proprietors.

"Every family in the world is interested in this new step in science. It starts into existence an extension of photography to all arts, sciences, trades, professions, academies, and public works. A correspondence is now going on throughout Great Britain and foreign countries to form an association of artists, photographers, manufacturers, and shopkeepers for working this new system of photography in all countries throughout the world. Success is already secured, for a principle of 'hand-in-hand' trading is adopted, so as to have harmony in business and encouragement to all faithfully devoted to the new work—the alliance of photography with every manufactory, shop, and warehouse in the world. On walls, ceilings of rooms, panels for doors and drawing-rooms, and in a thousand other ways the best subjects of our best painters and photographers can be *printed* without the loss of any shadow or subject, and in any paint, ink, or pigment required."

In connection with our notice, last week, of the memorandum of association of J. Gostick & Co., Mr. Gostick writes to call our attention, among other things, to an arithmetical error when alluding to the directorate of the new company—our notice, according to him, establishing the somewhat novel fact that three and five make "six." We advise Mr. Gostick to re-read the notice, when his knowledge of arithmetic and of the English language will aid him in perceiving the correctness of the paragraph. In explanation of the reason why, as stated in our last, the subscribers signed for only one share each, why they have only two directors, and why they use photography, he says:—

"The cause of failures in limited liability companies is because generally no one is incited to practise economy and industry, for all chiefs of departments have large incomes guaranteed—incomes to be paid before shareholders are paid! Not long ago a photographic company was started with many directors, for whom a bargain was made in the articles of the association that they were to be paid 'not exceeding *three thousand pounds* per annum,' and another bargain secured the manager *fifteen hundred pounds* per annum! That company spent ten thousand pounds, and the creditors are expecting little more than five shillings in the pound! The company is dead. Had it started under good management, and with healthy 'articles,' it would have been successful.

"With a wreck in view we, as common-sense men, learnt useful lessons, and we began our company cautiously. *Seven* persons must sign the memorandum of association as petitioners for incorporation according to law, and it does not matter at all what number of shares they sign for, because there is no *limit* to their liability; they are responsible for every debt contracted before registration. In the case of 'J. Gostick & Co., Limited,' three hundred pounds were expended before we had our certificate of incorporation, and we have now no debts, only a few pounds in current accounts. The one share each was only a nominal proceeding according to law. The petitioners were not asked to sign for more than *one* share each, and they were only used to assist in a friendly manner our beginning as a company. Not one of our subscribers is with us as a *worker*—they are allied to us only by '*one share each*,' and all the rest of our capital will be found by working shareholders.

"The great error in the notice to which I am replying is the insinuation that we were using photography in more varied ways than with the writer's tobacco, confectionery, and toys! We use photography in accountancy; we cannot do without it as auctioneers; in valuations we meet with things we know nothing about, and photography, called to our aid, catches a picture of the object, gets into a post-office, speaks next morning to a judge hundreds of miles away, and returns with the information wanted by the returning post, and in general business it is handy and profitable. Photography has been too long confined to portraiture and landscapes. It is destined to higher work—to more useful services; and the time will come when houses and cottages will be finished by Pouncy's mural photographic oil paintings.

"Pardon my intrusion, and excuse my tedious remarks.—I am, yours, &c.,

"*July* 5, 1869." "J. GOSTICK.

Meetings of Societies.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THIS society held its fourteenth meeting for the season on the evening of Wednesday, the 30th ult.,—Mr. G. Slight, V.P., in the chair.

The minutes having been read and approved of,

The SECRETARY stated that the present being the first of the summer meetings, which were intended mainly for conversational purposes, making arrangements for outdoor trips, &c., papers were not expected to be read, and hence there was no paper provided for that evening, nor would there be for the next three or four meetings. Those would be held at monthly instead of fortnightly intervals; but should there be any matter of importance requiring a paper, or an evening for its discussion, it would be arranged for.

Mr. LOTHIAN then, as agreed on, stated the results of various experiments he had been making with the new printing process of Mr. W. H. Davies, and exhibited specimens on prepared painters' canvas and on crayon papers. He also stated that he had been trying the developing of enlarged prints, but as the experiments had only taken place that afternoon he had not had time to test more than the possibility of the thing. His examples had been over-exposed, and therefore useless; but they had been sufficiently successful to show that the development of enlarged prints could be accomplished.

Mr. DALLAS stated that he had been making a few experiments with the material for solar camera work. The gum used was mastic, as mentioned by one of the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY. One of the results he had brought was promising, being very round and full of half-tone. He had no doubt the process would be found very useful for the purpose, but he had, as yet, found the development very slow. A larger experience, he thought, would, however, correct that.

Mr. Davies exhibited a life-sized portrait printed on painters' canvas, and several others which, he stated, he had tried on the suggestion made at the previous meeting by Mr. Tunny. He had found the process to

be easy to work, certain, and simple in the extreme, and, as they saw, very perfect.

In reply to a member,

Mr. Lothian said that he found the process of printing on canvas with the lac emulsion to be much simpler and very much more certain than by the process described by him some time ago before the Society. The method was simply as follows :—Wash the canvas with a weak solution of spirits of wine, and, as Mr. Davies described, rub over the canvas with a piece of cotton cloth wetted merely with the emulsion ; when dry, silver and print. The prints then needed only washing (to remove the free silver) and fixing, and, as they could see, there was no need for toning, as the colour of the silver was very similar to that produced by gold toning. Some of the other examples, they would notice, were repetitions of Mr. Davies's experiments with ammonia-nitrate and without toning, on paper of various kinds.

Mr. Tunny, in a few pertinent remarks (occasioned by a question as to the size of negative Mr. Davies had used in producing the life-sized bust before them, the canvas being 30 × 25 inches), endeavoured to show that there was little need for more than the head and shoulders being printed, and that practically a smaller-sized glass would have suited the purpose, as the artist only needed the likeness of the face; the rest was easy work. In this connection he (Mr. Tunny) stated that, the very next day after the Secretary had mentioned the mode of introducing an ivory head into a Bristol board for ivory painting, an artist had called on him, showing a picture done by that very method.

Mr. Dallas observed that it was a method that had long been practised by many of the early miniature painters. He had seen it many years ago.

Mr. Ross said that the examples of canvas printing before them that evening were certainly trying his faith in paper as the best medium for oil work, more especially as artists seemed to like prepared canvas. The texture of the canvas had been alluded to, but he was sure paper could be got of any texture; and among the examples brought by Mr. Davies was one on oil painters' sketching paper, which was very excellent. However, for bold, vigorous work nothing could exceed those on the twilled and Roman canvasses. The Society, he thought, could not but congratulate itself that it had been the means of simplifying the processes in that direction, which was *the* direction in which the public taste seemed to be tending.

After a few words from several other members, the subject of the first trip of the season was discussed, and it was arranged that it should take place to-morrow (Saturday), the 10th inst. The locality fixed on for the excursion was Cramond.

The meeting was shortly afterwards adjourned.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Society was held on Tuesday, the 29th ult., at the Free Public Library, William Brown-street,—the President, Mr. O. R. Green, occupying the chair.

The minutes of the former meeting having been passed, a general account was given of the two excursions that had been made during the month—the first to Hartford on the 9th, and the second to the Valley of the Weaver on the 24th ult.

Prints were exhibited as the results of these trips, but it seemed to be the general opinion that the first-named place did not offer any special inducements to photographers. The latter, however, not only afforded members a most agreeable holiday, but left much scope for future work in the same neighbourhood.

It was resolved, on the motion of the Rev. G. J. Banner, seconded by Mr. Wilson, that in future the Council should have the power of selecting the best photographs for the album, as a record of the excursions.

Mr. Frederick Pooley was elected a member of the Association.

A hearty vote of thanks was passed to Mr. Thomas Higgin for his kindness in providing a steamer for the Weaver excursion, and for his hospitality and attention on that occasion. The day had been a most enjoyable one in every respect, and a large number of photographs were taken, many of which possessed much merit.

Prints or negatives were exhibited by the following gentlemen, the results of the recent trips:—Rev. G. J. Banner, and Messrs. O. R. Green, Gough, Murray, and Guyton. Also views (10 × 12) of Gresford, and some taken in Derbyshire, by Mr. John Henderson; some taken in Welshpool by Mr. Guyton; and several transparencies by Mr. Roberts, comprising various subjects.

Mr. Roberts stated that he had used essence of coffee as the preservative for the plates in the proportion of two drachms of essence to two ounces of water, and this quantity he had found ample for two or three dozen stereos.

The pictures were much praised by the members, being clear, full of half-tone, and forming excellent specimens of printing on glass.

There was also exhibited a large instantaneous photograph (14 × 9), taken by Messrs. Robinson and Cherrill—a sea view, and which admirably depicted a flock of seagulls—which was greatly admired; an instantaneous photograph of such a size, with birds on the wing, never having been previously shown.

It was decided to have two excursions in July—one on the 7th to Chirk, Denbighshire; the other to Miller's Dale, Derbyshire, on the 21st.

Mr. Guyton drew the attention of the members to the parchmentising of paper to produce permanence in prints, and read from the *News* the formula as given by Mr. Crookes, which caused some discussion.

The meeting was shortly after adjourned.

BRISTOL PHOTOGRAPHIC SOCIETY.

On Thursday, the 24th ult., this Society met at the Philosophical Institution, Bristol,—Mr. Ennel in the chair.

The minutes of the last meeting having been read and confirmed, Mr. Guttenberg was elected a member of the committee in place of Mr. Bark, resigned, and Mr. Husbands was elected Treasurer. Mr. W. H. Warner, of Ross, was also elected a member.

It was resolved that assistants of all classes should be admitted as members at half the regular subscription; and also that an excursion should take place at the end of August. It was left to Mr. John Beattie to arrange the details connected with the excursion.

Mr. Beattie then gave a succinct description of the latest methods of photographic printing, with especial reference to carbon printing. After a short description of a simple method of making pictures on dead opal surfaces, he exhibited some samples as remarkable illustrations of the plan lately proposed by Mr. Davies. The pictures were completely on the surface of the coarsest drawing-paper. One, a Sarony mount, exhibited by Mr. Davies, had the hatchings below undisturbed. After a short statement of how patents were sometimes wrongly claimed and obtained, how patentees succeeded in protecting such through the action of the law, and how the public good suffered thereby, he (Mr. Beattie) offered five pounds as a subscription towards a fund which might be raised for the purpose of testing unjust patents. He then exhibited samples of carbon prints in oil pigments, on canvas and paper, by Mr. Pouncy. Then some specimens were shown on paper, which were all that could be desired in half-tone and purity of high-lights. They were printed from an inverted negative, without transfer, by Mr. Pouncy. The method of producing these is to prepare or coat the paper with the usual prepared pigment; the paper is then rendered transparent by a volatile oil, which, after printing and development, returns to its original opacity and whiteness. Mr. Beattie then exhibited most interesting experimental specimens by Mr. Blair, of Perth. They were prints on paper by single transfer, and some without any transfer at all; some with three or more layers of pigment, and some on cloth. A portion of these were exceedingly good, while others were evidently in a condition of improvement. The methods of production are so simple and so ingeniously described in Mr. Blair's pamphlet that those interested were referred to it. He (Mr. Beattie) stated that he had avoided as much as possible questions of little utility connected with the history of carbon printing; but, after carefully reading almost all that had been published on the subject, he came to the conclusion that the methods now in use in England depended for their origin more upon Mr. Pouncy and Mr. Blair than upon any other person. He had scarcely referred to the methods claimed by Swan, Johnson, and Edwards, because they were complex, and were fettered from general use.

Mr. Gillo, of Bridgewater, exhibited some most beautiful samples of enlargements in common collodion, enlarged from card-size negatives through the lens to about whole-plate size, whitened a little with bichloride of mercury, and toned with weak hypo. These, when dry, were transferred to paper in the following manner :—A sheet of thin Rive paper is brushed over with dissolved gelatine, and, when still moist, it is laid down nicely on the dry collodion transparency. It is then set aside to dry, when, as it dries, it will leave the glass. It may then be cut and mounted. Too much could not be said for the soft, pure, delicate effect of the pictures shown by Mr. Gillo. The same gentleman exhibited a series of card portraits on Obernetter's paper, which were contrasted to their great advantage with prints made in the usual way.

A conversation on various subjects then took place.

Mr. Ennel promised a paper for the commencement of the next session, on *Glass Houses and Lighting*.

After the usual votes of thanks the meeting separated.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A meeting of this Society was held on the 4th ult.,—M. Balard in the chair.

A letter was received from M. Luc Fossari on the presentation of his pamphlet on photographic enamels. This process he had cultivated for six years, and had taught it to his pupils. He thought it might be serviceable to amateurs if he were to give a concise account of a very simple, practical, and approved method of operating.

MM. Kock and Wilz, makers of apparatus, addressed the following letter to the Society :—

"We have read the communication made to the Society on the 5th March last by M. Fierlants relative to the means which, he says, he has conceived for obtaining the straightness of lines. M. Fierlants says :—

'I am not aware whether the plan is already known. I have never seen it published, and *it certainly has never been applied*. I take for witness all the proofs that have yet fallen into my hands.'

"By thus expressing himself M. Fierlants has committed an involuntary error, for since 1851 M. Kock has manufactured folding cameras for travelling, with movable fronts, by which the lens could be moved not only vertically but

horizontally, according to the wish of the operator. This construction evidently was intended to raise or lower the lens—the object indicated by M. Fierlants in his communication. This end was satisfactorily obtained by a great number of persons, and particularly by M. le Comte Aguado and M. le Comte Vigier, who obtained the finest possible results in 1853, with apparatus constructed by M. Kock according to this system.

"The cameras exhibited in 1855 were furnished with movable shelves for holding the objective. During the last six years M. Javary, who has the charge of photographing the plans and fortifications, has employed no other means, and it is the same that M. Soulier has used for obtaining negatives of monuments which present straight lines. Lastly: MM. Kock and Wilz, in 1864, applied this system to the panoramic camera which they have patented, with a modification consisting of the employment of a catch, to which the slide holding the lens is fixed for the purpose of raising or lowering it."

M. Bertsch remarked, with reference to this reclamation, that the observations of M. Fierlants, and the recurrence to them of MM. Koch and Wilz, might lead persons unaccustomed to optical discussions to suppose that by displacing the lens its qualities became modified. The effect, in reality, was just the same as would be obtained by raising the camera or by increasing its dimensions. This operation only gave the results indicated at the expense of sharpness, for it was the marginal rays which then contributed to the formation of the image in the centre of the plate.

M. Despaquis addressed a communication to the Society, in reference to the observations of Mr. Ernest Edwards, in a letter sent by him and read at a previous meeting. [See page 327.]

M. Ducos du Hauron then presented his pamphlet, entitled *Colour in Photography*, of which M. Davanne gave a succinct account at the last meeting.

M. Despaquis presented to the Society some carbon transfer proofs obtained by enlargement, and which were accompanied by the following explanations:—

"The only novelty is the application of this system commercially, and the facility which the enlarging apparatus affords of printing through glass without affecting the clearness of the picture, which might be the case by contact under a negative.

"The manipulations are reduced to the following:—

"1. To cover the plate with a layer of carbon sensitive mixture.

"2. Printing in the enlarging apparatus.

"3. Washing and developing the plate in a zinc vessel with hot water.

"These proofs are mounted afterwards on glass by placing at the back a glass, which admits of them being seen by reflection, like positives on collodionised glass, which have been so much in vogue.

"At the next meeting I will present some proofs on paper, cloth, and wood, which want of sun during the last month has prevented me from presenting at this meeting."

M. Marion (on presenting some gelatino-chromatised proofs of different colours) addressed the meeting as follows:—I have the honour to submit to the Society some gelatino-bichromated proofs of different colours—amongst them one of black lead. The weight of the colours does not appear to me to be an obstacle to the convenient production of the drawing. I submit the proof obtained with black lead as an instance of this. All the colours, whatever their weight, appeared to be alike serviceable. Whatever might be the colouring matter incorporated in the bichromated gelatine, the process for obtaining the proof remains the same as I indicated last year, and consists in applying the printed gelatino-coloured sheet perfectly flat, without air bubbles, upon a paper with a sticky layer of some kind. The substance which experience has led me to prefer as best adapted for the purpose is albumenised paper without salt—a light layer being preferred, for the reason that the hot water employed to dissolve the gelatine serves at the same time to coagulate the albumen without trouble and without expense. When, by the employment of hot water, the image is relieved from the coloured mixture which remained soluble on the paper, the vehicle becomes the subject, and the drawing remains unalterably fixed on the surface. In order to facilitate the study of this process I am printing a pamphlet for distribution gratuitously; and every Friday, from three to five o'clock p.m., persons desirous of learning may see the series of manipulations at my factory in Courbevoie.

M. Loewe submitted a collection of enlargements obtained by the aid of ordinary negatives retouched with printers' ink, and transformed afterwards into helio-typographic engravings or into lithophotographs. They were accompanied by the following explanations:—

"I make first a positive, the size of a *carte de visite*, and I enlarge it afterwards on bichromatised paper. When put in water the enlarged image reproduces itself in intaglio. The proof thus obtained is inked, taking care that all the cavities are filled with ink; that which remains on the surface is wiped off and the proof is left to dry; it is then retouched with printers' ink and placed upon zinc, copper, or stone, and the preparation of the type is proceeded with in the ordinary way.

"By this process it is easy to transform, in the space of a day, an ordinary negative into a block ready for printing on a large scale."

The following note, on improvements effected by M. Jeanrenaud, was presented to the Society:—

"In the last communication made by M. Jeanrenaud relative to his mode of operating, it will be remembered that he advised coagulating beforehand the albumenised layer on the transfer sheet, by plunging the latter into alcohol, and then leaving it to dry; but experience soon showed that the alcohol dissolved the resinous sizing of the paper after he had used it a certain number of times. There were stains upon the transfer paper; and, if after the transfer it was desired to operate with very hot water, swellings appeared upon the proof, which completely destroyed it. It was requisite, then, either to distil the alcohol or to throw it away, and employ a fresh quantity.

"M. Jeanrenaud has surmounted this difficulty by simplifying his mode of operating. The sheet bearing the bichromated gelatine layer, which contains the colouring matter, is placed, after having been printed by the light, in a case of blotting-paper, slightly moist. Whilst this sheet becomes supple and flaccid, the albumenised paper is immersed in a large cylindrical vessel filled with alcohol at thirty-six degrees; it is taken out again almost immediately and applied quite wet with alcohol upon a plate, albumen side up; the gelatinised sheet, which is then sufficiently pliable, is rolled with a roller upon the albumenised sheet. The proof, after being put under pressure for a few seconds, may be afterwards treated with boiling water without any swelling being occasioned thereby.

"This mode of operating presents many advantages—economy of alcohol, which may be employed to the last drop; the facility of preparing his albumenised paper at the moment when it is wanted; the absence of swelling even when boiling water is employed; saving of time, because the sheets, being no longer, as formerly, entirely moistened by water, it is sufficient to apply them and press them one upon the other to develope them immediately."

M. Bertsch presented a communication, which he read to the meeting, on the persistency of images on the retina of the eye, and which he considered might be of service in the instantaneous processes. He (M. Bertsch) gave some experimental demonstrations of the facts which he described, and allowed the members to witness the phenomena determined by the persistency of images on the retina. [M. Bertsch's paper is in type, but we are compelled to leave it over till next week.]

After having followed M. Bertsch with great interest through his experiments, and thanked him and the other gentlemen for their presentations, the meeting separated.

Correspondence.

Foreign.

Paris, July 6, 1869.

To continue the letter of MM. Geymet and Alker, the former portion of which will be found in your last number, must be my first duty. They say—

"We pass through the muffle every day five or six enamel plates, either to try our powders, to verify the fusibility of our pastes, or the accord of the matters which should combine together, and this is how we operate:—We guarantee by this method, although a little brusque, a perfect brilliance and regular and sure work, and we invite all to come and examine for themselves in our workshops the certainty of our operations. Before proceeding with the vitrification, it is requisite to wait till the fire of the furnace is well burnt up. It should be cherry red with white reflections, and a quick fire. The enamel should be taken by surprise, as it were, for it perfectly sustains a sudden change of temperature without cracking. During the baking the furnace door should be left open. The fire-clay plate, on which the enamel plate is to be placed, should be put in the muffle, and, when it has acquired the surrounding temperature, it is withdrawn red hot. The cold enamel plate is deposited upon it, and the whole replaced in the muffle, when the vitrification takes place almost instantaneously. The image comes out with a glaze, which leaves nothing to desire. The cooling of the vitro-enamel may take place at a distance from the source of heat without fear of any accident. We add to these few notes our formula for 'collodion' for these vitro-enamel pictures, for our receipt given in most works upon the process is not exact:—

Honey	24 grains.
White loaf sugar	48 ,,
Gum arabic	2 drachms.
Glucose	2 ,,
Saturated solution of bichromate of ammonia	4 ,,
Distilled water	5 ounces.

This formula is used by more than 1,500 pupils whom we have taught, and it succeeds perfectly in their hands and in our own.

"We are, Sir, always at your disposition to give your readers any information which may be asked for from you by them, and we beg you to accept, &c.,

"Geymet and Alker."

M. Marion, one of the oldest workers for photographers in preparing them papers of various kinds, according to their wants and the demands which the advance of our art-science has created, has just published a complete guide to the use of his papers for the carbon process, by which pictures in any colour may be readily obtained. From this work I am tempted to cull a few hints. The gelatinised paper prepared with various colours can be bought ready made, just as photographers are supplied with their albumenised paper. To keep this paper flat it should be preserved in a cool and dry place, spread out flat, and under a little pressure. This paper is worth, I find, from about 16s. to 30s. per quire, according to the colour, the cheapest being black; the dearest is prepared with a carmine pigment. The sensitising bath is composed of—

Bichromate of ammonia	2 parts.
Distilled water	100 ,,

The sheet is floated on this solution, gelatine side downwards, and then it is completely immersed for about two minutes, care being taken to avoid all air-bubbles. This bath must be kept at a comparatively low temperature, or the gelatine may be dissolved. The paper must be dried slowly—not too rapidly. After the proper exposure under the

negative the paper should be taken out of the printing-frame *at once*, and upon no account should it be left in contact with the negative longer than really necessary. The reason of this is, according to M. Marion, that the process of coagulation or hardening of the gelatine continues spontaneously after the exposure of a sheet to the action of light, and not only upon those parts which have been exposed, but over the whole surface of the sheet. The same process of coagulation is observed in paper which has been sensitised too long in advance of the time when it will be required, and this is especially the case in hot weather. The effect of this *continuation of coagulation* is to render the whole film insoluble and prevent its "transfer" and development.

The image before development is stuck on a sheet of albumenised paper in this manner:—The gelatinised side is placed face downwards upon a sheet of plate glass, and the back is moistened with a wet sponge, care being taken to only render the sheet supple and not to moisten the gelatinised surface. A sheet of blotting-paper placed between the glass plate and the gelatine picture will be a good preventative of this. Several sheets can thus be prepared in advance. The sheet of albumenised paper is moistened, also, by floating its *plain* side upon a dish of pure water. When this sheet is ready, spread it, face upwards, upon the blotting-paper just named, and apply the gelatine film to it carefully. A roller is useful in this operation to pass with a slight pressure over the two sheets till they are in perfect contact, and without any air-bubbles or moisture between them. It is not necessary to wait till the sheets of paper are dry before proceeding to the development of the image. For this, it is necessary to have plenty of hot water at hand, and large deep dishes to contain it and the pictures. Boiling water being poured into a dish, the pictures are plunged into it as rapidly as possible, in order that the moist heat may coagulate the albumen and the development of the image. M. Marion insists upon the superiority of this operation over all others, for he says:—"The albumen in part dissolved, and having penetrated a thin film of coloured gelatine, *retains the half-tones*, which without it would disappear mechanically." "With films of albumen more or less thick and more or less moist, it should be possible to increase or diminish the degree and softness of the pictures at will." M. Marion again invites all who would like to see the operations and manipulations of this process, to visit his *ateliér*, 78, Avenue de l'Empereur, at Courbevoie, near Paris, any Wednesday afternoon between three and five o'clock.

In the *European News* I observe an article upon the zirconia light, in which some of your experiments are recorded. I fancy the article is from the *Engineer*. One statement contained in it is, I think, open to argument; it is this:—"These conclusions do not in any way affect the question of the permanency of zirconia under the fierce heat of the oxy-hydrogen flame; but such permanency, if purchased at the expense of inferior light, is too dearly bought and will condemn the invention. Unless the inventors are acquainted with some peculiarities of the zirconia unknown to those who are versed in the use of the lime light, and can by an unknown method bring out a light from the zirconia equal to that given by lime, the zirconia light, from an economical point of view, is a failure." I do not see this at all, *i.e.*, I do not see the logic of the conclusion. It is reported of the Viceroy of Egypt, I believe, that he said—"Tell me what you wish to see, and I will tell you how to see it." Well, what is the point of view taken by the authors of the above quoted conclusion? Is it the use of the zirconia for the production of a light for scientific purposes, or for more lengthened operations? Do they come to the conclusion after taking into consideration the requirements of the lime light, *i.e.*, frequent renewal of the cylinders and consequent cost in material, labour, and constant attention? The lime light might give more light for ten minutes, all things being equal, than the zirconia light; but compare cost at the end of a month, and which light will be the cheaper? I fancy, "from an economical point of view," the zirconia light would win.*

A few weeks since I reported some experiments which had been made with reference to the action of an ozonised atmosphere in determining the explosion of picrate of potash. The reputed author of those experiments, M. Houzeau, of Rouen, writes to the scientific journals and denies all knowledge of such researches, nor does he know who sent them for publication. Some one else writes and affirms that *since the publication* of the experiments trials have been made in the laboratory of M. Houzeau, and the results are *completely negative* to those announced. Here is another ozone hoax, and it will go well with the advertisement I quoted in connection with it in the same letter.

R. J. Fowler.

Home.

PHOTOGRAPHIC SOCIETIES AND THEIR CENSOR.

To the Editors.

Gentlemen,—In Mr. Winstanley's article on *Photographic Societies*, published in your last issue, alluding to the Manchester Photographic Society, he states that he was "asked to produce the reports of some of the subsequent meetings for the official organ, viz., The British Journal of Photography," but, "having no desire to usurp the Secretary's post, he consented to *assist* that gentleman by writing a sketch of some of the following meetings."

Permit me to say, in reply to this statement, that Mr. Winstanley *was not asked to produce any reports.* He was simply requested to put on paper what he had previously spoken at the Society's meeting. Beyond this his assistance was neither required nor asked.

It is usual with members who occupy the attention of a meeting *specially* to read a paper, which paper is afterwards handed to the Secretary for publication. As Mr. Winstanley did not conform to the usual custom, it was therefore absolutely necessary to correct reporting that he should write his paper after the delivery of its substance.

Perhaps when I inform your readers that Mr. Winstanley is no longer a member of the Manchester Photographic Society, the knowledge of that fact may help them to a better appreciation of the spirit of his recent articles than they would otherwise acquire. As Mr. Winstanley has put in a sort of apology for some of my reports, I must request him, in future, to offer no similar apologies for me. I neither fear his censure nor value his patronising sympathy. I shall not suffer from the one, nor gain by the other.

Mr. Winstanley, in a preceding article, objected to the existing system of introduction to photographic societies; he would abolish the practice of requiring a proposer and seconder for any candidate for membership, and cited his own case in support of its abandonment. Does it not seem unaccountable that a gentleman living in Manchester, practising photography, and known to some, at least, of its members, should have a difficulty in obtaining an introduction to the local photographic society? It is for Mr. Winstanley to show that the fault lay in the institution rather than in himself. I quite admit that, even with proposers and seconders and the ballot too, persons of incompatible disposition do, now and again, gain admittance, and the most pertinent case I know of is that of Mr. Winstanley himself.

Mr. Winstanley insinuates that the reports are not truthfully rendered. Not to use any stronger expression, I tell him his imagination is rather too active. He will not succeed in making his own merits apparent by detracting from those of other people, and when he throws dirt he may be assured that some of it will stick to himself. Personally I bear him no ill-feeling; and, had he not insinuated that the Secretary of the Manchester Photographic Society could not get along without his assistance, I should neither have noticed his remarks nor have troubled you to publish this communication.—I am, yours, &c.,

Charles Adin,
Hon. Sec. Manchester Photographic Society.

Manchester, July 5th, 1869.

[On the subject of reporting the meetings of societies we may be permitted to say a few words, having had a somewhat extensive experience. We profess to be able to give a fair digest of any photographic meeting, but there are occasionally communications made which render it imperative to apply to the speaker for a written copy of his remarks, as in the case described by Mr. Adin. For example: at the last meeting of the South London Photographic Society, we did not report Mr. Howard's remarks, because, from their nature, they would require to be carefully revised by himself; hence we asked him for, and he supplied us with, a written copy of his remarks on alkaline development. A similar course is adopted every day by reporters; and the fact that Mr. Adin, as secretary and official reporter of a society, did so in the case of Mr. Winstanley, or of any other person, merely shows that he followed the course which we and every other journalist desirous of accuracy in a report of an unwritten communication would have done. The good business tact which is required in a secretary is not always found coexistent in one person with the ability to report, in shorthand or otherwise, the transactions of a society; and we believe we speak the sentiments of nearly every reader when we say that if we receive from such a secretary a "digest" or condensed report of a discussion, we relish it better than a fuller report—if the *fulness* of the latter owes its speciality to matters which do not interest the general reader. After stating thus much, it will scarcely be necessary to say that we do not agree with many of the remarks made by Mr. Winstanley in his article on reporting the meetings of photographic societies, published last week. To report and publish *every* little item of gossip or matter of merely personal interest would never do at all. Were the meetings of some of the metropolitan societies thus reported, some reports which we compress into half-a-page would be so expanded that the twelve pages of the Journal would not contain them; and yet, by thus condensing and abridging verbosity, we do not consider that we make any sacrifice whatever of either the accuracy or the real fulness of the reports. The *Proceedings of Societies* are doubtless very interesting; but the conferring on them the wordy and literal fulness implied by Mr. Winstanley's remarks would have three effects—first, that of preventing many from speaking who might have valuable suggestions to make, but who, from diffidence

* We cordially endorse Mr. Fowler's conclusion, and we think it is fairly deducible from our own report on the subject. In a protracted trial the lime would be "nowhere." We would here also add, with reference to the kind expressions of MM. Geymet and Alker in the concluding paragraph of their letter above, that we highly esteem their courteous and obliging offer of assistance to our readers.—Eds.

or being unaccustomed to *vivâ voce* addresses, might not be able on the spur of the moment to express themselves precisely as they would wish to be "seen in print." A good reporter will make a "good speech for a bad speaker;" that is to say, he will note the points aimed at and present them in a grammatical and properly-expressed form, divesting the speech of irrelevant matter. The second effect of full *verbatim* reporting would be that wordy speakers, for the mere sake of seeing themselves in print, would monopolise the time of the meeting; and the third effect would be the conversion of such societies into advertising mediums. A few words, in conclusion, respecting the mode of admitting members. We do not know what method is preferred in Manchester; but in London the ballot is *generally* considered the best entrance door to a society. If a candidate be not admitted it is merely an evidence that there are three or more members who, for reasons known to themselves, are undesirous that the candidate for admission should be invited to associate with the body. The ballot has its abuses; it has its uses also. If a proposer have any doubt whatever about the election of his nominee, he ought, in justice to him, to ascertain privately whether his chance of admission is clear before he runs the risk of the ballot. We have known a person proposed as a candidate for admission to a society, but whom the proposer was requested to "withdraw" for a time. This procedure is both courteous and kindly.—Eds.]

MR. POUNCY'S PATENTS.

To the Editors.

Gentlemen,—A rumour is abroad that "J. Gostick and Co. Limited," accountants, &c., will carry on a photographic trade through Pouncy's patents. This is an error. A company is in formation for Mr. Pouncy's patents, and we are only its agents, and work photography only for the necessities of business.—I am, yours, &c.,

J. Gostick, pro J. Gostick & Co. Limited.

9d, *New Broad-street, E.C., July* 7, 1869.

EXCHANGE COLUMN.

An excellent violin, in case, with two bows, will be exchanged for a Harrison's rest, best make, or a No. 1 Dallmeyer's triplet lens.—Address, A. Lee, 42 Milsom-street, Bath.

A number of negatives, stereo. and whole-plate, of English and Welsh scenery, will be exchanged for stereo. or half-plate negatives of Irish, Scotch, or foreign views.—Pumphrey Brothers, 13, Bath-row, Birmingham.

I will exchange a quarter-plate portrait lens by Voigtlander, with a quarter-plate camera, for a square camera for 10 × 8 plates, landscape, sixteen-inch focussing. Must have a swing back.—Address, Usherwood, Dorking.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

P. P. Skeolan, Harrogate—*Portrait of Miss Burdett Coutts.*

Edward Gregson, Halifax—*Group of Ministers and Delegates of the New Connexion Conference.*

☞ *Correspondents should never write on both sides of the paper.*

*** In consequence of the non-receipt of a parcel per post our leading article is not quite complete this week.

Zeta.—We cannot answer your question at present.

A Derry Man.—The size was correctly given. We find it to be very convenient for both stereoscopic and full-sized pictures.

T. Clark.—To obtain the effect desired you must employ a very dark background. We should recommend black velvet for this purpose.

Tyro.—By giving a longer exposure you will reduce the great contrast between the vegetation and the sky. Your pictures are all somewhat under-exposed.

A. L. (Bath).—1. We are not yet in a position to say whether there will be a further publication of Mr. Lea's *Manual.*—2. The manual by Mr. Lake Price is adapted for amateur as well as for professional photographers.

D. T. K.—1. We have not had much experience with the plates to which you allude, but they bear a good reputation.—2. We prepare our own plates.—3. Pyrogallic acid when dissolved in alcohol keeps better than when dissolved in water.

F.R.S.—1. The subject of atmospheric polarisation is doubtless interesting, but we are not prepared to go into it, especially at present.—2. Any Nichol's prism will answer, but that which we employed was more than an inch in diameter.

A Gibraltar Correspondent some time ago wrote requesting that a certain picture should be lent to him. We have now obtained it and wish to send it to him, but, unfortunately, we have mislaid his address. Will he kindly favour us with it again?

Geo. Johnstone.—You must use a much smaller stop than you have hitherto employed. A portrait lens copies an object its original size, but not so well as a properly-made copying lens. To secure good definition over a moderate area the former lens must have a smaller stop than the latter.

P. M. S.—In the *Penny Magazine* for 1834 you will find a series of articles descriptive of Hogarth's works. From these you will be able to extract such particulars as are necessary for your purpose.

Senex.—Your suggestion to use gallic acid in the nitrate bath is not so original as you suppose. About twelve or fourteen years ago it was recommended by the late Mr. Berry, who put in a plea in its favour. Meanwhile, we advise you not to proceed with your proposed experiment unless you previously make up your mind to have your bath destroyed.

H. Rowland.—The correction of a telescopic object glass differs from that of a photographic lens. Your telescope will answer quite well for photographing either the sun or moon; but by previous experiment you will have to determine the precise amount of difference that exists between the visual and actinic foci. That difference, once ascertained, will be practically a constant one.

Markings on the Film.—Three correspondents have been complaining during the past week of being annoyed with surface markings on the negative. One of them describes his case very clearly, and to him we say, filter the bath, and then, when the markings appear, draw over the surface a slip of clean white paper, which will remove a kind of scum which causes these marks. It is probable that the foregoing remarks will also apply to our other two correspondents.

B. Williams (Melbourne).—A solution of gelatine in acetic acid will prove an excellent addition to your supply of chemicals. A few drops added to the iron developer will confer upon it properties similar to those you desire, and which you seek to secure in another direction. It is better that you should test experimentally, before you start on your inland tour, the value of the addition, by adding it in various proportions to a developer with whose qualities you are already well acquainted.

Eburneum Process.—J. Davonport.—Without entering into the details of the "eburneum process," which have already been published by us, we may here state that the process consists in making a glass transparency by any of the well-known methods, and, after toning it, placing it on a levelling stand and pouring on a quantity of gelatine containing oxide of zinc. Now allow it to become quite dry, and remove the film by passing a penknife round the margin. One or two points must be noted. If the collodion be of a very adhesive description, give the plate a slight coating of wax dissolved in ether or any other suitable solvent. This will prevent the collodion adhering too closely. Do not hurry the drying of the gelatine film, but allow it to stand for thirty hours before attempting to detatch it. The proportions of gelatine, &c., which have been recommended are—*water*, twenty ounces; *gelatine*, five ounces; *oxide of zinc*, one ounce; *glycerine*, half-an-ounce. The quantity poured on the plate should be such as will, when quite dry, yield a film about the thickness of a card; and, to prevent atmospheric action, the back of this imitation ivory card should receive a coating of spirit varnish before being removed from the glass.

In Type.—Articles by D. Winstanley, George Price, M. Bertsch, &c.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.**

APPLICATIONS FOR NEW PATENTS.

June 10, 1869.—"Apparatus for Taking Photographs by which the Operator can Take a Number of Prepared Sensitive Plates and Expose them Successively Without the Aid of Changing Box or Bag. No. 1796."—Walter Cook.

June 30, 1869.—"Improved Processes for Producing Printing Surfaces. No. 1965."—Robert Henelade Courtenay.

July 5, 1869.—"Transferring Photographs to Wood, Metal, Ivory, and Other Surfaces. No. 2022."—Frederick Wilhelm Grüne.

LONDON GAZETTE, *July* 2.

Notice of Sitting for Last Examination.

F. Simpson, Nottingham, photographic artist.—July 27.

METEOROLOGICAL REPORT,

For the Week ending July 7th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

July 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
1	30 20	65	49	52	58	NE	—	Fine
2	30 25	63	53	51	56	ENE	—	Overcast
3	30·26	65	52	53	55	NE	—	Overcast
5	29 97	75	53	61	65	ESE	—	Dull
6	29 91	80	60	65	67	WSW	—	Dull
7	30·12	76	60	61	68	SW	—	Dull

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 480. Vol. XVI.—JULY 16, 1869.

ON THE SOLUBILITY OF A VARIETY OF GELATINE IN SOLUTION OF COMMON SALT.

A few weeks ago our attention was specially directed to a singular property of gelatine which is but little known to photographers, and yet one which might be turned to account occasionally in carbon printing; we refer to the solubility of gelatine which has been treated with alum in a solution of common salt. When gelatine containing alum is allowed to dry completely it becomes nearly insoluble in water, even when the latter is warm; but if we substitute for warm water even a cold solution of common salt, of such strength that each ounce contains about ten grains of salt to the ounce, we are able to dissolve some of the gelatine.

Though we have been long acquainted with the above fact, we lately stumbled upon it in a singular way in the course of some experiments on the sizing of a peculiar kind of paper. A manufacturer of paper was obliged to produce a web or sheet which contained in it a quantity of common salt. This substance was not added directly to the sheet, but resulted from a particular decomposition essential to the production of a special colouring matter for the paper.

No difficulty was anticipated at the outset from the presence of the salt in the pulp from which the paper was "thrown" or manufactured, nor did any arise until the sheet was prepared, *i.e.*, sized with gelatine, pressed, cut, &c., and delivered. It was then found that the paper would not "bear;" that is, would not bear up the ink or keep it upon the surface as it should when written upon, though a full proportion of alum had been added to the size with which the paper was manufactured. On investigating the matter, we found that the chloride of sodium or common salt present was the cause of the difficulty, and the way in which the salt acted was simply as follows:—

When paper was sized the salt in the tissue dissolved out in the sizing liquid to some extent, and counteracted the tendency of the alum to greatly diminish the solubility of the gelatine on drying. When ink was then applied to the surface of the paper there was no obstacle to its making its way through the sheet and appearing on the other side, since the gelatine acted on by the salt was unable to resist it, and the liquid, according as it dissolved more salt in its passage through the paper, became more irresistible at each step, the only bars to its progress being then the absorbent power of the tissue and the limitation by the second surface of the sheet.

The remedy which we succeeded in applying to counteract the evil was one which it is unnecessary for us to state here; suffice it to say that the difficulty was overcome when treated with a view to destroy the antagonism existing between the alum in the size and the common salt in the tissue.

Let us now see how far this peculiarity of common salt touches some photographic operations. It was hoped some time ago that gelatine could be used commercially for coating paper instead of albumen for photographic purposes, or, to make a premeditated "bull," for albumenising paper with gelatine. At least two modes of accomplishing this were proposed. One set of processes was patented by Mr. Swan, the chief idea running through all of these methods of Mr. Swan's being the rendering of a gelatine film insoluble by the action of chrome-alum or a sesquisalt of chromium. The second plan was, we believe, that adopted by Mr. J. V. Robinson, of Dublin, who first coated sheets of paper with bichromated gelatine in the usual way and then exposed to light. In this way the gelatine was rendered insoluble in warm water, and by treatment with water and *a dilute acid* the excess of bichromate and the reduced chromium compounds were removed from the film, leaving behind a layer of gelatine insoluble in hot water.

So far all went well; but it then became necessary to introduce into the film an alkaline chloride previous to sensitising in the usual way in the silver bath. For this purpose Mr. Robinson floated the sheet on a solution of common salt, we believe, containing about ten or fifteen grains to the ounce of water; but, instead of obtaining a good, even film, the gelatine surface disappeared almost wholly. It had been dissolved off by the common salt solution. Therefore, gelatine which has been rendered insoluble in hot water by the action of light in the presence of a bichromate is dissolved by common salt.

Gelatine, when treated with alum, is also somewhat soluble in the chloride of sodium solution. We have seen how a knowledge of one of these facts may become of much practical interest, and we would now show that the solubility of the gelatine film rendered insoluble by light in the presence of bichromate of potash or ammonia may be turned to account in a very useful way.

If we take a developed carbon print, we know that the gelatine of which it is chiefly composed is in such a state that it can no longer be acted upon by warm water. Now, in using the carbon process, it is by no means an unusual thing to have our proofs over-printed, owing to the difficulty of determining the proper time of exposure under variable atmospheric conditions. When such an over-exposed print is obtained now, our chief mode of reducing it is to cautiously rub with a soft sponge charged with warm water; but here we have the risk of rubbing harder than is necessary and detaching a portion of the picture from its support, or of producing an ugly tear in the picture. In order to avoid this difficulty we have endeavoured to apply the solvent power of the solution of common salt in water, and find that, when certain precautions are adopted, we can reduce a print almost to any extent we please.

When we desire to reduce a print, our first step must be to remove the reduced chromium compounds as completely as possible from the film, otherwise the common salt would have no power whatever upon the tissue, as the presence of these bodies seems to enable the film to resist all ordinary modes of attack. The removal of excess of bichromate of potash or ammonia from the film is effected in developing the print; but, in order to remove the compounds of chromium resulting from the action of light in the sensitive tissue, we plunge the print into a bath, made by diluting one ounce of muriatic acid of commerce with six ounces of water.

After remaining for an hour or two in this bath the print is washed and then plunged into a tepid solution of common salt. The film now gradually loses intensity with tolerable regularity. The action can be stopped by abundant washing of the print in plain water. In the foregoing operations no rapid solution is to be ex-

pected, but a very gradual softening and solution of the tissue. Even this result is not attained unless the action of the acid has been sufficiently complete and prolonged originally; at the same time, the employment of much heat or of too concentrated an acid is to be avoided, as a strong acid tends alone to disintegrate the film and rapidly remove every trace of a picture.

SURFACE STAINS AND MARKS ON NEGATIVES.

In one of our "answers to correspondents" last week we referred to the fact that we had received no fewer than three letters during the previous week on the subject shadowed forth in the heading of this article. Since we wrote that reply we have received two more letters on the same subject, and we are thus reminded of the old saying that "it never rains but it pours."

The stains which thus appear to have set in as an epidemic are of a superficial nature, and may often be rubbed completely off. Their shapes are rather whimsical, and appear as if a kind of scum from the bath had settled on the surface and reduced the silver in the form the scum had assumed. From all that we can learn—certainly from the evidence furnished by the communications we have recently received on this subject—these stains appear to be much more prevalent during hot than in cold weather.

After some investigation of the subject, we recommend persons thus troubled to try the following experiment:—After the plate has been collodionised and excited, allow it to stand in a vertical position for a few minutes, as it would do if placed in the slide; and then, without exposing it in the camera, pour over it the iron developer. In all probability the stains will appear as usual, showing that they are not necessarily dependent upon the influence of the dark slide or camera.

Having established this fact, proceed to coat and excite another plate, and allow it to stand as in the former experiment. Now examine the surface very carefully, and it is more than likely that markings will be discovered similar in outline to those which will afterwards appear, more strongly marked, when the developer is applied.

In several instances we have known these markings to be produced in consequence of the contact of the plate with the holder. Quite unlike the results of the former experiments, we have seen the plates remain quite clean under the action of the developer, but becoming stained with the surface deposit in question only after they were placed in the slide. This has, we are aware, been observed by many other experimentalists, and establishes the fact that in certain circumstances the contact of the holder induces the conditions under which the deposition takes place. It is of no consequence that the plate-holder has been carefully varnished; this but serves to aggravate the evil in some instances, for, having compared the results obtained from the use of a holder having a set of old, well-stained corner-pieces with a similar holder carefully varnished, the latter was, if anything, the worse.

The physical nature of the collodion has much to do with surface markings. A hard, skinny, or repellent collodion is more conducive to the evil than one of a more porous and non-contractile nature.

A scum is sometimes formed on the surface of the bath which is so delicate as often to be scarcely observed, but which favours the reduction of the silver in the form in question.

Keeping the plate too long after removal from the bath and before developing is also favourable to the production of these markings.

Having thus stated several predisposing causes, we proceed to point out the obvious remedies.

1. If the collodion be too horny, add a *very* small quantity of distilled water to it. Ammonia has a powerful influence upon the physical constitution of collodion. Carbonate of soda we know to be exceedingly useful under certain circumstances.

2. If with a really good and suitable collodion the plate dries unequally, rinse it in distilled water previous to development, and then pour over the surface a twelve or fourteen-grain solution of nitrate of silver which has not been used for ordinary bath purposes.

3. Prevent an accumulation of bath solution on the lower end of the plate by means of blotting-paper, which will absorb it. Place the blotting-paper in such a manner as to prevent the sensitive plate from getting into direct contact with the holder of the dark slide. A small piece of blotting-paper placed at each corner will, in nine cases out of ten, effectually prevent the markings in question from being formed.

4. Do not allow the plate to remain too long in the exciting bath, and do not keep the plate longer between sensitising and developing than can possibly be avoided.

5. Keep a careful watch over the surface of the bath, and draw over it, now and then, a bit of very clean paper, by which any incipient scum will be removed.

By adopting one or other of these precautions the evil of surface markings will be entirely prevented. We have, of course, presumed that the operator has kept the bath up to the proper strength and in good working order *otherwise;* for in the foregoing we have referred to only one class of stains, namely, those white, superficial "mat," "oyster-shell," "fortification," "arabesque" deposits with which we suspect, the majority of photographers are too intimately acquainted to call for more elaborate description at our hands.

PHOTOGRAPHING ON WOOD BLOCKS.*

IN TWO PARTS.—PART II.

4. Preparing the Surface of the Block.—It is desirable, although not necessary, to rub the surface of the wood, as usual, with a little flake or Chinese white in gum water. The only advantage gained by this is the obtainment of a whiter ground for the picture than the wood naturally possesses. Then prepare the following solution:—

Gelatine	15 grains.
Water	1 ounce.

Soak the gelatine in the cold water till the former has swelled up to its full extent, and dissolve by placing the bottle containing them in a dish of hot water. While the solution is still warm, and immediately before applying it to the wood block, dissolve in it about five grains (very little suffices) of bichromate of potash. Warm the surface of the block and lay it down, face upwards, on a table. Filter on to it, through a tuft of cotton-wool in the neck of a funnel, a sufficient quantity of the bichromated gelatine to cover the block well. Perhaps as good a plan as any—and it is the one I always adopt—is to filter out a pool of the solution on the centre, and spread it with a camel's-hair brush, taking care to avoid the formation of air-bubbles, and, of course, also avoiding dust. Allow the solution to soak into the wood for about a minute; then pour off the excess and stand the block up on its edge, upon two or three folds of absorbent paper, to drain and dry. Expose to light for a short time, in order to enable the bichromate to *fix* the gelatine or render it insoluble.

When dry there should be no appreciable thickness of gelatine on the surface. If the pores of the wood are filled with the insoluble medium, that seems amply sufficient for the purpose of retaining the image in perfect adhesion to the wood. Should there be an appreciably thick pellicle of gelatine, approaching to the appearance of albumenised paper, it is very evident that such a film would interfere materially with the engraver's work, and, in fact, would render the block almost useless. It is necessary to avoid touching the prepared surface with any greasy substance, or rubbing it with the hand. In all probability that would prevent the tissue from adhering well in the transferring process.

I have tried the preparation of the block with albumen, and afterwards coagulating the latter with strong alcohol and a little kreosote; but I find this plan does not answer nearly so well as the one I have described, inasmuch as a rather thick coating of albumen seems to be necessary to keep the transferred tissue attached to the wood with sufficient tenacity; and, for the reasons stated in my last article, a thick coating is inadmissible.

5. *Printing on the Sensitive Tissue.*—Make sure that the pigmented gelatine is not in the least tacky, else you may lose your negative by the tissue sticking to it. A good plan to guard against such a mishap is to rub the surface of the gelatine with a little kaolin, or, better, with French chalk, before placing it in contact with the negative. Expose as usual in a printing-frame and in diffused daylight, the pigmented side of the tissue being placed next the negative.

It requires considerable experience to know the right time of exposure, as no image is rendered visible by the action of light. Actinometers of various kinds have been devised, but, as they all depend on accurately observing and appreciating the depth of tint assumed by a sensitive surface after being acted on for some time by light,

* The Editors of this Journal, in a foot note to the first part of this article, express their surprise at a statement of mine to the effect that a good process for printing on engravers' blocks was still a desideratum. I am perfectly aware, and stated as much in my article, that many attempts had been made, some of them by myself, with more or less success, but that there were objections to all the processes employed, one strong objection being that if printed direct on the wood from an ordinary negative the image was in a wrong position for the engraver. This, of course, could be got over by transferring the negative and printing from the back of the film. But the most serious objection of all is the employment of silver salts on a surface like that required for the engraver. I was not aware, nor am I aware now, that a transfer carbon process for the purpose in question has been described. At all events, such a process is infinitely superior to every other, and ought to be adopted in preference. I was one of the Editors of The British Journal of Photography when the portrait referred to appeared, in December, 1865, and was, of course, cognisant of its existence when I wrote my last article.—G. D.

there still exists some difficulty in correctly estimating the correct time of exposure. The plan I adopt is to place a small piece of an uniformly sensitive silver paper in the frame alongside the negative, and from the tint that it gains to judge of the exposure. After a little experience few mistakes will be committed.

Generally speaking, when the exposed tissue has to be transferred to wood, one-sixth part of the time required for printing on sensitive albumenised paper will be sufficient; but if the tissue is to be transferred to paper, the exposure must be prolonged to one-fourth of the same time. This variation in the exposure should therefore be kept in view when these two different transfer media are employed.

The reason why in the one case a shorter exposure is necessary, seems to be because the image adheres to the wood with great tenacity, and, sometimes when the gelatine coating is very thin, is actually driven into the surface and cannot afterwards be totally removed by scrubbing with a brush in boiling water.

6. *Transferring the Exposed Tissue.*—Cut the tissue to the size of the block if that has not previously been done. Indeed it is better to do so before printing, and then there will be no difficulty in placing the embryo print in its right position on the wood. Moisten the prepared surface of the block with water. Dip also the exposed tissue for a few seconds in a dish of cold water. Place a fold or two of bibulous paper on a slab of flat glass, and on the paper the exposed tissue with the pigmented side uppermost. Now press down the prepared side of the wood on the tissue for about a minute, and slip the whole along the glass to the edge, when it will be found that the two surfaces are in intimate contact. But to make sure of all air-bubbles being pressed out, take up the block, place over the tissue a piece of paper, and rub—not too violently—the back with a convenient little instrument called "Wolff and Son's paper cleaner," and by some a "squeegee." It can be easily made, or it may be purchased for sixpence at the makers', Great Queen-street, London. It may be described as a piece of vulcanised India-rubber about three inches long, nipped and fastened between two pieces of wood, and projecting beyond their edges about a quarter of an inch. I first saw one at work in Mr. Edwards's printing establishment about a year ago. It was used for the purpose of squeezing out the superfluous moisture from the tissue and the transfer paper, and for bringing them into the most intimate contact. It serves admirably for this work.

When the exposed tissue has been thus transferred, allow it to get partially or altogether dry before commencing to develope the picture.

7. *The Development.*—Pour into a dish a sufficient quantity of warm water, temperature from 80° to 90°, to cover the block, or to allow of its floating. Some kinds of boxwood are specifically lighter and others heavier than water. If the former, it is only necessary to allow the block to float, picture side downwards, and let it develope itself, after the released tissue has been removed. If the wood is specifically heavier than water, then place the block, picture side upwards, in the dish, and allow it to remain there undisturbed for two or three minutes. By that time the tissue, with some superfluous gelatine and pigment, can, in all probability, be easily removed; but if any resistance be shown allow the block to lie a little longer in the water. After removing the tissue the clearing up or development of the image may be allowed to go on for some time in the same water, and afterwards completed in a fresh and clean supply. In cases of over-exposure much hotter—sometimes nearly boiling—water is often required; but it is by far preferable to complete the development, if that be possible, in lukewarm water.

The image clears up or is developed more rapidly if the picture side of the block be placed downwards in the warm water. For this purpose I employ, when necessary, a conical dish, pour into it a sufficient quantity of water, and thrust the block, face downwards, as far as it will go. The sides of the tapering glass prevent the surface from reaching the bottom. There I leave it to develope itself, pulling it out occasionally to watch progress and see whether hotter water is required.

Cautions.—The side of the block on which the image is should never be allowed to touch the bottom of the dish, because that is sure to injure the picture; nor should the surface be touched with even such a soft body as a camel's-hair brush till quite dry.

As a farther guide to the engraver, I always lay down two reversed duplicates on paper—one of them being lightly printed and the other deeply. The former is to indicate the minutest form in the deep shadows, and the other to show the traces of shading in the high lights. For such transfers common albumenised paper answers very well; but the albumen must be previously coagulated by brushing over its surface strong methylated alcohol. The coagulating energy of the alcohol is much enhanced by mixing with it a little kreosote. When this paper is dry, the best and simplest mode that I know of for making the transfer is to press together the surfaces of the albumenised paper and the tissue under cold water, laying this compound film on a plate of glass and rubbing out the superfluous water with the "squeegee," as before. There is not the least necessity for passing the transferred tissue through a rolling press, as the "squeegee," if properly used, causes perfect adhesion. Hang up to dry, or partially dry, for half-an-hour or so, and develope in warm water, finishing with cold.

I did not think it necessary to mention, because I suppose every photographer to be aware of the fact, that all operations with the sensitive tissue, except the exposure, must be conducted in the dark room. GEORGE DAWSON, M.A., Ph.D.

POUNCY'S CARBON PROCESS.

THE short article in the last number of the Journal, in which regret was expressed at not having received a fuller report of my remarks made at the Bristol Photographic Society, calls for a line or two from me.

My reasons for coupling Mr. Blair's name with Mr. Pouncy's are because I believe, from the evidence I have examined, that Mr. Pouncy is the *practical* inventor of carbon printing, in the same sense that Archer was of the collodion method, or Professor Wheatstone of the stereoscope. The idea of collodion being so used was made known some time before Archer demonstrated its practical use, and many have read how far back Brewster tried to prove the law of binocular vision had been observed. But what better was the world until observation resulted in practice through the labours of Wheatstone and Archer?

I am sorry you cannot perceive "the services Mr. Pouncy has rendered to photography as bearing in any degree upon carbon printing as practised in the present day." Were you right as to Mr. Pouncy's speciality (which I think you are not) that would not alter the case. The first carbon prints he made were on paper—to a great extent in the same materials as are generally used now, and, excepting Mr. Blair's addition, were the same in principle as to mechanical manipulation. Mr. Sutton in his pamphlet states boldly that Mr. Pouncy was the first who *practically* worked in carbon, and in Mr. Simpson's book I find nothing that clearly contradicts that statement. No one doubts that various theories had been published, and that in them lay the embryo of the present methods. I claim nothing more for Mr. Pouncy than that he was the first who, by great persistence, reduced theory to practice.

I couple Mr. Blair's name with that of Mr. Pouncy in the same sense that I couple the name of Mr. Goddard or M. Fizeau with improvements in the Daguerreotype. Mr. Pouncy was the first to show a passable photograph, in the true sense of the word, in carbon. Mr. Blair was the first to suggest a method of lighting, which, when applied to Mr. Pouncy's plan, formed the brain, spinal column, and complete nervous tissue, so to speak, of the present most successful methods of carbon printing. You will see that it is not his recent patent that has influenced me on the above argument, except so far as it is a falling back upon what he did originally.

When I made my remarks before the Bristol Photographic Society I was under the impression that Mr. Pouncy would be induced to throw aside the question of a patent, and confine himself to the manufacture of material and to printing. In my expectations in this respect I am disappointed. I do not believe that any of the patents are valid; it only requires the expenditure of some money and a little spirit in order to set carbon printing free. JOHN BEATTIE.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER II.—IMITATION ENGLISH LENSES.—OVER AND UNDER CORRECTION.

THE glass of which a photographic lens is constructed exercises upon it an influence of a most important nature. In our first chapter we have said that the lenses of English makers have been "imitated."

In order to show the value of an imitation lens we have carefully examined one of this class and compared it with the lens of which the former was the professed imitation. It was a quick-acting *carte* lens of a wide angular aperture, and the imitation was such a counterfeit of the real lens that we can easily imagine the instructions given to the workmen to be as follow:—Remove these lenses from their cells, measure with the greatest accuracy the curves, diameter, and thickness of each, and then make others *in every respect alike.* To the brass worker instructions of a similar nature would be given respecting the mounting; and if the imitation lenses were burnished

into the imitation mountings, in what respect, it may be asked, would the counterfeit be inferior to the genuine?

The counterfeit which we examined possessed all that elegance of finish which characterises the work of skilled French mechanics; and but for the absence of the name from one it might have been thought that both emanated from the same maker. It was not a bad lens—far from it indeed; but when both were carefully compared in the camera a difference was at once apparent. There was a slight variance in the focus, but there was a marked difference in the definition of the two pictures which we took. The subject was a range of buildings about two hundred yards distant, and on the walls of which were displayed large printed bills.

By permission of the owner we had the lenses taken asunder, and each subjected to a careful scrutiny. The curvatures of each surface had certainly been very cleverly imitated. In the front lenses, for example, the crown glass of one fitted the flint of the other, and *vice versâ;* but in the *colour* of each flint there was an appreciable variation. Not only so, but, although of the same diameter and thickness, the French flint was so much heavier than the English that it was felt to be almost a work of supererogation to ascertain—as we, however, afterwards did—the difference between the densities of the two.

We have adduced this case to show that, although a counterfeit may be as like a genuine lens as one pea is said to be like another, there may still, for want of the guiding master mind by which the original was produced, be one or two apparently trifling points overlooked or probably unable to be understood, but the presence of which, as parts of an important whole, are requisite in order to the formation of an instrument of the highest class.

Achromatism in a lens is an essential requisite. There are two kinds of achromatism, on which we shall say a few words, and which, for want of more distinctive names, we shall designate as *visual* achromatism and *actinic* achromatism.

The nature of the former may be understood from the experience of Professor Piazzi Smyth, who, when undertaking the Admiralty astronomical experiment of 1856 on the Peak of Teneriffe, found that when taking a photographic view of the sun with the Sheepshank's telescope (a five-foot equatorial) of the Edinburgh Observatory, all his attempts at obtaining good definition were unsuccessful "until by a series of experiments the very unexpected result was found that the chemical focus of the telescope was ·5 *inch longer* than the visual."

It is not possible by photographic lenses to unite together in one focus *all* the rays that come from a body, and hence opticians so correct them as to combine those that are most useful for the purpose required. In a telescope, for example, an object glass must have such a degree of over-correction that it shall produce a visually brilliant image upon the retina after passing through an eyepiece made of non-achromatic lenses; whereas the photographic objective must be corrected with special reference to the grouping together of as many of the chemically active rays as possible, together with the yellow or luminous rays of the spectrum. The aggregation of the former secure intensity, while the junction with them of the latter give the coincidence of the visual with the chemical foci.

It was formerly considered to be impossible to make a lens possessing the highest order of intensity which should have these foci coincident, but it is now effected by every good optician. Large apertures, crisp definition, with perfect union of the luminous and actinic foci, are now found happily blended in all our best lenses.

In order to secure such an union the skill of the optician is taxed to select the special kind of glass best adapted for his purpose, and which in the case of a photographic lens is not necessarily that which he would select for a telescopic or microscopic lens. On this subject Monckhoven observes:—

"In all cases the achromatism determined by calculation is never exact. * * But the optician modifies by practical experience the results furnished by calculation. With two prisms only two colours, or at most three, can be achromatised by a good selection of the flint and crown glass; for to obtain complete achromatism it would be necessary that the ratios of dispersion of the substances which form the prisms should be equal in all parts of the spectrum, and hitherto no such substances have been discovered. But two prisms suitably chosen as to angle and material are sufficient for practical purposes."

If the reader be in possession of a lens which, like the telescope described above by Professor Smyth, will not work to visible focus, but which is otherwise good, he need not discard it; because, by adopting the expedient we are about to relate, it may be converted into a good and serviceable instrument.

If the lens be *over*-corrected, as is most likely to be the case, after the focus has been obtained on the ground glass the lens will require to be pulled out a little way in order to give a sharp working focus on the same plane. Ascertain by an experiment the exact difference between the two foci; that is, the length that the lens was withdrawn from the ground glass.

Now, having procured a few concave lenses of very weak power (spectacle glasses will do), mount one of them in such a way as to lengthen the focus of the combination an amount equal to the difference between the two foci; and, in determining this, let it be observed that the position of the concave lens will influence the focus. It is, however, better that a lens be selected of such a focus as to effect the alteration when placed between the front and back lenses of the combination, and near to the place where the diaphragms are inserted. Let us, then, suppose that such a lens has been selected and mounted so as to drop into the tube like a Waterhouse stop, the manner of proceeding to take a picture is as follows:—Insert this "lens stop" and focus as sharply as possible. Take care never to focus without it. Now insert the camera slide containing the plate; remove the "lens stop" and expose. Take care never to expose while this lens is inserted. The result will be an absolutely sharp picture, and this no matter at what distance from the camera the object is situated.

It is a matter of great surprise to many even experienced photographers to find that, on placing a very fine piece of ground glass in exactly the same position as the plate which received the sharp picture, the picture defined upon it is often sadly out of focus.

If the subject or sitter were always placed at the same distance from the camera, a remedy for non-coincidence of foci could easily be provided by such a slight alteration of the focussing-frame or the dark slide as would suffice for the sensitive plate being permanently removed to a greater distance from the lens than was the ground glass; but the distance between the two is variable in proportion to the relative distance of the latter, and the evil can only be effectually and easily obviated in the manner described.

If the lenses were *under*-corrected (a fault we very seldom notice) and required the sensitive plate to be nearer than the ground glass to the front of the camera, similar means to those above described would have to be adopted, only in this case the adjusting central lens would require to be a convex instead of a concave. We believe that such lenses may be easily procured from nearly every optician and spectacle dealer at a cost of a few pence.

PERSISTENCE OF VISION.

THE following communication, on the persistency of images on the retina of the eye, was made by M. Bertsch to the Photographic Society of France, at a late meeting:—

IN the course of my investigations as to the duration of the intermittent periods of the electric spark and of the voltaic arc, I have been led to make the experiments on which I am about to address you. If they have but distant relations with general photography, they may, I hope, tend to solve certain problems, which do not lack interest, relating to the processes called instantaneous.

When a lighted object appears to us during only a very short time—that is to say, for an instant—it leaves upon the retina an impression which is not as suddenly effaced, but which, on the contrary, exists during a certain brief period. I am endeavouring at the present time to measure the duration of that existence, and to ascertain whether it be the same with all the rays of the spectrum. For that purpose I am constructing apparatus which will enable me to ascertain it as conveniently and precisely as possible. In the meantime, by means of the imperfect instrument at my disposal, I may give you an idea of the phenomena that I am curious about, and desirous of examining relative to vision.

No doubt you are aware of the remarkable experiments, now of ancient date, made by M. Lissajous on the optical determination of the amplitude, the direction, and the number of sound-vibrations. You may have seen the luminous figures he obtains when marking out upon a vertical screen the rays of light sent out by small mirrors fixed at one of the branches of discordant diapasons, or in accordance with the third, fifth, or octave. These rays concur in the formation of regular images, always the same for the same stroke. You have, perhaps, witnessed the experiments of M. Helmholtz on the appearances which little flames present, in communication, by means of an elastic membrane, with a column of air put into a sonorous pipe, and sent out into the field of vision by a cubical mirror turning in a parallel manner upon an axis passing by two horizontal opposite faces. These curious images are not altogether real, and would not subsist if the different parts of which they are composed did not leave upon the retina, at the points which receive them, impressions of some duration.

The retina is, as you are aware, a membrane which lines the foundation of the eye. In this extremely thin membrane are unfolded, perpendicularly to its plane, an infinite number of nervous threads of the greatest fineness, each of which transmits to the brain the luminous im-

pression which it receives. This organ, at the focus of the optical apparatus of which the eye is composed, may be compared to the ground glass of our cameras; only, as I have stated, this marvellous focussing screen is of extreme sensitiveness, and has a rapidity of impression almost infinite. It receives the image, as it were, instantaneously, but each of its members vibrates for a certain time under the luminous shock which it has received.

It is estimated that the duration of each instantaneous shock is one-tenth of a second of time before it is extinguished. Supposing, then, that before the end of this persistency a new and different impression should strike another point of this organ, the image transmitted to the brain would be formed of two partial impressions, the first of which would not be effaced when the second was produced. It would be the same with all partial images which might, in the interval of the tenth of a second, pass in the field of vision affecting different points in the plane of the retina.

If in darkness I cause to revolve before you (and this is a child's game known to everybody) a live coal or a lighted stick, we shall have the sensation of a circle—that is, when I shall have run through the circumference in the tenth of a second. If I reverse the experiment, rendering the light intermittent by ten isochronal interruptions, and by substituting a small mirror for the lighted stick, you will see that my circular movement, supposed to be very regular, is no longer a continuous circle, but a circle composed of ten small mirrors immovable and at equal spaces. If, preserving to the light the same intermission for a tenth of a second, I slacken the movement a single equal fraction, then the ten mirrors will appear to move in a sense opposite to their real direction. By increasing, on the contrary, the rapidity one-tenth of a second, they will appear to you to progress slowly in the real direction of their movement.

What would take place under these circumstances on a photographic plane rendered sensitive to instantaneity? It is easy to foresee it. The mirror, having only made one turn, would present in photography the same image that the eye has perceived—that is to say, a circle composed of ten mirrors at equal distance the one from the other. We should be able, then, to affirm that the chemical action of its light is produced in the tenth of a second. But if, on the other hand, in order to obtain an image it required two turns, we should be obliged to double the time by converting it into the fifth of a second. By disposing the movement and the interruptions of light chronometrically, we shall find in this experiment a rigorous means of appreciating the real degree of sensitiveness of the combinations employed.

In order that these experiments may be thoroughly intelligible, I have prepared the apparatus before you. Symmetrical drawings are traced on card discs of a ray from ten to fifteen centimetres. I place them horizontally on the vertical axis of a turning apparatus. Two or three decimetres above I place at the bottom of a skylight a tube of rarified gas so arranged that the light may be concentrated upon the drawings. By means of an enumerating reel I convert the dynamic current of a galvanic pile into alternate static currents which pass through the tube. The electric spark, as you know, becomes under these circumstances a spray sufficiently luminous to light the discs.

As the hammer which interrupts this reel is not a diapason, so, on the other hand, the turning apparatus has no regulator. You will see, when I cause the current to pass, the drawings of the discs become transformed every moment according as one of the two becomes an aliquot part of the other or otherwise. I cause the current to pass and set the apparatus in motion. The disc appears as if it were of one uniform tone, which proves the rapidity of its rotation. By the shrill sound of the vibrating blade of the hammer of the reel you will note the great rapidity of the interruptions and of the intermission of light.

Now let us place ourselves in the dark. The drawings reappear immediately upon the disc perfectly clear. They do not resemble a real drawing, which shows that the interruptions are not divisible in the entire number by the elements of the first drawing, or, rather, that these elements do not return at equal times to strike the same points of the retina of the eye during the shining of the light. The disc appears to stop; the coincidence between the movement and the shining is then perfect; the primitive drawing reappears. If I press the button of the instrument that interposes, by a little manipulation I manage in the same time to double the number of interruptions. The relations continuing the same, the image is not transformed. A little stronger pressure and everything changes as by enchantment; the disc appears to turn in a contrary sense. I modify at my pleasure the number of interruptions, and you see that the drawing is quite changed. The centre turns to the right, the middle part rests immovable, the border flies towards the left, and the drawing, whatever it be, is always clear.

I should not have presented an apparatus so primitive if the very imperfection of its mechanism did not bring with it, as you see, a share of the picturesque to these various images.

A Fair Inference.—Amateur artist is seated under a snug little portable tent, and is discovered hard at work placing a scene on his canvas.—*Chawbacon:* "Raything early, Measter." *Amateur:* "Not very; it's twelve o'clock." *Chawbacon:* "Aye, Aye! But I mean you're raythur earlier than t'others. Fair doan't begin till Monday."—*Fun.*

ON THE ATOMIC WEIGHT OF ALBUMEN, AND THE COMPOUNDS FORMED BY SENSITISING A CHLORIDED AND NON-CHLORIDED ALBUMENISED PAPER UPON A SOLUTION OF NITRATE OF SILVER.

IN TWO CHAPTERS.—CHAPTER II.

The last chapter concluded with a puzzling question, viz.:—As the various atomic weights there given for albumen agreed very nearly with the results of its analysis, and therefore might be considered as pretty accurately representing its constitution, which of them represented its combining molecule—that is, the atomic weight with which it enters into the composition of the compounds, termed "albumenates?"

Fortunately it is not necessary for photographers to solve this puzzling question; and they have, therefore, only to deal with the amount of nitrate of silver required to form the albumenate. Now, whichever of the various atomic weights given in the table at page 209 really represents the combining molecule of albumen is of very little consequence with respect to the amount of nitrate of silver that will be required, as this will differ but very slightly. In fact, so little will it vary that even taking the two extreme atomic weights in the table, viz., Lieberkuhn's and my own, and considering albumen as being bibasic—that is, requiring for one atom of albumen two of nitrate of silver—the difference in the quantity required will not be more than three grains in a whole sheet of paper; and it is scarcely necessary to say that this slight variation in the amount of the free nitrate in the sensitised sheet is of no importance when baths of the usual strength are employed.

Although photographers have to deal with albumenate of silver, what may be the nature of this compound, and whether one or more than one compound is formed by the act of sensitising a chlorided albumenised sheet of paper upon a solution of nitrate of silver, is in no way affected by whatever may be the real atomic weight of albumen.

This brings us to the question—What is an albumenate of silver? In considering this question we must first take non-chlorided albnmen. Dr. Löwig says:—

"If to a solution of albumen we add a solution of metallic salts, as sulphate of copper, nitrate of silver, bichloride of mercury, &c., precipitates are formed which consist of albumen-metaloxyd and of the compound of albumen with the acids. The latter can be removed with water, whilst the albumen-metaloxyd remains undissolved."

According to this statement (which we have no warranty for disbelieving) when a non-chlorided albumenised sheet of paper is sensitised upon a solution of nitrate of silver two compounds are formed—one an albumenate of silver, consisting of albumen and oxide of silver, and the other a compound of albumen and nitric acid.

Considering that Dr. Löwig's work was published in 1851, and translated into English in 1853, it seems extraordinary that little more, if anything, is known respecting the compounds formed by sensitising chlorided and non-chlorided albumenised paper upon a solution of nitrate of silver. However, in 1863, Dr. J. Emerson Reynolds published in The British Journal of Photography, Vol. X., his interesting *Contributions to the History of Albumen and Certain of its Compounds with Metallic Oxides*, in which, at page 252, he confirms Dr. Löwig's statement by saying he believes the results of his experiments prove that, "leaving the chloride out of the question, our ordinary photographic paper when sensitised contains coagulated albumen in addition to albumenate of silver." I doubt very much, however, whether the chloride can be left out of the question when our ordinary chlorided albumenised paper is sensitised upon a solution of nitrate of silver; but this is a matter we shall deal with presently.

We come now to a statement which I cannot help thinking is based upon error; at all events we have no proof that it is otherwise than a mere presumption, and it is rather singular that it emanated from one who had written—"I am of opinion that only matters of fact should be spoken of in photographic researches." In the *Photographic News*, Vol. X., for 1866, at page 354, there was published a translation from the *Photographisches Archiv*, entitled *Economical Process for Printing Positives*, by Dr. Schnauss. From this I shall merely extract what is necessary for my present purpose. Dr. Schnauss commences by saying:—

"It may be considered as an admitted fact that the beauty of positive photographs on paper depends, not upon an absolute quantity of chloride of silver, but upon the silver found in excess. * * * We may conclude that hitherto we have, perhaps, used too great quantities of chloride of silver uselessly, or, what amounts to the same thing, we have salted the paper too much; besides, we have not taken the nature of the albumen into consideration. On account of its tenacity a very thick coating remains upon the paper after it is dry—a coating that contains a notable quantity of salts. * * * We have also completely neglected to take into account the chloride contained naturally in the albumen dried upon the paper—a quantity by no means insignificant, since, according to Poleck, it contains *more than one-half of one per cent.*, a quantity in itself sufficient to produce the chloride of silver necessary for a copy, requiring then only a small quantity of nitrate of silver for this salt to be in excess."

The words I have put in italics are evidently, from what follows, a mistranslation, and should have been *more than one and a-half per cent.* Dr. Schnauss says:—

"I wish to give in this place the exact proportions of white of egg, such as is constituted (according to the researches of Poleck) in the formation of the sensitive coating. Dried albumen contains 3·042 per 100 of soluble ashes, and if we reckon how much chloride in all the dried albumen contains, we find it

to be 1·53 per cent. * * * * To distinguish this process from the ordinary one we may name it the 'albumenate of silver process,' even though the chlorides present play an essential part in the operation; for we cannot separate the chloride from the natural composition of white of egg."

Dr. Schnauss thus virtually asserts that when a sheet of non-chlorided albumenised paper—which is what he uses in his "economical process"—is sensitised upon a solution of nitrate of silver, two compounds are formed, viz., a chloride of silver and an albumenate of silver. Surely Dr. Schnauss must be in error when he states the chlorides naturally present in albumen to be but 1·53 per cent.; for, according to Poleck, 100 parts of the ash of the albumen of poultry eggs consists of 25·67 chloride of potassium, 8·57 chloride of sodium, 5·43 potash, 12·49 soda, 6·25 lime, 7·03 magnesia, 2·09 sesquioxide of iron, 15·28 phosphoric acid, 0·84 sulphuric acid, 9·01 carbonic acid, and 7·05 silica, and that the chlorides and other soluble salts form the larger portion of this ash.

We see from this that the chloride of potassium and the chloride of sodium form together more than one-third of albumen, viz., 34·24 parts out of the 100, and, therefore, much more than "sufficient to produce the chloride of silver necessary for a copy." "If"—yes! *if.* Now, this apparently insignificant little word of two letters is a very important one. There is, undoubtedly, more than sufficient chloride naturally in the albumen to furnish the print with the chloride of silver that is considered necessary for its production, *if* the silver in the sensitising bath will abandon the nitric acid with which it is in chemical combination, and eliminate the chlorine from the chlorides of potassium and sodium and enter into combination with it separately from the other constituents of the albumen, and thus form chloride of silver. But, will it do so? that is the question. Methinks not. *If* it will do so, what is there left to form the albumenate of Dr. Schnauss? According to Poleck, potash, soda, lime, magnesia, sesquioxide of iron, phosphoric acid, sulphuric acid, carbonic acid, and silica.

If the chlorides have the power to act independently of the other constituents of albumen, and thus form a separate and independent salt, when a non-chlorided albumenised paper is sensitised by a solution of nitrate of silver, why may not some of the other constituents do the same? Why should they be expected to band themselves together and form the albumenate of Dr. Schnauss? But I question verymuch whether it is in their power—without the aid of the chlorides—to form the compound which we know as albumenate of silver. Most assuredly they cannot if chemists are correct in their opinions respecting this compound, for every one who writes upon the subject speaks of albumenate of silver as the compound formed by a chemical combination of oxide of silver and albumen as a whole; that is, the albumen is considered to enter into combination with oxide of silver as a simple element.

We are told that "albumen is a weak acid, and apparently bibasic;" that is, it requires two atoms of base to form a neutral chemical compound. Now, Lieberkuhn considers his formula represents "the molecule of albumen as it exists in the metallic albumenates." We will therefore take his formula, *plus* two atoms of oxide of silver, for the formula of albumenate of silver, viz., C_{144}, H_{112}, N_{18}, O_{44}, S, + 2 AgO, which gives its atomic weight as 1844—that is, according to Lieberkuhn.

Now let us assume that Lieberkuhn's formula really does represent the molecule of albumen as it enters into combination with oxide of silver. If we refer to the table at page 209, which gives the formulæ for albumen as deduced by various persons from its empirical formulæ, we shall find that Lieberkuhn's gives the lowest atomic weight, and therefore, with the same amount of albumen, his formula will require the largest quantity of oxide of silver to form an albumenate of that metal, as the quantity required is in inverse proportion to the atomic weight of the albumen.

We have shown that the quantity of chloride naturally present in albumen is, according to Poleck, 34·24 parts in 100. Now this is an enormous percentage. If, then, these 34·24 parts of chlorides of potassium and sodium in 100 parts of albumen be considered as forming chloride of silver when sensitised upon a solution of nitrate of silver, they will abstract nearly eighty-four grains from the bath; whereas, if they be considered as forming albumenate, they would only abstract about eight grains, even if we reckon albumen as being bibasic.

Most assuredly, therefore, if the statement of Dr. Schnauss be a fact, more nitrate of silver will be abstracted from the sensitising bath than will be the case if his statement be a fallacy; consequently his "process" has no right to be designated "economical." Moreover, methinks the very circumstance of his using a sensitising bath of only seven grains to the ounce fully proves that his idea is not based upon fact.

We have seen what Dr. Löwig says about the effect produced when metallic salts are added to albumen, viz., that "precipitates are formed which consist of albumen-metaloxyd and of the compound of albumen with the acids;" we have also seen that this is corroborated by Dr. Emerson Reynolds. Neither of these writers make any mention of a chloride of the metal being formed, and, as far as my own reading extends, I have never met with any writer who even hinted at such a thing as being in any way *probable.* I think, therefore, we are perfectly warranted in not giving any credence to the statement of Dr. Schnauss—that the sensitising a non-chlorided albumenised paper upon a solution of nitrate of silver produces chloride of silver in addition to an albumenate of silver.

GEORGE PRICE.

(To be concluded in our next.)

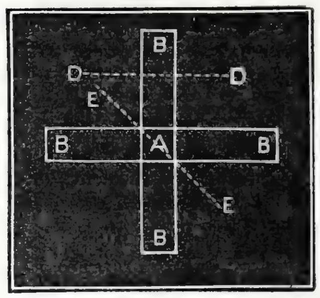
PROFESSOR TYNDALL ON LIGHT.

(CONCLUSION.)

DR. JOHN TYNDALL, F.R.S., ended his lectures on *Light* on the 3rd of June. I have already summarised all but his two concluding lectures, which were upon polarised light and the properties of the interstellar ether.

Professor Tyndall said that the double refraction of Iceland spar was first discovered by Erasmus Bartholinus, in 1699, and Huygens accounted for the phenomenon upon the wave theory. The latter philosopher discovered that, when light is transmitted through Iceland spar, the beam is divided into two of equal intensity; but, when either of these beams is sent through a second crystal of Iceland spar, it is usually divided into two of unequal intensity, and, in certain positions, one of the beams is quenched altogether. In 1808 Malus examined with a bi-refracting prism the solar light reflected from a glass window, and found that, in a certain position of the spar, the ordinary image of the window wholly disappeared, owing to some new property impressed upon the light by its reflection from the glass. Tourmaline has the same effect upon light transmitted through it. The lecturer illustrated this by projecting the images of two tourmaline crystals upon the screen by means of the electric lamp and an object glass. The waves of light which, before passing through each crystal, vibrated in all directions, after passing through each crystal vibrated only in a plane parallel to the long axis of the crystal. Thus, no waves of light which were transmitted by the vertical tourmaline B B, *fig.* 1, vibrated in the direction denoted by the dotted line D D, nor could the crystal transmit any rays thus vibrating at right angles to its longer axis. Hence, when two tourmalines were crossed, as shown in the diagram, no light could pass through A, which, consequently, appeared as a black square upon the screen. The lecturer said that, when purchasing tourmalines, it is best to choose those which have a greenish hue, as such polarise light more completely than tourmalines tinted with other colours.

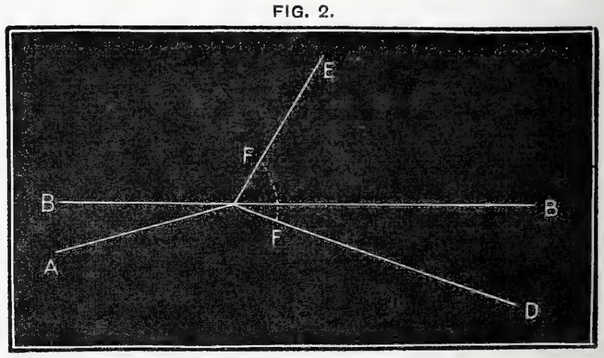
FIG. 1.



Professor Tyndall described a beam of plane polarised light in the following clear language:—"Imagine a cylindrical beam of light with all its ether particles vibrating in the same direction—say, horizontally—looked down upon vertically, the ether particles, if large enough, would be seen performing their excursions to and fro across the direction of the beam. Looked at crosswise—horizontally—the particles would be seen advancing and retreating, but their paths would be invisible, every ether particle covering its own path. In the one case we should see the lines of excursion; in the other the ends of the lines only."

When speaking of the polarising of light by reflection from glass, he said that the beam is partially polarised at all angles of reflection, but perfectly polarised at one angle only. This angle augments with the refractive index of the substance; for water it is 53°, for glass 58°, and for diamond 68°. The direction of the vibrations of the polarised beam is parallel to the polarising surface. The total polarisation of light, both by reflection and refraction, is governed, he said, by the following curious law:—"Light is perfectly polarised by reflection when the refracted and reflected rays together form a right angle." Thus, let B B, *fig.* 2, be the reflecting surface and A the incident beam of light.

FIG. 2.



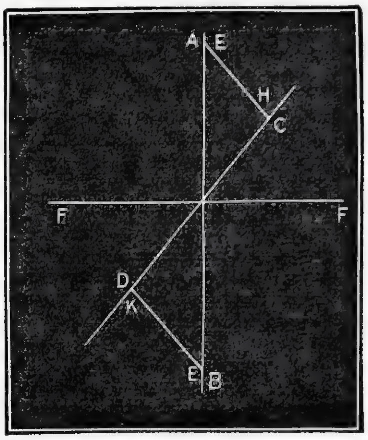
When the right angle F F is made by the reflected beam D and the refracted beam E, both the refracted and the reflected beams are perfectly polarised. In his experiments showing the polarisation of light by reflection Professor Tyndall used single plates of glass roughened and blackened at the back. When polarising light by refraction he used a bundle of transparent sheets of glass. For double refraction very fine crystals of Iceland spar were employed.

As already explained by the aid of *fig.* 1, when two tourmalines are placed with their axes crossed no light can pass through A; but when the crystals are placed over and parallel to each other, light passes through both of them freely. When they are placed over each other, so as to form the letter X, a portion of the light gets through the centre where they cross each other; for, in a manner similar to the resolution of

forces in ordinary mechanics, an oblique vibration may be resolved into two—one parallel to the axis of the tourmaline and the other perpendicular to the axis. The latter component is quenched, and the other is transmitted.

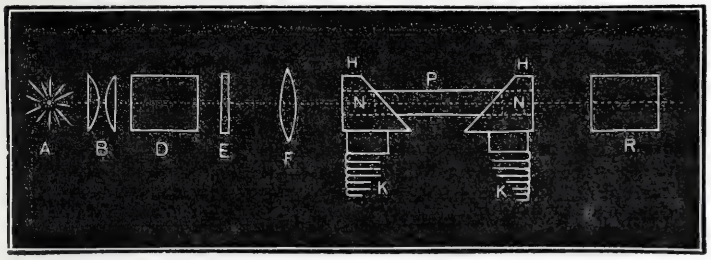
Suppose, now, a third plate of tourmaline to be pushed obliquely, as at E E, *fig.* 1, between the two with their axes crossed: as it is pushed in it will appear to scrape the darkness away and will let light come through A, though the two crystals would before let no light pass through A. Let A B and F F, *fig.* 3, be two tourmalines with their axes crossed, C D a third tourmaline introduced obliquely, and let the light be supposed to come through the three crystals from behind. The ether vibrations will be divided into two, and the C D portions only will get through the first two crystals, whilst half the remaining vibrations will get through the last crystal F F. It is the same as the resolution of forces in ordinary mechanics. Let fall the perpendiculars H E and K E, and those portions of the force will be quenched by the first two tourmalines.

FIG. 3



The lecturer then entered into the philosophy of the colours of double-refracting crystals in polarised light, the rings surrounding the axes of crystals in polarised light, elliptic and circular polarisation, and rotatory polarisation. When speaking upon the latter subject he exhibited Faraday's celebrated experiment of the twisting of a ray of light by magnetism. In this experiment the rays from the electric light A, *fig.* 4, are rendered parallel by the condensers B, and then

FIG. 4.



passed through a large Nicol's prism mounted in the brass tube D. A circular plate composed of two semicircles of right-handed and left-handed quartz was placed at E, and an image of this brilliantly-illuminated plate was thrown upon a distant screen by means of the lens F. A powerful horseshoe electro-magnet, whose ends are shown at K K, was fitted with movable soft iron poles H H, pierced with large horizontal holes N N. Between these two poles a bar of Faraday's heavy glass P was placed lengthwise, so that the light had to pass through its longer axis. Lastly, a second Nicol's prism was placed at R, and the screen was fixed a long distance off, beyond R. The halves of the image upon the screen of the plate of quartz E were usually of complementary colours, but a position was found where the whole circle appeared uniformly of a puce colour. A current of electricity was then sent round K K, and instantly one half of the circle of light upon the screen became red and the other half green. When the direction of the current of electricity was reversed the red and green halves of the circle upon the screen changed sides. These strange effects are not obtainable when the heavy glass bar P is removed, and they are probably caused by some strain upon the atoms of the glass set up by the magnetism. It is a noticeable fact that no theory could have led Faraday to make this curious discovery, which would have been unknown to the world but for his indefatigable industry as a practical experimentalist; indeed, now that the facts are known, it is difficult to make a theory to fit them.

At the close of his series of nine lectures Professor Tyndall said much about the nature of the interstellar ether, and the following are some portions of his closing address:—"I have endeavoured in these lectures to bring before you the views at present entertained by all eminent scientific thinkers regarding the nature of light. I have endeavoured to make as clear to you as possible that bold theory according to which space is filled with an elastic substance capable of transmitting the motions of light and heat. And consider how impossible it is to escape from this or some similar theory—to avoid to ascribing to light, in space, a material basis. Solar light and heat require about eight minutes to travel from the sun to the earth. During this time light and heat are detached from both. Enclose, in idea, a portion of the intervening space—say, a cubic mile of it—occupied for a moment by light and heat. Ask yourselves what they are. The first inquiry towards a solution is, 'What can they do?' We only know of things by their effects. What, then, are the effects which this cubic mile of light and heat can produce? At the earth, where we can operate upon them, we find them capable of producing motion. We can lift weights with them; we can turn wheels with them; we can urge locomotives with them; we can fire projectiles with them. What other conclusion can you come to than that light and heat which produce motions are themselves motions?

"Our cubic mile of space, then, is, for a measurable time, the vehicle of motion. But is it in the human mind to imagine motion without, at the same time, imagining something moved? Certainly not. What, then, is the thing moved in the case of our cubic mile of sunlight? The undulatory theory replies that it is a substance of determinate mechanical properties, a body which may or may not be a form of ordinary matter, but to which, whether it is or not, we give the name of ether.

"* * * * The great Thomas Young never saw with his eyes the waves of sound; but he had the force of imagination to picture them and the intellect to investigate them. He rose from the investigation of the unseen waves of air to that of the unseen waves of ether, his belief in the one being little, if at all, inferior to his belief in the other. One expression of his will illustrate the perfect definiteness of his ideas. To account for the aberration of light he thought it necessary to assume that the ether which encompasses the earth does not partake of the motion of our planet through space. His words are:—'The ether passes through the solid mass of the earth as the wind passes through a grove of trees.' This bold assumption has been shown to be unnecessary by Professor Stokes, who proves that, by ascribing to the ether properties analogous to those of an elastic solid, aberration would be accounted for without supposing the earth to be thus permeable. Stokes believes in the ether as firmly as Young did. I may add that one of the most refined experimentalists in France, M. Fizeau, who is also a member of the Institute, undertook to determine, some years ago, whether a moving body drags the ether along with it in its motion. His conclusion is that part of the ether adheres to the molecules of the body and is transferred along with them."

At the close of his address, after stating how the planet Neptune was discovered by Adams and Leverrier, by means of a true mathematical theory, Professor Tyndall said:—"It so happens that the undulatory theory has also its Neptune. Fresnel had determined the mathematical expression for the wave surface in crystals possessing two optic axes; but he did not appear to have an idea of any refraction in such crystals other than double refraction. While the subject was in this condition the late Sir William Hamilton, of Dublin, a profound mathematician, took it up and proved the theory to lead to the conclusion that at four special points of the wave surface the ray was not divided into two parts, but into an infinite number of parts, forming at those points a continuous conical envelope instead of two images. No human eye had ever seen this envelope when Sir William Hamilton inferred its existence. If the theory of gravitation be true, said Leverrier, in effect, to Dr. Galle, a planet ought to be there; if the theory of undulation be true, said Sir William Hamilton to Dr. Lloyd, my luminous envelope ought to be there. Lloyd took a crystal of arragonite, and, following with the most scrupulous exactness the indications of theory, discovered the envelope which had previously been an idea in the mind of mathematicians. Whatever may be the strength which the theory of gravitation derives from the discovery of Neptune, it is matched by the strength which the undulatory theory derives from the discovery of conical refraction."

The Royal Institution session is now over, the last Friday evening lecture having been delivered on June 4th by Dr. Wm. Odling, F.R.S., under the presidency of the Prince of Wales.

William H. Harrison.

PHOTOGRAPHIC SOCIETIES: REPORTING THE MEETINGS.—*(Concluded.)*

The hope of reward and the fear of punishment the theological world has demonstrated to be the most useful instruments which can be employed amongst mankind for the cultivation of virtue and the suppression of vice. The latter of these two instruments—the fear of punishment—would seem to be far more efficacious than the former as a means of keeping frail humanity in something like an approximation to order. It is, at least, the means adopted by the legislature in this our own civilised country. A man may be honest, truthful, industrious, useful, and respected, but the state offers only for these qualifications such small rewards as enfranchisement. The higher honours and more substantial rewards which it is capable of giving seem to be lavished indiscriminately, with little or no reference to the actual merits of the recipient. Not so the punishments of the state, which, if not distributed with absolute justice, are at least inflicted with a wonderful approximation to it. That the influences occasioned by experiences adverse to our liking are, as a rule, of a salutary nature, seems to be the fact. "Spare the rod and spoil the child" is a maxim old enough and true enough, and applies as well to communities as to individuals. Inflict heavy taxes upon a nation which is prone to the luxury of war, and that luxury

loses much of its delight. This rule, which applies to individuals and to communities, is by no means without its bearing in the case of photographic societies. Encourage the virtues or good deeds of their members and they flourish; encourage their failings and they languish.

That the full and accurate style of reporting advocated by the writer in his last article will, to some extent, do both, and be productive of the desirable results indicated, there is good and substantial reason to believe.

The Manchester Photographic Society has been for some years in the habit of holding an annual *soirée* and exhibition, which have been as a rule, and taken "for all in all," highly encouraging and eminently successful. Crowds of the fraternity and their friends have assembled in the gaily-decorated rooms, where they have examined with interest the beautiful photographs there displayed, have witnessed the attractive experiments performed, and the exhibition of transparent photographs on the screen with feelings of the greatest satisfaction—feelings which have been shared in to their fullest extent by the writer, whose gratification in relation to such gatherings would be increased directly in proportion to their success.

Few institutions—few societies—have ever been organised without there lurking somewhere in their constitution some elements of disease or decay. Experience has shown that these elements, when compared with those of success and vigour, are eminently liable to increase and multiply. To nip them in the bud, when that is practicable, is therefore, in all probability, by far the wisest course to pursue; for mild remedies do not prove efficacious when used for the removal of aggravated disorders, experience having shown that

> "Diseases desperate grown
> By desperate appliance are reliev'd,
> Or not at all."

At the last *soirée* of the Manchester Society the writer was urgently requested by some seven or eight of the *soirée* committee to write the official report of the meeting—a performance, when properly done, neither too easily nor too agreeably accomplished. The duty was one which he accepted with the utmost reluctance, inasmuch as he felt there were many others in the Society who were more competent to perform it, and upon whose exertions on behalf of the general body fewer calls had been made. Some of the gentlemen of the committee proposed that the report, when written, should be submitted to them before publication; whilst one or two, speaking in reference to the anticipated perfections of the exhibition, made the "special observance" that the writer must not forget to "daub it on thick." A report cut down, extended, or altered by a number of gentlemen who profess themselves incompetent to produce a report individually (although, by-the-bye, the profession was, on the part of *some*, more modest than correct) could hardly be expected to be a particularly coherent affair, nor particularly accurate, either, when the colouring was intentionally in some parts "daubed on thick." As the writer invariably declines to authenticate with his name sentiments which are not his own, or statements of the absolute veracity of which he is not convinced, he, of course, could not consent to produce a report which was to be subjected to the variety of "correction" which, in this instance, he was led to expect. Let it be understood that he charges no one with improper feeling or wishes other than for the success of this and similar undertakings. Those who proposed to "daub it on thick," doubtless, considered that such a process would be for the general good—an opinion which may be more correct than the writer has any idea of, but from which he emphatically, but respectfully, begs to differ.

The meeting, be it remembered, was not a private one, inasmuch as it could be attended by anyone who, without giving his name, tendered a shilling each for his tickets to those who were entrusted with their sale. The reporters of the several daily papers, and some of the representatives of photographic literature were in the room, and any exaggeration of merits in the official report must surely have excited ridicule or contempt for the Society by which they were sanctioned, had such occurred; and it was with the distinct intimation that he would do his best to make the report accurate, whether to the satisfaction or the discontent of individuals, that the writer took the office pressed upon him.

The descriptive portion of the lantern entertainment gave the strongest evidence of having been very badly prepared for, and to this effect the writer delivered himself in the report alluded to. He did not say, and he did not think—nor does he now think, nor did he intend anyone else to think—that the bad management of this department lay with the unfortunate gentleman who had been selected to read the list of names of subjects and producers, which had never been furnished to him. That gentleman's attempts to acquire the information which should have accompanied the exhibition of the pictures seem to have been as great as anyone could possibly have been expected to make in the very limited time at his disposal; nevertheless there was a fault, and a grave one, somewhere. Possibly it was with the *soirée* committee at large, and if so the writer must take his share of it, as he was one of them. Possibly it was with a section of that committee; if so, the individuals composing that section are entitled to the blame. Possibly it was through the members who exhibited not furnishing the desired information, or not furnishing it in the regulation manner, and if so the exhibitors themselves were to blame. In the report it was simply stated that the fault existed. It was not stated or in any way intimated who was responsible for it; and the "pitching into" which the writer received at the following meeting of the Society was certainly unmerited, seeing that no one ventured to impugn the veracity of those statements of which they complained.

In going his round to examine the pictures individually (a kind of work for which, by the way, he does not consider himself at all too well qualified), the writer was requested by some ten or a dozen gentlemen in succession to be sure to say a word or two in praise of *their* productions. Notwithstanding the advice given him by several to whom he mentioned this fact to pass over the pictures of these gentlemen entirely without any notice, whatever their merit, he did his best to produce an accurate and reliable report, fair and just to all.

To return to the practical bearing of the subject under consideration, it remains to be determined how far the faithful reporting of a meeting tends to increase the health of the general body. The defective description which accompanied the lantern exhibition was, as stated in the report, an exaggeration of the defective management by which this department was characterised the year before; indeed, the defect alluded to has been the standing one of the *soirées* of the Manchester Photographic Society, and, with the fatal aptitude for propagation possessed by defects, has increased year by year. Several members of the Society, and among them some of the most respected, disgusted with this state of affairs, had ceased to produce transparencies for the annual *soirée*, having given up the idea of their being exhibited in a satisfactory manner. Of these some six or seven called upon the writer, privately, to express their satisfaction with his report, and to state that they would make renewed and extended exertions in the production of transparencies for the next *soirée*, as there could be no doubt that on a future occasion there would be no defective description in connection with the lantern practice to complain of. Whilst some complained that the *soirée* report was not an elegant composition, but bumped violently from one topic to another with about as much grace as is exhibited by a heavy cart in a state of progression on a rough road—which, by-the-bye, is strictly true—many have expressed themselves to the effect that it was the only full one the Manchester Photographic Society ever had; whilst others have stated that if similar reports were likely to be prepared they would take care not to be again amongst the non-exhibitors. In short, although circumstances have occurred which made the writer deem it desirable for him to tender his resignation as a member of the Society, some gentlemen have proposed that he should attend their meetings as an introduced guest, in order to report them in what they consider to be a satisfactory and useful, if not a brilliant, style. As he has no wish to produce any ill-feeling in the Society, it is improbable that he will accede to this request; but it is likely he will attend and report the next *soirée*, if his admission is, as it ought to be, procurable upon the usual payment.

The writer regrets that he is unable to give his instances of societies' defects from experiences amongst a number of such bodies. Because he confines his illustrations to the Manchester Photographic Society it must not be supposed that he entertains any ill-will towards its members as a body; on the contrary, he wishes them every success. When he considered his presence and services of use to them they were at their disposal; when he felt that his absence was considered desirable by some of them, rather than be "a bone of contention" amongst them he withdrew. It may be that he thinks he has not been used particularly well by all; but his hints for the more successful management of photographic societies have not been, and shall not be, on that account, mixed with those attacks upon individuals which detract from the dignity of any writer or any society in the habit of making them.

D. WINSTANLEY.

[We should have preferred had Mr. Winstanley treated the subject of reporting in an abstract manner, rather than have confined his observations, as he has done in this article, to the circumstances attendant upon the production of *a particular report.*—EDS.]

ARTISTIC COPYRIGHT.—The consolidation and amendment of our laws of artistic copyright have long been greatly needed, in consequence of the confused and inefficient state of the existing legislation upon that subject. At the request of a considerable number of the most eminent British artists and other persons interested in the matter, the Society of Arts again took up the question, and, under the directions of the Council, a Bill was prepared. Lord Westbury felt so much interest in it that he devoted a very considerable time to its settlement and in mastering all the necessary intricate details. That Bill, as our readers are aware, was brought into the House of Lords by Lord Westbury, where it was read a second time and then referred to a Select Committee. It is with much regret we learn that some of the members of the Committee considered it their duty to propose or support, and were enabled to carry, such amendments in the Bill as denuded it of several of the most important provisions it contained. Under these circumstances, we understand it has been determined that it will be better for artists and the public to endure the existing defective state of the laws in question for another year rather than to proceed with the present Bill in its denuded form.—*Athenæum.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 21st	Edinburgh	Hall, 5, St. Andrew-square.
,, 22nd	Bristol	Philosophical Institution, Park-st.

SOCIETY FOR THE ADVANCEMENT OF PHOTOGRAPHY, BERLIN.

A MEETING of this Society was held on the 2nd ult.,—Dr. H. Vogel in the chair.

The CHAIRMAN opened the meeting with an address having reference to the new and expeditious constitution of the Society, and congratulating the members on their prompt and decisive action in the matter, after which he read a list of the new members and of the presents made to the Society.

Herr SCHWIER then reported on his experiments with the carbonate of silver paper of Schæffner and Mohr, and laid before the meeting the comparative proofs obtained with the new and with the usual paper. The latter were treated with and without ammoniacal fumes. Both he and the Chairman expressed themselves perfectly satisfied with the "Schæffner and Mohr" paper.

Herr PETSCH spoke very favourably of the proofs, and said that he considered the new paper was certainly to be recommended for small studios and amateurs, but he feared the ammoniacal fumes would act prejudicially upon the tone.

Herr SCHWIER said this was not the case with his proofs.

Dr. D'HEURENSE wished an explanation of the singular fact that Schæffner and Mohr's paper without ammoniacal fumes had so little sensitiveness, but after being subjected to such fumes showed itself sensitive in the highest degree.

The CHAIRMAN attributed this to the union of carbonic acid and ammonia nitrate of silver being much more sensitive to light than carbonate of silver alone.

From information recently received from MM. Schæffner and Mohr, which the Chairman read to the meeting, it was stated to be much better to subject the paper itself to the fuming than by employing for this purpose the cushions in the printing-frame.

Dr. HEURENSE asked how long cushions once fumed would be serviceable.

Herr SCHWIER replied that they would be serviceable all day long; but the fresher the fuming the quicker the printing was.

Herr PRÜMM reported on the recent employment of enamel-photography by Dr. Oidtmann in the production of window pictures. A new and interesting branch of art-industry had been developed thereby, which, under the name of "pyro-photography," formed an extension of glass printing in the same manner as paper photography had done with the art of drawing.

Dr. OIDTMANN said he was quite willing to furnish burnt-in proof prints of any pictures they might be pleased to send him. He recommended Obernetter's chloride of silver paper for the production of such positives, and said the same also applied to Obernetter's process in pyro-photography.

Herr PRÜMM added that this dusting-on process was not only important to pyro-photography but also to xylography, because, in either case, a woodcut drawing was produced. He suspected that Herr Grüne operated in that way when producing his photo-xylographs.

The CHAIRMAN observed that, on the contrary, Herr Grüne transferred his collodion pictures on to pieces of wood, and then removed the collodion skin by means of a solution; the picture which remained, therefore, consisted of granules of silver. He (the Chairman) also drew the attention of the meeting to the glass painting establishment of MM. Tessie du Mothay and Marechal, in Metz, where photography was also employed with success; but they worked by a much more complicated process than either Grüne's or Obernetter's. The Grüne process he held to be, for the production of ornaments in gold and silver, of the highest importance.

Several Albert prints were then introduced, in some of which the lights were brought out in an extraordinary manner.

Herr A. BURCHARDT said he suspected that that had been effected by etching. He did not believe that absolutely pure whites could be obtained with the new process. Albert printed on a collodion layer, and very probably required some blacks which would be mixed together strong with water-colours and glycerine, which would in some measure adhere to the lights and colour them. With pure lampblack such beautiful half-tones, he believed, were unattainable.

Herr KORN said he thought the cause of many faults was the chalky ground of the paper.

The CHAIRMAN and Herr W. BURCHARDT considered those extraordinary lights had been obtained by fastening paper on the gelatine layer during the printing, which was forcibly torn off afterwards.

The CHAIRMAN feared that this might have been too often attempted, and that the plate as well as the print had been lost. It might be, therefore, that Albert had employed a peculiar paper prepared with wax or some similar substance less adhesive.

Herr KORN said he wished to be informed whether Herr Albert worked with a lithographic press. The examination of the prints led to the conclusion that they had been produced by a roller press.

The CHAIRMAN mentioned that he understood that caoutchouc rollers were then employed for printing, and that, according to the darkening of the plate, greater or lesser rollers were used with different tones of colour.

Herr KORN thought it would, doubtless, be necessary for the carrying out of the process to employ a printer thoroughly acquainted with the routine.

Herr LINDE considered it strange that Herr Albert had not brought his process into employment by printing new editions of the former results.

Herr PETSCH said that the architectural views were very clever, but he expressed himself as not particularly satisfied with the portraits by Albert's process.

The opinion was generally expressed that a correct judgment could not be arrived at from a few proof prints, however beautiful those might be, but only after a full display of proofs printed from the same plates, and the falling off from the first part to the last being taken into consideration.

The CHAIRMAN exhibited specimens of Woodbury's process, and said that Goupil and Co., of Paris, were working the process to great profit, and had promised him more than a thousand prints for the Society's journal. Goupil and Co. execute therewith only the reproductions of oil paintings, and they reckon a thousand pieces at 160 francs. He hoped within a few weeks the whole would be delivered, and he would then take an opportunity of laying them before the Society.

Owing to the lateness of the hour the rest of the business was postponed till the next meeting.

ANOTHER meeting of this Society was held on the 11th ult.,—Dr. H. Vogel in the chair.

Herr HAMMERSCHMIDT said he had succeeded, during his recent visit to the eastern cities, in photographing (by the aid of reflectors used with the solar light, as employed so successfully upon the Egyptian monuments) the dark interiors of the holy sepulchres at Jerusalem. Till then the photographs of these places had been unattainable. Owing to the bad state of his health he had been prevented bringing these proofs to lay before the meeting, but he would do so on a future occasion. He had brought a large number of pictures by Walker, of Buffalo, and Notman, of Montreal, which had been executed in the style of Adam-Salomon, and which were submitted to the Society for its opinion. In order to facilitate a comparison he also showed an original picture by the latter. In England and America he said that far-famed artist had found many admirers and imitators, but few, if any, in Germany. This might be in consequence of the direction given to the respective national tastes. Some in that country found fault with Salomon's generally too deep blacks, his immoderate affection for velvet drapery, which he took occasion too frequently to force upon his models, &c. His imitators, it must be admitted, exhibited more of what was technical than artistic in their pictures, although he confessed that some of those before the meeting were worthy of admiration.

Some proofs were also introduced from an American photographer, whose pictures, from their style, had been designated by the title of "Rembrandt effects." They consisted of pictures on deep black grounds, from which the portraits (mostly in profile) stand in bold relief. During the operation the apparatus is turned to that side (as regards the spectator) of the face which is lighted only in half-shadows. The figure merges by degrees in the dark background.

A discussion arose respecting these pictures. Many members considered the effect was not bad. Others thought the background of the picture too black.

Dr. ZENKER called attention to the fact that on several of the American pictures, as well as those by Herr Petsch, the whole countenance was kept in half-shadows—the rule in art, that the face must catch the top light, being purposely disregarded; but, nevertheless, the effect was a brilliant one.

Herr PETSCH remarked that most of the pictures were studies of heads, and the manner of lighting referred to did not suit in all cases.

Herr PRÜMM gave information respecting Walker's process for the reproduction of drawings without a camera, alluding to the proofs sent to the society by Mr. Walker, of Washington. A negative was taken from the original drawing on linen, and from the negative a very successful positive had been obtained.

Herr BURCHARDT said that so far back as 1851 he had obtained reproductions of drawings with success by a similar process, but with iodide of silver. Drawings themselves on thick paper copied well in this manner, but the process was too expensive for productions in any quantity.

The CHAIRMAN thought they would cost less than if produced with the camera.

A communication was then read relating to the private affairs of the Society; after which the meeting was adjourned.

Correspondence.

Home.

INTENSIFYING NEGATIVES.

To the Editors.

Gentlemen,—Some time ago I took a number of negatives of a place to which I have not access at present (Algiers); but find, now that I have varnished and examined them, that they are too feeble for printing.

As I have a considerable number of negatives, and as they are all uniformly thin, I would esteem it a great favour if I could be informed by yourselves, or any of your correspondents, if there be any way by which I can increase their density now that they are varnished. The varnish is part of an old stock that I purchased from Anthony, of New York, some years ago, and which I then used for varnishing my collodion positives. When the plate is slightly warmed it dries very bright and glossy.

Do you think there is any chance of my getting it removed? And, if so, will you kindly advise me what to do after it is removed? Should I apply corrosive sublimate, or would an application of pyrogallic acid and silver continue the intensification? And, if so, how should I set about it?

As I have duplicates of four or five of the negatives, I do not in the least object to sacrificing them by way of experiment, if so be that I acquire wisdom and experience enough to save and utilise the rest of them.—I am, yours, &c., A Naval Officer.

Portsmouth, July 10, 1869.

[Although in these times of transparency printing and enlarging we should not feel much disposed to make our negatives *very* dense, yet, in accordance with the request of our correspondent, we inform him how we should proceed under similar circumstances, premising, however, that he need not sacrifice a single negative in carrying out the experiment. Let him, first of all, warm the plate slightly, as if he were about to varnish it. Then pour over it some strong alcohol; sufficient, indeed, to form a raised surface all over the plate. Keep moving it slightly, so as to send it backwards and forwards in waves. When it is believed that the gum or resin has been dissolved pour it off into a bottle, and immediately apply a second quantity of the spirit previously warmed. Now place the plate on a level stand, and make up an alcoholic solution of pyrogallic acid of three or four grains to the ounce. It is better, however, to have this ready before commencing to operate. Now, pouring off the second quantity of alcohol, immediately apply to the picture the alcoholic solution of pyrogallic acid (the acid is very soluble in alcohol) to which one or two drops of a solution of nitrate of silver has been added. Great intensity can be obtained in this manner; after which proceed as usual—that is, wash, dry, and revarnish.—Eds.]

OFFICIAL *VERSUS* NON-OFFICIAL REPORTING.—POLARISED LIGHT.

To the Editors.

Gentlemen,—Permit me to say a few words on the subject of official *versus* non-official reports of photographic meetings.

Seven or eight years ago I was a member of the then existing Photographic Society of Scotland—a body which did some good in its day—and, as a member, I received a monthly journal which professed to be the organ of the Society and to contain the official reports of its meetings.

I had often thought that in these reports too little had been made of the meetings, and, when calling one day subseqently upon an Edinburgh photographer, and expressing myself to that effect, he told me that I could always depend upon finding a full report of the transactions in The British Journal of Photography; "but," added he, "it is not the *official* report, and is, therefore, not supposed to be so correct."

Curiosity, and the desire of ascertaining something that had been said by a member at a previous meeting—but for which I had looked in vain in the official and "correct" report—induced me to obtain some numbers of your Journal, which I liked so well that I have ever since been a subscriber. Upon carefully comparing *your* report with that published in the Society's own organ, I was much struck with its superiority as regards general comprehensiveness; while, in respect of accuracy, this comparison and my own knowledge of what transpired at several meetings at which I was present, convinced me that in no one point was the non-official behind the official report, while in many others it was immeasurably superior. I am a legitimatist in everything, but I confess that I do not recognise any superiority in a report *because* it may have been written by an official of the society. I like fulness, and confess to a partiality for *verbatim* reports, provided everything savouring of special puffery be rigorously excised.

But all this is "by the way," and is not the subject on which I particularly wished to address you, which is as to a practical method of improving our lenses so as to avoid the reflections from foliage caused by the polarisation of light, to which you referred in your interesting and jaunty article at page 313, entitled, *Out for a Day, and Suggestions Arising Therefrom.*

I fortunately possess a large and very fine Nicol's prism (not "Nic*h*ol" as you spell it), which was made by the late Mr. Nicol himself, and the perusal of your article led me to examine not merely vegetation, but the sea, and many other objects; and in doing so I have derived great pleasure.

The idea of attaching such prisms to our photographic lenses is so excellent that I am very desirous of doing so in my own case, but I am slightly at a loss how to proceed. My prism is a large one, but, alas! my smallest lens is very much larger. How, then, am I to apply it? The angle of vision, like that of your own and, I suppose, every other prism of this kind is very narrow—too narrow for pictorial effect.

Are there no means of so shortening the rhomb of spar of which these prisms are made as to cause them to embrace a greater range of view? Assuming this to be effected, how should I proceed next? Must I place a small lens in front, and another behind the prism? or, in other words, should I insert it inside the tube of a portrait or other combination of lenses? Or must I obtain a single landscape lens of very small diameter and interpose my prism between the lens and the diaphragm?

If the Rev. J. B. Reade (to whom photography owes so much), Dr. Millar, you, or any gentleman who has given this subject due consideration will afford me a clue to practically applying this subject to photography, I shall feel personally greatly indebted, and I am sure so will every intelligent reader of the Journal.

I feel ashamed of occupying so much of your space, and shall for the present subscribe myself,—Yours, &c., Auld Reekie.

Edinburgh, July 12, 1869.

[Perhaps Mr. Reade will kindly afford our esteemed correspondent the information desired.—Eds.]

THE PHOTO.-VELOCIPEDE.

To the Editors.

Gentlemen,—Perhaps W. J. A. G., who communicated to your Journal of May 14 something on velocipedes, will kindly tell us more about the comparative advantages of the bicycle over the tricycle as regards speed and labour, no weights being carried. What are the comparative distances that can be run with the same amount of labour? It is very important to scores of persons at the present moment, and any gentleman who will give his experience will much oblige.

I have driven a tricycle two miles and back without the slightest tendency to upset, and very little strain on the arms. I am now learning the bicycle practice, and have driven a mile on level ground, but could not satisfy myself that it was easier work than the three-wheeler. I don't know which to purchase.

I think an improvement is much required in the seat part. It ought to partake more of the form of the carriage seat than of the saddle. In mechanics, action and reaction are equal and contrary, consequently when we push the treadle the treadle pushes us with the same force, but in the opposite direction, namely, off the saddle. This is only prevented by our holding hard on to the steering bar, thereby throwing great strain on the arms, which have quite enough to do without. Besides, it shifts us on the seat sideways, as we alternately push on one treadle and then on the other, thereby causing us to lose our balance, and rendering necessary the turning of the driving wheel to correct it, causing that wabbling so often seen.

I propose that the seat should have an upright back, but very low, together with sides, also very low. This would prevent the body from shifting any way, and enable the person to use his full power of legs, without calling upon the arms to prevent his being pushed off the saddle. Going up hill it would be of the greatest use when our utmost power is required, and the then slope of the saddle adds to the tendency. Let any one sit on a chair and push against the wall, even with one foot, and he will soon find he cannot exert half his force without pushing himself off the seat.—I am, yours, &c., T. S. Reeves.

July 11, 1869.

PHOTOGRAPHIC SOCIETIES.

To the Editors.

Gentlemen,—I am glad to learn from the concluding paragraph of Mr. Adin's letter in your last that that gentleman entertains no ill feeling against me personally.

His denial of my veracity in his second paragraph, his intimation that I write from unmanly or improper motives in his fourth, his citation of me as "the most pertinent case" of "incompatible disposition" within the range of his knowledge in his fifth, his comments upon the defects of my imagination in his sixth, together with his allusions to the interesting process of throwing dirt, would, but for his fortuitous explanation that he bears me no ill feeling, have caused me to do him the injustice of arriving at another and less satisfactory conclusion. Whether owing to my own obtuseness or otherwise, I have failed to

find in his letter any other than matters of a more or less personal nature, which I take it are not worth the expenditure of time and ink involved in a reply.

In my articles on photographic societies I have endeavoured to avoid personalities and to confine my attacks to failings instead of men. Mr. Adin's letter does not convince me that in this object I have thus far been other than successful; and, had I permission to divulge their names, I could mention several gentlemen of temperance and ability who have voluntarily asserted that they could indorse every word on societies which has thus far been published in my name.

In reference to your editorial remarks I will, with your permission, say one or two words.

Suppose at a society's meeting, during a discussion on a certain variety of dry plates, a member asks "Are such plates costly to prepare?" and a dealer immediately calls out "I can put you them in at so much per square inch per dozen," would it not be better to report for *once* this abuse of the meeting than to hear at the next meeting that a camera exhibited by one gentleman could be sold by another for five or six pounds, as the case might be? (1)

Abuses of this kind, when largely indulged in, would soon be productive of unpleasant consequences, and the *occasional* mention of things of this kind, it seems to me, would effectually end them in societies where members indulge in them.

I am not aware that I advocated *verbatim* reporting at any time. I only suggested that the arguments *pro* and *con* should be given, and distinctly stated that the reports (which I contended should be, as it were, reflections of the proceedings) might be judiciously "uniformly dimmed," but in no particular deformed; by which I meant that they should be condensed but not destroyed, in which opinion I imagine we agree. (2) If reports were to be strictly *verbatim*, I myself should certainly never utter a word at a society's meeting, as my own *vivâ voce* delivery is of a jerky, repeating nature, and, I am told, is "not strictly in accordance with the rules of Latin grammar."

In conclusion: let me add that, prior to the publication of his letter, I always considered Mr. Adin a better writer than myself; and when I mentioned that I assisted him, I did not intend it to be understood that he was in any way deficient. If his letter do not justify this opinion, I am not to blame. The only reason I should hitherto have assigned for any one preferring me as the writer of a report would be that they *knew* of what I was capable rather than that others were not equally so.—I am, yours, &c., D. WINSTANLEY.

Manchester, July 10, 1869.

[1. Scarcely so, we think, because any persons possessing such a mercantile character as to do this once, would do so with the more alacrity on subsequent opportunities, when they found that they could advertise their wares thus cheaply.—2. Perfectly so.—EDS.]

THE INVENTION OF CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—I, like many others, feel an interest in the history as well as the practice of carbon printing, and, like you, with Mr. Beattie's statement before me, cannot discern in what respect Mr. Pouncy has, as alleged by the former gentleman, contributed to carbon printing as it is now practically carried on in this country and on the continent.

Mr. Pouncy's name was not known (publicly, at least) in connection with carbon printing until a considerable time after processes nearly identical with that which he subsequently patented and tried to sell by subscription had been both published and patented in this country. On the very first day of the year in which Mr. Pouncy's name was first heard of in this connection, Mr. Thomas Sutton published a process of carbon printing precisely similar in principle with that of Mr. Pouncy; and even after the latter gentleman had published his process, he was advised that it would be unsafe for him to encourage any person to work it, because it trenched too closely on a pre-existing patent by M. Poitevin, and Mr. Pouncy himself—wisely, I think—forsook his patent after the six months of probation permitted by the law.

Now, as the process of Mr. Pouncy was impracticable for producing good pictures—and, even if practicable, had been in all its leading features anticipated—in what respect, may I be permitted to ask Mr. Beattie, is the modern practice of carbon printing indebted to Mr. Pouncy? Has he contributed *any one thing* which has conduced to the high state in which we at present find it, as worked by Swan, Braun, or the Autotype Co.? I believe not. I have for many years been accustomed to hear the name of this gentleman associated with those whom I considered the pioneers of carbon printing; but, after a careful scrutiny of all that has been communicated by or on his behalf, I fail to discover the grounds for the claim.—I am, yours, &c., GEORGE SCOTT.

July 14, 1869.

WHAT BECAME OF THE OLD MINIATURE PAINTERS.—In a recent number of *Britannia* there is a somewhat amusing article by Dr. Scoffern, entitled *Venus among the Poisons*, the second part of which is devoted to some of the secrets of the *late* (may we say?) Madame Rachel, from which we derive some insight into the enamelling and artistic secrets of that wonderful rejuvenatrix. After describing the process of filling up the furrows in an aged lady's face, we are informed that at this stage it (the face) is wholly devoid of complexion. It is, however, in its surface akin to ivory, "and ivory, the reader will not need to be informed, is the material preferred to all others by miniature painters. Whilst Madame was in the full flood of her prosperity and practice all the chief miniature painters lent her their co-operation. This class of artists suffered severely, as is well known, by the process of photography. Of late years, miniature painting on ivory has well nigh gone out of practice, and the wonder was how these gentlemen managed to live at all, to say nothing about supporting elegant establishments. Madame Rachel could have solved the mystery had she been so inclined; but the delicate reticence of that lady in all that related to her *clientèle* is a quality for which she has always been conspicuous. In no one single case has that lady been known to disclose a secret that would have compromised a patient. It would be impossible to state the exact sequence of operations which an accomplished miniature painter went through, on one of the enamelled living panels set before him. Like other painters, he kept general effects in view—laying on a wash here, scumbling, dragging, stippling, according to needs apparent. His first duty was to work in a predetermined key, and preserve the unities. It would have been an obvious mistake in art to have elaborated the complexion of a blonde on the face and bust of a brunette, or *vice versâ*. Although Madame cannot herself paint, she has the most lively critical appreciation of all that goes to constitute excellence in the painting of others. She made it a point of conscience to superintend herself every stage of the painting operation; and in this way, her intuitive perception of what is true and beautiful in art soon led her to discover the powers—the bent and specialities—of miniature painters in her employ. A strange artist was never allowed to practise on an enamelled female face until he had either shown the quality of his art on two wax lay-figures, or else on two old women by himself provided. One of these he got up as a blonde, the other as a brunette, and the two being compared, then did Madame recognise at a glance the precise leaning of his talent. Having once discovered this, that particular artist was ever after restricted to his own special line. As regards the final glaze, I have not been able to acquire any precise intelligence. I believe it to have been a solution of soluble glass."

MR. S. C. HALL ON SPIRIT PHOTOGRAPHS.—Mr. S. C. Hall, the well-known author, and editor of the *Art Journal*, has addressed a communication to Judge Edmonds, of New York, and which is published in a Boston weekly newspaper, the *Banner of Light*. The article contains statements that will be interesting to some and amusing to others of our numerous readers who are acquainted with that gentleman in either his artistic or literary connection. Having addressed the Judge on another matter, Mr. Hall says:—"I should not, however, trespass on your time if I had nothing to say but that. I have a fact to relate, *apropos* of the trial of Mumler—particulars of which have reached me. It is this:—A few days ago, sitting with Daniel Home and seven other friends, my venerable and truly Christian sister, who passed from earth about eight months ago, was enabled to be visible to me and those who were with me. She was not only not a spiritualist, but strongly and sternly objected to the principle, as anti-Christian or demoniac. She had never been present at any manifestation, never would be. But not long before her departure, I said to her, 'I am sure God will permit you to visit me after you leave earth. You will be permitted to do so for my comfort, and as a helper on my way to Christ. I wish you to promise that you will do so, if God gives you the power.' She did not absolutely make me the promise; but she did say, 'My dear brother, if it be for your good, and God permits it—and He may do so—I will be with you when He has called me from earth.' When she appeared to us in my drawing room, her face was so healthy—so full of the red and white that exhibit health—that at the moment I did not recognise her; for she had been two years confined to bed, 'died' of cancer, was a great sufferer, and was naturally reduced to a skeleton—so to speak. Suddenly I said, with an exclamation, 'It is my sister.' Three blows were struck on the table. The eyes were closed—she had been blind during the last ten years of her earth-life—possibly but for that I should not have recognised her; there was so marvellous a contrast between the face, as I saw it on her 'death' bed, and the face as I saw it then; so healthful, so beautiful, so happy, smiling, but the likeness was exact, for I recognised every feature after my exclamation; the hair, exactly as she wore it, or plaited back, and the cap exactly as she wore it also, which the Master of Lindsey, the Hon. Mr. Lindsey, called a 'mutch,' *i.e.*, the cap of the old Scottish model. She remained before us thus palpably for about two minutes—certainly more than one—long enough for any photographer to have made a photograph of her; and I am very sure there would have been no difficulty whatsoever in making such photograph if the apparatus had been ready; that it would have been at once recognised by any person who knew her during her 'life' here, and that it would have been as distinct and palpable as any photograph of any (so-called) living person. I have no doubt that each of the eight persons present would make exactly the statement I have made. Dear sir, I have already expressed my hope that in thus trespassing on your time, I shall give you pleasure rather than annoyance. You are discharging a duty, onerous, trouble-

some, nay, dangerous, in so far as the world's estimate is concerned, and I have felt impelled to stand at your side, with aid as far as it can be given you, not far, indeed, but with earnest fervour. I pray you accept from Mrs. S. C. Hall and myself, expressions of cordial and affectionate regard and esteem. We are your fellow-workers, though in a humble way. May God give us strength to be more effective labourers in spreading the light that comes from his new revelation.—Your faithful servant and friend, S. C. HALL, F.S.A., Barrister-at-Law."

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A Wheeler and Wilson lock-stitch sewing machine, musical instruments, a microscope, and telescope will be exchanged for a large lens and camera.—Address, C. D., Chard.

A copper still, with copper worm, to hold four gallons, and a tin receiver, to hold two gallons, will be given in exchange for any useful scientific article. —Address, Mr. W. JACKSON, Priory Cottage, St. Neots, Hunts.

A Jamin half-plate portrait lens, and half-plate mahogany camera, very complete, with four single and six double dark slides, equal to new, will be given in exchange for a 12 × 10 portrait lens, by Ross, Dallmeyer, or other good maker.—Address, C. H. FREE, Queen-street, Hull.

I have a first-class bellows camera, for plates $8\frac{1}{2}$ by $6\frac{1}{2}$, by Meagher, with three double and one single slide, and capital lens by Lerebours, all in condition equal to new, which I would exchange for a stereo. bellows camera and double slides, with pair of six-inch lenses by Ross or Dallmeyer.—Address, Mr. E. ROBERTS, Weaver-buildings, Liverpool.

A pantascopic camera and lens (by Johnson, of London), for 12 × 7 pictures, suitable for out-door work; a whole-plate camera and lens; a piano and fire-place, solid and reversible; a turntable for photo-sculpture, twenty-four sections, and a small one for clay model—all first-class articles; the whole or any of them will be given in exchange for a microscope, *carte* lens, universal $7\frac{1}{2} \times 4\frac{1}{2}$ camera, with doublet, or any of the late descriptions of landscape lenses. Any difference in price adjusted.—Address, M. D. SUTHERLAND, 39, Savile-street, Hull.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

P. P. Skeolan, Harrogate.—*Portrait of Mr. Julian Adams.*

Auguste Eugene Lesage, Dublin.—*Six Portraits of His Eminence Cardinal Cullen, and two Groups of Cardinal Cullen, the Very Rev. Dr. Moran, and Very Rev. Dr. Conroy.*

☞ *Correspondents should never write on both sides of the paper.*

J. B.—We showed both samples of the India-rubber to an experienced dealer, and he says that they are as pure as can be obtained.

A. BERREYER.—Add to the alcohol some powdered carbonate of potash previously made dry. The water will then sink to the bottom.

LIEBIG'S METHOD OF SILVERING GLASS.—"Clericus" asks if any of our readers have tried this method of silvering glass, and with what success.

T. EVANS.—Although, as you surmised, the negative was broken when we received it, sufficient remained whole to permit our examining it. See an article in the present number.

D. T. K.—We do not know how the morphine dry process fares at present, but out of a numerous circle of personal friends and a large number of correspondents we are not aware of any one practising it.

PHOTO.—Your idea for a sky-shade is effective and good, but you have been forestalled by another ingenious photographer, Mr. Joseph Raine, of Richmond, who showed us a similar piece of mechanism nearly a year ago.

SAM. WALTHAM.—1. You must make the stand much longer—at least five feet in length.—2. The lighting must be from *below*, not from above, as usual. Just think the matter over: whether does the earth when snow-clad or a leaden sky reflect most light?

CONSTANT SUBSCRIBER.—We are quite unable to advise you in the selection, for we have never either seen or heard of the persons you name. The French make suitable enamels, and so do some Clerkenwell enamellers, but with Belgian productions of this class we are unacquainted.

THOS. WOODCROFT.—A work on photography was issued by M. Disderi in 1862, but we have not seen it. On referring to our general scrap and note book we find that it was an illustrated volume, and that M. Lafon de Camarsac contributed to it some introductory observations.

JOHN FERRIS.—1. It is probable that the failure is owing to your using the toning bath too soon after mixing. You should have allowed it to remain at least one day before immersing the prints.—2. The acetate toning bath will keep for an indefinite period.—3. The carbonate of soda toning bath should be used soon after mixing; it will not keep.

A JUVENILE.—Photozincography and photolithography are one and the same thing, with this difference—that in one case a lithographic stone is used and in the other a zinc plate, the process of printing being similar in both.

A JERSEY AMATEUR.—You may easily obtain oxide of silver by adding a solution of caustic potash to a solution of nitrate of silver. A dense brown precipitate will fall, which is the oxide in question. You must wash it with several changes of water.

WILLIAM GILLINGWATER.—The hardness to which you refer is not a consequence of employing the albumen, or indeed any dry process, but it arises solely from the negatives having been under-exposed. With proper exposure and development it is not now possible to indicate with any certainty, from a mere inspection of a number of photographs, which of them have been produced from "dry" and which from "wet" negatives.

"ALBUMEN" (Eccles).—The following is the albumen mixture recommended in the collodio-albumen process:—

Iodide of potassium	26 grains.
Bromide of potassium	12 ,,
Distilled water	2 ounces.
Ammonia	1 drachm.

The acetate toning bath given in our ALMANAC can be relied upon as one of the best.

ROGERS BROTHERS.—You are partly right and partly wrong. The coffee process will prove to be four times more rapid than your estimate of it provided you adopt a different method of development. To secure the greatest degree of rapidity, immerse the plate in lukewarm water and then apply a three-grain solution of pyrogallic acid to which a very small portion of a weak solution of carbonate of ammonia has been added. The picture will flash out with great rapidity, and, after being washed, it may be intensified up to any extent in the usual way.

B. PARSONS.—One point of difference between a single lens and a triplet is this:—When an architectural view is taken the former distorts the picture more or less by representing those lines near the sides as slightly curved instead of being straight, whereas the latter lens renders the picture free from distortion. The triplet, also, from the greater number of its surfaces, reflects and absorbs more light than the single lens; hence for such marine views as those you mention, and in which the greatest possible rapidity is required, the single lens will best answer your purpose.

B. F. THOMPSON.—The receipt of your letter intimating that you had taken a photograph in the natural colours of objects was the cause of some little excitement, which, however, became suddenly allayed when, by the following post, we received the picture itself. You cannot consider it a "natural" colour when the hair and face of a handsome woman are of a green and purple hue! The effect obtained is a *de*fect, and is owing to irridescence. It is well known to experienced photographers. We cannot yet offer you our congratulations on having made an important discovery.

*** Up to the hour of going to press the usual weekly letter from our Pari correspondent, Mr. Fowler, had not arrived.

RECEIVED.—*Patent Monopoly.* By Henry Dircks, C.E. *The Aneroid: How to Buy and How to Use it.* In our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.

LONDON GAZETTE, *July* 9.

BANKRUPT.

G. ALDRIDGE, Ashley-cottage, Kensington, photographer.—July 27, at 11, at the Bankrupts' Court, London.

METEOROLOGICAL REPORT,

For the Week ending July 14th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
8	30·8	80	61	66	75	SSW	0·02	Overcast
9	30·24	78	56	60	68	WSW	—	Bright
10	30·40	78	54	60	68	W	—	Fine
12	30·12	87	57	65	76	E	0·15	Overcast
13	30·18	70	53	54	56	SE	—	Cloudy
14	30·32	77	52	55	63	SW	—	Fine

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 481. Vol. XVI.—JULY 23, 1869.

ON ALBUMEN AND SOME OF ITS COMPOUNDS.

In another page we give the concluding portion of Mr. Price's article on this subject. We must all be interested in the discussion of a matter so closely connected with the daily progress of photography, and, though in all probability few of our readers care to know what the atomic weight of albumen may be, yet it is worth remembering that the settlement of this question would tend materially to fix our ideas relative to the whole process of silver printing on albumenised paper. The determination of this point, however, is a matter which is beset with difficulty, owing to the circumstance that none of the compounds of albumen with other bodies, such as silver, are so strongly marked as regards physical or chemical characters as to assure the chemist that he is dealing with definite compounds of constant composition. In fact, the opinion has long prevailed that egg-albumen is a mixture of at least two different bodies, similar in proportion and in composition, but differing in atomic weight.

We regret to find that, notwithstanding the amount of labour which Mr. Price has expended on the examination of albumen, he has not lately added any new facts to our old store of information on the subject; and, though he has elaborately discussed many interesting questions, yet he does not appear to have got much beyond the point at which he rested some years ago. In fact, our positive knowledge of albumen is comparatively small in extent, and at this time it may be well to remind our readers whose *specialité* lies in the examination of printing questions that the following matters are well worthy of minute examination.

In the first place, we do not know whether the chlorided albumen film, when treated with nitrate of silver, produces a definite compound of chloride and albumenate of silver, or whether we have a mere mechanical mixture of the two bodies. Mr. Price has shown that the facts bearing on this point are extremely few and unreliable.

Secondly: when the varieties of ammonio-nitrate of silver solution are used instead of the ordinary bath, what compounds are formed, and what are the variation in properties of the various bodies produced? That wide differences in properties of the products do exist there can be no doubt, as our own experiments have long since demonstrated; but the entire question requires minute examination at the hands of some experimentalist able and willing to devote the necessary time to the inquiry.

Finally: when a silver print fades we are still completely in the dark as to the exact nature of the light-coloured body produced. That the sulphur present in albumen has much to do with the change is tolerably certain; but that it is wholly responsible for the mischief is probably more than doubtful.

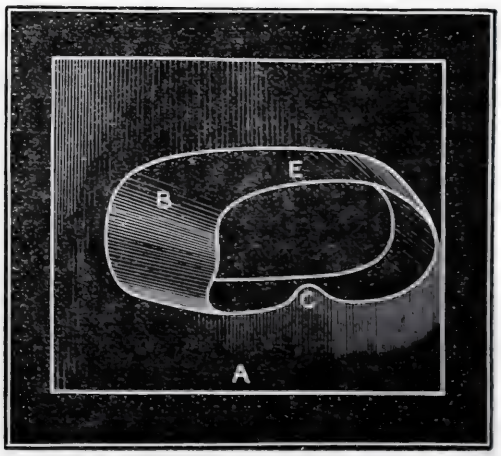
A FOCUSSING BACK FOR FIELD WORK.

We propose this week to describe a little addition to the camera which we find very useful in field work. No doubt some of our readers will recognise an old friend, but this will not detract from the practical value of our arrangement to the more recent recruits in the photographic army; and, as the latter is now occupied with the summer campaign, we can scarcely suppose that any hint touching field operations would be thrown away.

We have all experienced, from time to time, the inconvenience of the black focussing cloth on a windy day. Our camera stand may be securely planted and our head enveloped in our black velvet muffle, when, lo! a gust of wind catches the cloth like a sail, and a fluttering end gives the patient disciple of the black art a sharp flip on the ear. Again: we have some trouble in preventing a corner escaping and in keeping out the light for a sufficient time to enable us to get a satisfactory look at the image on the ground glass. Lastly: the photographer is conscious that he never looks so thoroughly awkward as when "his limbs are seen protruding from a camera," as *Mr. Punch* once forcibly put it in the early days of the art, to say nothing of the running commentary of the invariable juvenile attendants of the itinerant photographer on the personal appearance of the unfortunate operator.

If we wanted to make out a case against the focussing cloth we might add considerably to the above list of high crimes and misdemeanours of which it has been or is guilty; but we have too lively a sense of the aid we have derived from it to seek to disparage the services of our black friend. We will, nevertheless, suggest a mode of dispensing with his aid which, we have little doubt, will be appreciated by those of our readers who try the substitute in the field.

With the aid of a simple microscope we can easily test and regulate the degree of sharpness of the image upon the ground glass; but it is of equal importance to the operator to get a general idea of the effect of the view which he purposes taking. This cannot be satisfactorily done unless all extraneous light be excluded, and this cannot be always accomplished by the focussing cloth. Instead of the latter, then, we use the simple back and face-piece figured below, by means of which all light is excluded except that passing through the lens of the instrument.



The wooden piece A is of such a size that it lies flat against the frame of the focussing glass, and so excludes all extraneous light. It is obvious that the size of this piece will vary with that of the camera. In this wooden plate an oval opening is made measuring about six inches by three, and to the edges of this opening is attached a stiff cardboard face-piece B, so arranged that the edges will exactly fit the curves of the face, leaving room for the nose at C and the forehead at E. Care should be taken that B projects sufficiently from the wooden slip, so that when the face is applied so as to completely fill up the opening, and the plate is arranged against the focussing glass, the observer is able to distinctly see the latter and any image which may be thrown upon it. When this point is attained, the cardboard face-piece is covered with black velvet for the sake of comfort, and our apparatus is complete.

When this piece is once adjusted to the camera we have no more trouble with it, as it is easily packed, very economical, and can be made by any person possessing even a very small share of mechanical ability. However, it excludes all unnecessary light during focussing—strong sunlight or a high wind being equally incapable of interfering with satisfactory work, while even in the studio it will be found useful.

We may add that the little adjunct to the camera which we have just described may also form part of a dark box for field work with wet plates. A description of this we may probably give in a week or two; meanwhile we have no doubt whatever that anyone using this face-screen once in the field will discard the focussing cloth and use the former instead.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER III.—SINGLE ACHROMATIC LANDSCAPE LENSES.

The single achromatic landscape lens may, so far as photography is concerned, be said to be everywhere present. Every photographer is familiar with its many good qualities, which are cheerfully recognised.

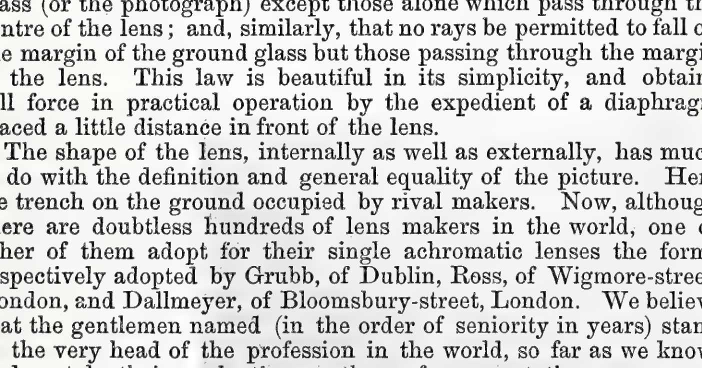
Its external configuration is that of a plano-convex or meniscus lens placed in a mounting which permits the passage of light only through a contracted aperture a short distance in front of the lens. Here the tyro is apt to put the question—"Would it not be as well that the diameter of the lens should be made at once small, rather than incur the expense of making it large while in practical working it is small?"

It is now about twenty-three years since this question first occurred to ourselves, and we then set about an elucidation of the truth in the following manner and with the following results:—The lens, a plano-convex achromatic, had a diaphragm, with an opening of about a fifteenth of its focal length, placed in front of it, the distance being nearly equal to the diameter of the lens. Good pictures were obtained by the Talbotype and Daguerreotype processes when the arrangement was as thus described. "But," thought we, "why not remove this diaphragm altogether, and thus secure more light?" This was done, but no focus worthy of the name could be obtained. We then reasoned thus:—If the object of the diaphragm be merely to reduce the size of a too large lens, then it will better do so if placed in *close* contact with it rather than at the distance at which it is now placed. Accordingly the diaphragm was removed until it was brought into close contact with the lens.

When a picture was taken under the altered circumstances the centre was as sharp as before, but the sides were hazy and out of focus. The withdrawing of the diaphragm did not impair the already good central definition, but it immensely improved the sharpness of the margin of the picture.

The position of the stop or diaphragm, then, must be such that no rays of light shall be permitted to reach the centre of the ground glass (or the photograph) except those alone which pass through the centre of the lens; and, similarly, that no rays be permitted to fall on the margin of the ground glass but those passing through the margin of the lens. This law is beautiful in its simplicity, and obtains full force in practical operation by the expedient of a diaphragm placed a little distance in front of the lens.

The shape of the lens, internally as well as externally, has much to do with the definition and general equality of the picture. Here we trench on the ground occupied by rival makers. Now, although there are doubtless hundreds of lens makers in the world, one or other of them adopt for their single achromatic lenses the forms respectively adopted by Grubb, of Dublin, Ross, of Wigmore-street, London, and Dallmeyer, of Bloomsbury-street, London. We believe that the gentlemen named (in the order of seniority in years) stand at the very head of the profession in the world, so far as we know, and we take their productions as those of representative men.



Now suppose that each of these opticians were asked to make a landscape lens of a certain diameter and focus, they would do so according to the figures represented in the foregoing diagram.

No. 1 is Grubb's aplanatic lens; No. 2 is Ross's Wilsonian and wide-angle view lens; No. 3 is Dallmeyer's patent wide-angle landscape lens. In Grubb's lens the crown glass is next the diaphragm (which in all the lenses is placed next to the flattest side); in Ross' the flint concave occupies that position; while in Dallmeyer's the flint lens is enclosed between two elements of crown glass. Were a very deep meniscus of the No. 2 character demanded it would assume the form given in No. 4. These forms represent all the single landscape lenses made throughout the world—certainly all those that have found their way to London, so far as we can ascertain.

Landscape lenses intended for extremely rapid work are made comparatively flat, like a plano-convex; those required to embrace a very wide angle are made much deeper. Let us suppose that we have two lenses of equal diameter and focus, but one of which is a plano-convex, while the other is a very deeply-curved meniscus. If both are worked with stops of equal size, the former will give a well-defined picture over a small area, while the definition of the latter will be much more extended. In the latter case the stop may be pushed up much closer to the lens without impairing the definition, while at the same time the field of delineation will be considerably increased. This latter quality is obtained, however, at the expense of fine definition; for, in proportion as the depth of the meniscus form increases, so is the necessity for employing a smaller stop increased.

When the single achromatic lens, internally constructed according to any of the above methods, is employed for architecture, it is found that a certain degree of distortion arises. It is here unnecessary to discuss the optical law which necessitates this; it is sufficient that we notice the fact. A square object, such as a building, a plan, &c., will, when reduced by a lens of this description, present a reduction of the original not in accurate drawing, but with a diminishing proportion between otherwise equidistant lines in proportion as these are distant from the centre of the picture. A perfectly square drawing or building, for instance, would thus be reproduced with the edges curved outwards like the sides of a barrel. This distortion diminishes—nay, vanishes—when the picture is to be reproduced its own size. We have a small landscape lens which distorts when we take an architectural view on a $7\frac{1}{2} \times 5$ plate, but which gives a copy quite free from any trace of distortion when we employ it for reproducing a picture the size of the original.

The nearer the stop is to the lens the larger will be the angle of view delineated, and the less will be the distortion of an architectural subject; but each movement of the stop towards the lens is attended by a slight falling off in the marginal definition, and necessitates a reduction in the size of the stop.

One here, naturally enough, might be led to express regret that the qualities of a flat field, absolute freedom from distortion, with good definition and good light, could not be found embodied in one lens. This *has* been done, we rejoice to say; but as the consideration of the subject leads to a description of the numerous new compound lenses recently introduced, we shall defer noticing them till our next chapter.

MR. REJLANDER'S NEW STUDIO.

During the hottest part of one of the hottest days of last week I sauntered into Mr. Rejlander's new studio to see how the great master was contriving to keep himself cool. Walking upstairs, I entered his large and well-ventilated reception room, which, considering the state of the weather outside, was but moderately hot. While turning over and examining the posing and lighting of some recently-executed pictures, I was hailed from above by the genius of the place, with a salutation and an invitation to walk upstairs. "You'll find it cooler in the studio," he added by way of inducement. The idea of a photographic studio being a cool and desirable retreat in a broiling hot day seemed very funny, and the recommendation to walk upstairs, to my taste, savoured much of the sarcastic. But when I entered I was most agreeably disappointed. The atmosphere of the room was indeed delightfully cool, with a light refreshing breeze fanning through it, as if from a "punka," although there was scarcely a breath of air stirring outside, and the sun's rays were pouring down on the roof with meridian and cloudless splendour.

Most of us have had painful experience of what a photographic studio is in hot weather; how depressing, wearying, and worrying it is to work in it, and how happy and thankful we are, when toil is over, to get out of it. But Mr. Rejlander's rooms are not of this character. In the hottest days they afford as pleasant a retreat as the shade of Virgil's proverbial wide-spreading beech tree, and neither disturb the sitter with their glare nor fatigue the operator with their closeness.

In planning and arranging this new studio, Mr. Rejlander and his builder have indeed executed a rarely happy specimen of photographic architecture—not by haphazard, but evidently by most carefully-considered and well-carried-out design.

Before this elegant mansion in Victoria-street was built, the original intention of the architect was to convert the upper part into a first-class photographic studio, so that there was no necessity in this case for knocking away partitions here, re-arranging there, and compromising with difficulties everywhere. The architect and the skilled photographer who advised him had a *carte blanche* for any reasonable amount of space in an excellent position, overlooked by no buildings or other terrestrial objects, and if they have not made the best of their advantages they have, at least, produced a studio superior to any that exist in this country.

Without illustrative diagrams it would be impossible to convey to the minds of your readers a full idea of its construction; therefore I shall not make the attempt. But it will not be so difficult to indicate the principles on which the conversion of the studio into a cool retreat in hot weather and a cosy winter residence is based.

The roof is nearly flat, except where there is a kind of ridge-roof skylight furnished with blinds to admit top light in any quantity that might be required. Externally the covering is of lead lying on a thick coating of hair felt; below these is a layer of one-inch deals and a two-inch coating of coarse non-conducting plaster; then, again, a vacant space of nearly one foot, through which the air circulates freely; and, lastly, the ceiling proper of the room. All this was arranged with a definite object in view, namely, to keep out the external cold and retain the internal warmth in winter, and to exclude the heat in summer.

But all these precautions would have been unavailing unless the ventilation of the *suite* of rooms had been carefully attended to. To make this more clear a short description of the general plan of the studio will be necessary.

The studio is convertible, when necessary, into two or three rooms by means of crimson curtains attached to rods. Two large plate glass windows reaching nearly to the floor and opening on hinges are inserted in the north-west wall; these, as a rule, form the principal light. The north-east end consists almost entirely of one enormous sheet of plate glass fixed in a movable frame. This frame is balanced by means of pullies and weights, and can be lowered down through the floor, leaving that end open and leading on to a spacious balcony, from which there is a capital view over London and its interesting (?) chimney-pots. This end can also be darkened with curtains when required. The opposite, or south-west end of the studio is fitted up as a neat parlour, and has two windows facing the south-west, or nearly so. This compartment can be cut off from the studio proper by curtains. Then, again, there are other anterooms, &c., opening from the studio, which, however, form no part of it, and are merely there for other conveniences.

From this brief description one will probably understand how, when these windows were opened and the curtains partially drawn aside last Saturday, at 2 p.m., at a time when the heat was most oppressive and not a breath of air outside to stir a leaf, it was a rare and unexpected luxury to cool oneself in, of all odd places, a *photographic studio*, and enjoy a glass of un-iced claret.

Since my previous visit to these rooms Mr. Rejlander has added much to their convenience by erecting on the roof his old tunnel-shaped "cowshed" studio for printing operations.

George Dawson, M.A., Ph.D.

ON THE GUM PROCESS FOR DRY PLATES.*

In the production of dry-plate negatives amateurs often complain of a want of uniformity in the results obtained by them, without sufficiently appreciating the importance of adhering throughout to one invariable system of manipulation, and preparing beforehand the necessary plant for their successful manufacture. In the choice of processes by which uniform results can be secured by the exercise of proper care, I would recommend the adoption of the gum-gallic process as worked out by Mr. Russell Manners Gordon. This has, in my hands, proved the best on the score of keeping properties, both before and after exposure of the plates. Few can be aware of the immense time and labour bestowed by Mr. Gordon in the perfecting of his beautiful process, and of the great number of experimental plates he has prepared in order to test the results of the gum-gallic method against other processes. Having frequently been requested by my friends to furnish them with details of my mode of working, I gladly avail myself of this opportunity of describing my manipulations, which will be found to agree in most particulars with the practice of Mr. Gordon.

To Clean Dirty Varnished Plates.—Having accumulated some four or five dozen, or more, in order to save the trouble of repeated operations, provide a tin fish-kettle with perforated false bottom, costing seven shillings, and, having filled it three-parts full of water, add a quarter of a pound of common washing soda, and set it on the fire to boil. Just when the water commences to boil slide in the dirty plates, one at a time, with the film upwards; after five minutes remove the kettle from the fire and pour in a sufficient amount of cold water to permit of handling the glasses without discomfort. Now lift up the false bottom and take out the plates, one at a time, and wash them under a tap to remove the soda and old film, which is now quite softened and loose, from the glass, and place the latter in a rack to drain. It is important not to allow them to remain out of the soda liquor so as to become dried in the air before washing the plates with plain water, or the alkali will corrode the surface of the glass and injure the plates for subsequent use. With a little care this plan of cleaning will prove more simple and expeditious than any other process with which I am acquainted.

Cleaning the Plates for Use.—Before commencing to apply the preliminary coating I roughen the edges and clean the plates with tripoli and water mixed with a few drops of ammonia. This is far better than using old collodion for the purpose, and does not so seriously affect the eyes.

Preliminary Coating.—My experience with a substratum of albumen mixed with twelve or fifteen parts of water is somewhat limited; but I am inclined to think that it makes the collodion film more sensitive than the same film would be without its use. In my experiments no fogging has occurred; but sometimes a slight veil has been produced, which may be considered rather an advantage than otherwise, for in printing from under-exposed negatives there is less tendency to hardness, and it is easier to obtain soft and harmonious prints with average exposures.

Collodion.—The quality of collodion which I prefer to use is made with equal parts of ether and alcohol, and contains from five to six grains of pyroxyline of a moderately short and rather thick, not too tough, character, say:—

Iodide of cadmium	3½ grains.
Bromide of cadmium	2 ,,
Iodide of ammonium	1 grain.

If kept for a few months after iodising the collodion works more uniformly; and I am in the habit of decanting it for use into a collodion-pourer which is capped but not stoppered, and filling this as required from a reserved clear portion in another bottle previously decanted from the stock. This precaution prevents the occurrence of nibs or specks on the plate; and if any of these should by chance be observed it is better to reject the plate at once, for it can never produce a perfect negative. Every plate properly coated should be looked upon as capable of giving a good negative; the percentage of losses may, at any rate, be kept down to a very small figure, which will cover mischances of every kind.

The safest test of the collodion being of suitable quality and consistence for the process is that, when the film is wetted with water previously to development, it should soften evenly over without creases, and not show stains afterwards, and intensify regularly up to the required pitch. If there be any doubt respecting the quality of the collodion being proper, it may still be used by moistening the film with a mixture of one part of alcohol and three of water instead of pure water before developing, taking care to wash away all greasiness induced by the presence of the alcohol before pouring on the developer.

The Nitrate Bath should contain from thirty-five to forty grains of nitrate of silver per ounce, with just enough acid to show the faintest reaction on blue litmus paper. The bath must have a few grains of iodide of potassium added to it before filtering, in order that the plate, when immersed, shall not be robbed of its creaminess. Time of immersion, five minutes. I use *two* silver baths in the preparation of a series of plates, so as to keep pace with the subsequent washing.

Washing the Plates from the Nitrate Bath.—Arrange a succession of porcelain baths, four containing distilled water and the others filled with common water. Then, having lifted the sensitised plate from the dipper employed in the silver bath, transfer it to one upon which it goes regularly through the washing baths without the necessity of further transfer; such dippers are easily made from a slip of glass with a cross-piece fastened on with marine glue. The six washing baths can be placed together side by side, and held together at a proper slope by an elm board one and a-half inch thick, with the centre cut out sloping to hold them; a wedge at the

* *Journal of the Photographic Society.*

end they rest on will allow the baths to lean more or less as required. The whole are covered with a paper cap, the more effectually to keep out light and dust. Having coated eight plates in succession, leaving each for about five minutes in the silver and passing them forward through the water baths one at a time as another is prepared, it will be found that after six washings, with a slight draining after each immersion, the first plate may be taken out and fixed on a pneumatic holder, to be finally washed under a tap, rinsed with distilled water, and drained.

The Preservative.—Gallic acid solution made by dissolving three grains to the ounce of distilled water by the aid of heat and filtering. This is poured on and allowed to run well over the plate and up to each corner for a few seconds, then drained off and thrown away.

The gum preservative (gum arabic twenty grains, sugar candy five grains, and water one ounce, filtered) is poured on in the same way, and the plates placed on a rack to drain. Before pouring on the gum solution, if it is put into a glass measure so as to quite fill the latter, all the air-bubbles which rise to the surface can be floated off, and no blisters will form on the plate afterwards. By the time all the eight plates are on the rack there will not be much moisture to drive off; and they should then be placed on a stove, resting with one end on blotting-paper, to be finished.

When the plates are properly dried on the stove, edge the collodion film with a rather thick solution of shellac and alcohol, using a brush as mentioned some years since by Major Russell.

Should the plates be required to be kept for any length of time they are best stored in a white pine box, well coated both inside and out with varnish made of shellac and spirit. This is seldom done by the box-makers.

Pigment Applied to the Backs.—Burnt sienna ground in water, mixed with an equal bulk of British gum and a few drops of glycerine, painted over with a wide camel's-hair brush and again dried. Each make of plates should have a small piece of paper with a reference number stuck on the back of every plate; the carbon tissue prepared by the Autotype Company, being black on the gelatine side, answers well. Should any plate after exposure turn out faulty, the possibility of being able to refer back to the collodion used will often prove very useful.

Exposure.—Although a good dry-plate negative can often be produced in a few seconds, much time is saved, when developing, by giving a full exposure, whereby the printing qualities and softness are much improved. More bromide added to the colodion imparts extra sensitiveness where short exposures are imperative; and the plate should then be left for a longer time immersed in the silver bath. When using a six-inch stereo. lens I usually give from one to two minutes. Dallmeyer's "wide-angle" and also his "rapid rectilinear" lenses arie the most suitable for short exposures; they give great brilliancy w thout requiring the use of too small a stop. The most useful lens of all, I find, is the wide-angle No. 3, which covers a 10×8 plate, and gives nearly straight lines on a $7\frac{1}{4} \times 4\frac{1}{4}$ plate.

Development.—Wipe the colour carefully from the back of the negative with a piece of sponge; then soak the film with water (or alcohol and water) until it is thoroughly moistened, and apply the developer, which, in the event of over-exposure being suspected, should be previously diluted with an equal bulk of water. Allow the action to proceed until all the details are well brought out, when the plate is washed with water and intensified with a two-grain solution of pyrogallic acid, with a very little silver added. The iron developer is used in conjunction with a few drops of nitrate of silver, say:—

Protosulphate of iron	20 to 25 grains.
Glacial acetic acid	20 min.
Gelatine dissolved in acetic acid	10 or 20 min.
Water	1 ounce.

Fix with hyposulphite of soda, and wash thoroughly. If any liquid should happen to have worked its way underneath the film, a pinhole must be made at one corner to let it escape.

Subsequent Intensification may nearly always be resorted to with advantage for the purpose of improving the printing qualities of the negative. This operation is performed as usual with pyro. and silver, the latter added only in very small quantities.

Varnishing the Plates.—A convenient method of drying the plates before varnishing is the base-board, with central upright, made after Major Russell's plan; upon this the negatives can be rested before a fire, so as to dry them slowly and thoroughly. If the least trace of moisture be left in the film at the time of varnishing, there will be no security for the proper adhesion of the picture to the glass, and the film often cracks in consequence. After the plate is well dried and still slightly warm pour on the varnish, and let it not only spread all over but return a second time over the plate before pouring it off at one corner; then hold before the fire again until the varnish has set firm. A good varnish should leave a brilliant surface when dry, and hardly show upon which side of the plate it has been applied. The more a negative has been developed the longer will be the time required for the varnish to soak through to the glass. A dull surface will indicate too short a treatment, and such a varnished film cannot be so well depended on.

General Remarks.—A substratum of albumen carefully applied after Mr. Fry's method seems to give the best results, and ensures a thorough adhesion of the film to the glass. Take one ounce of albumen to twelve or fifteen of water, beat them well together, and allow to settle. When filtered, add enough liquor ammoniæ to impart a distinct colour. Put the clean plate upon a levelling-stand and pour a small pool of the mixture on to the centre; then with a piece of card guide the albumen to within one-sixteenth of an inch of the edge of the plate, tilt it off at one corner and put in a rack to drain and dry. When dry, the surface is beautifully smooth and bright; and, inasmuch as every part of the plate which has been touched with albumen will afterwards be coated with collodion, there need be no fear of injuring the bath.

I have endeavoured to be precise in the foregoing instructions, with the view of aiding amateurs who may be inclined to employ the gum process, well knowing how essential it is to success that small matters of detail be properly attended to and appreciated before commencing operations by this or other plans of dry-plate photography.

MATTHEW WHITING, JUN.

HOW TO KEEP THE STUDIO AND CHEMICALS COOL DURING SULTRY WEATHER.

DURING the intense heat of the past week I have been almost compelled to suspend portrait operations; for the temperature has been so high in my glass room—which, as you know, is erected in my garden—that no visitor could remain in it for over a minute at a time.

A writer in the *Daily News* having advanced plausible reasons for the startling assertion that we should experience greater and more oppressive heat a month hence than we now enjoy, or groan under—as the case may be—I seriously turned my attention three or four days since to a mitigation of this evil, and with such excellent results that I hasten to communicate them.

Remembering what my friend the "Peripatetic Photographer" (for I *think* I penetrate his disguise and recognise in him a personal friend) had said a couple of months ago relative to cooling a studio by means of a gas pipe laid along the ridge of the roof and converted for the nonce into a *water* pipe, I obtained from a wholesale dealer in Drury-lane about fifty feet of the gas pipe recommended by my friend, at a cost of threepence per pound, my entire outlay, if I remember rightly, being about three shillings and sixpence.

This piping I had laid over the ridge of my studio roof and connected with the cistern in my house, which is situated nearly thirty feet distant from my studio. The end of the pipe was closed up, and small holes were pierced along the pipe by means of a darning needle placed in a handle. When the water was turned on a tiny stream issued from each orifice, and induced a remarkable feeling of coolness, although it was some time before the thermometer became sensitive to the delightful moderation of the intense heat. It eventually, however, became so, and fell several degrees.

"Evaporation is attended by cold," says a maxim in chemistry, and, with the well-known enthusiasm of a photographic amateur, I was determined to do nothing by half measures. A large sheet was obtained from the chambermaid, and, having been immersed in water, it was suspended in the studio while we were at lunch.

On returning to the studio, which only an hour before had been hot almost to suffocation, you may imagine our joy at finding it pleasantly cool, and the thermometer still falling.

To me this apparently trifling discovery must prove of great value; for it will enable me to convert what was formerly ovenlike in temperature into a cool retreat—much cooler, indeed, than any part of my house.

The principle and advantages of evaporation ought really to be more studied by photographers than they are. I can readily imagine the case of a professional photographer, whose livelihood depends upon his ability to take photographs at command, being placed *hors de combat* by the sultriness of the present summer.

The more rapid the evaporation the greater is the degree of cold that is induced. Let any reader try the following experiment to convince himself that this is the case:—Place a handkerchief over the back of the hand and then let it be wet with water. Mark the fact of the hand becoming much colder. Now repeat the experi-

ment; but, instead of wetting the handkerchief with water, use alcohol, ether, or chloroform. An *intense* degree of cold is instantly felt, proving the greater abstraction of caloric by the rapidly evaporating spirit than by the water.

Place the bulb of a thermometer in a bottle of collodion during a hot day, and carefully note the temperature. Now wrap round the bottle a piece of muslin, and either sprinkle over the muslin a few drops of methylated spirit or place the bottle in a shallow vessel containing the spirit, which, by capillary attraction, will wet the whole surface. After ten minutes of this treatment immerse the bulb of the thermometer once more, and observe what a great depression has taken place in the temperature of the collodion. Have the thermometer so arranged that it may stand in the bottle, and then, by means of a pair of common bellows, hasten the evaporation of the spirit or water (according as one or the other is employed) by directing a current of air vigorously against the bottle. It will be found that the temperature will fall still lower.

It is well that those photographers who have not received a chemical education should be made acquainted with these things, because by such knowledge they may be enabled to set at defiance, so to speak, the decidedly adverse influences which accompany the present tropical weather.

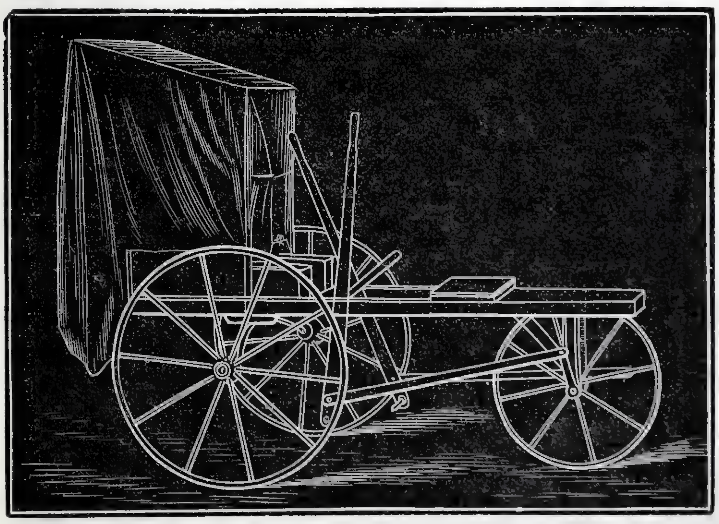
Even in anticipation, the idea of being obliged to pour hot collodion upon a hot glass plate might cause a shudder to seize upon the photographer in a sultry atmosphere; but by the principle here laid down both glass plate and collodion may be made quite cool, if not cold. I have stated how the former is to be accomplished; to accomplish the latter feat—that of rendering a plate cold—it is only requisite to pour over it a little old and otherwise worthless collodion, and, after allowing it to remain for about a minute, to rub it off again. The evaporation of the collodion solvents will have rendered the plate quite cold. To render this fact palpable to the most humble capacity, paint or smear collodion over the bulb of a sensitive thermometer on a hot day, and the mercury will immediately begin to descend. The *rationale* of this experiment is that the sudden evaporation of the collodion has induced cold, which in turn has contracted the mercury in the bulb.

George Markham, M.D.

THE PHOTO-VELOCIPEDE.

I have returned from my Orkney and Caithness tour, and having constructed a velocipede intended for photographic operations, I took it with me to test its capabilities in travelling up hill, carrying a dark tent and all the apparatus and chemicals necessary for the wet process. After travelling through Orkney and part of Caithness, I am happy to say that my velocipede has proved a decided success.

I send you a photograph of it with everything packed ready for travelling, and also one with the tent set up ready for operating.* As



I see inquiries made in your valuable Journal respecting the velocipede and its application to photographic purposes, I shall be glad to offer to your readers my mite of information with respect to its form and use.

In form it is a tricycle, the driving wheel of which is two feet in diameter with a crank of six-inch stroke; this wheel is situated behind. The two front wheels are two feet nine inches diameter, made of wood, with a handle attached to steer with.

The dark tent—which forms a box when closed—contains camera, lenses, chemicals, tray, bath, and everything necessary for the wet process, and weighs, when packed, about forty-five or fifty pounds; it is placed in a receptacle formed by two lockers—one on each side—in which are stored many extra things for a longer journey. These are placed in front, and the camera legs are strapped on to one side.

It is so constructed that it will work with either hands or feet or both. It goes remarkably easy, and I can carry everything necessary and travel any good road, taking the hills, at a speed of six miles an hour. To attempt much more than that would be harder work; but at that rate I could go more easily than to carry one quarter of the weight and walk four miles an hour.

Its construction cost me much thought and labour, yet I cannot claim anything in its construction save the modification to suit my purpose in connection with photography. The original plan was the invention of a gentleman who sent it to me from Derbyshire; and should any of my brethren of the camera wish for further information as to my modification of the velocipede utilised, I shall be happy to inform them through your columns.

William Sutherland.

* We have only considered it necessary to engrave the one in which the tent is shown erected for use. The reader's imagination will readily indicate its appearance when the tent is packed up for travelling.—Eds.

CARBONATE OF AMMONIA IN THE DEVELOPER.

Some years ago, when ammonia was pressed into the service of our art-science in the form now known as alkaline development, other alkalies were proposed wherewith to supplement or, if necessary, supersede this pungent liquid. Carbonate of soda, according to one, and carbonate of potash, according to another, were severally proposed; but neither of them secured a permanent hold upon the affections of dry-plate operators in this country. Carbonate of ammonia, as proposed by Major Russell, has been more successful, and is now, we may venture to say, almost exclusively employed, not alone in connection with the collodio-bromide process, but with every process in which alkaline development is employed.

Having made some experiments to discover whether one of the inodorous salts above-named could not be successfully employed instead of those found by experience in this country to be best, Mr. M. Carey Lea concludes that it cannot be done. In the current number of the *Philadelphia Photographer* he says:—"Carbonate of ammonia has passed into very general use as the alkali for developing collodio-bromide plates when the alkaline development is used. The only other alkaline substance now at all in favour is dilute liquid ammonia. Both these substances are volatile, and, when a number of plates are developed at a sitting, the air becomes a good deal charged with the vapours.

"Without regarding ammonia and its carbonate as being very unhealthy substances, I cannot think it very desirable to pass a considerable period of time exposed to their vapours. When ammoniacal fumes are dense, their action is decidedly noxious; they attack the blood through the respiratory organs, and produce a paralysis of the blood-corpuscles. Even in the more attenuated form in which the vapours may surround us during development they cannot be considered as otherwise than objectionable.

"I hoped to find that *potash*, in the form of bicarbonate, might be made to take the place of ammonia, but was disappointed. I made the comparison very carefully. Two plates, identical in every respect, received an exactly equal exposure, the one following the other with the least practicable delay. Two developing baths were made of exactly equal strength, with the only difference that in the one the solution of ordinary sesqui-carbonate of ammonia was replaced by an equal quantity of a solution of equal strength of bicarbonate of potash.

"The difference in the result was extremely striking. By the time that the plate developed with ammonia was fully out and finished, that treated with bicarbonate of potash only faintly showed the skyline.

"This treatment seemed also to have somewhat injured the plate. Although it was carefully washed off, and then treated with the regular ammonia developer, the plate did not come out fully as well as the other, which had been begun as well as finished with ammonia.

"I therefore conclude that bicarbonate of potash is altogether inferior to sesqui-carbonate of ammonia as a developer for dry plates made with bromide of silver.

"As it seems impossible to replace ammonia with an inodorous alkali, I can only suggest the necessity for good ventilation whilst working in this way. It is one advantage in dry-plate photography that the plates are generally densified at night, and that in pleasant weather the windows can be open to dissipate the ammonia fumes."

ON THE CO-OPERATION OF CHEMICALS.

Collodion and Developer.

Under the above heading Mr. Samuel Fry contributed to our Almanac for last year a brief article, in which he set forth the resemblance between the co-operative plan developed in social life and that which ought to exist in our photographic system. "We hear a good deal," he says, "about rapid working, instantaneous pictures, and so forth, but I have often found that those desirous of accomplishing great things in this direction had not a sufficiently clear understanding that it is no use to have any one of the chemicals employed in the highest efficiency unless the others are so also. It is of no use to take great care in purchasing very famous collodion, decanting it, &c., unless the bath be in a normal state of rapidity—unless the developer also possess a constitution calculated to endorse the efforts made by the photographer to obtain the highest results."

In connection with this idea as to the co-operation of chemicals, we remember that long ago, "in the days when the art was young," Mr. Tunny, one of the earliest collodion workers of whom we are aware, used, when employing a collodion which would not yield a picture of sufficient intensity, so to modify the relative proportions of the chemicals co-operatively employed in the production of the negative as to secure the desired result. The principle is one which naturally suggests itself to every reflective mind.

In the third chapter of his article, *Stepping Stones Over Rough Places*, Mr. Fennemore contributes to our Philadelphia contemporary some useful remarks on a subject than which, he says, there is nothing in the photographic dark room that requires to be better understood, viz., the proper relation between the collodion and the developer:—

The propensity of many photographers to stick to one formula, for the production of the different compounds used in photography, cannot be sufficiently condemned. For instance: with some, collodion should contain five grains of iodide and two of bromide to the ounce of collodion to produce the proper amount of sensitiveness and intensity; with others, four and a-half to two and a-half, and so on. I do not pretend to deny that the variation between the amount of iodide and bromide will affect the result in a material degree; but I do maintain that the general excellence of the negative and the amount of intensity will depend more upon the quality and quantity of the pyroxyline that is used in the production of collodion—some samples of cotton producing a weak and flat image, others again producing very strong contrasts.

The sensitiveness of the collodion will also depend more on the pyroxyline than on any slight variation in the quantity of iodides or bromides. A collodion producing a weak and soft image is generally much more sensitive than one that gives considerable intensity; consequently, any *set* formula will be found, in general practice at least, to be very unreliable. This may be proved by taking a given quantity of bromo-iodised ether and alcohol, divide it into three equal parts, and to each part add a sample of cotton from three different makers. Coat a plate from each, and expose and develope under the same conditions, and you will find that not only the quality of the negative but the intensity of the image will vary materially, and in some cases there will be a great difference.

The question, then, is not so much whether so many grains of this salt or that will be the best formula for general work, but what proportion of iodide and bromide is necessary, with the sample of pyroxyline we have, to produce the best results. With some samples of cotton, negatives can be produced with as much softness and detail with half-a-grain of bromide to the ounce as others with two and a-half grains. It is, therefore, very important, when making collodion with a fresh lot of pyroxyline, to make a few ounces first and try it, in order to determine the relative quantity of each necessary to produce the best results. This being done, we must depend upon the developer to give us the right balancing between intensity and half-tone so necessary in all good negatives.

How, then, is this to be done? Certainly not by having a fifteen, thirty, or sixty-grain iron solution as a regular developer; for a good photographer will have no regular developer. He may have a general one, which he strengthens or modifies, in order to produce the result he desires; but an arbitrary formula for either collodion or developer, if adhered to, will only lead to vexation and disappointment in many cases where it might easily have been avoided, and this can be done where the nature of development is properly understood. If a negative is properly exposed, with a collodion giving moderate intensity, a developer ranging from twenty to thirty grains to the ounce will be found amply sufficient. If, on the contrary, the negatives are weak and flat, one-half the above strength will be sufficient. But should it be intense, double the above strength may be used with advantage.

As I said above, a collodion that gives a weak image with plenty of detail is generally very sensitive, and will bear a very weak developer which deposits silver slowly. The parts, therefore, most impressed by light receive the largest share of the deposited silver, particularly if the plate is kept in a rocking motion during development, and the more silver deposited upon the opaque parts of the negative the more intense it becomes. A weak developer, therefore, tends to give intensity, and should be used with a collodion giving weak negatives.

A collodion giving strong contrasts should have a strong developer, for the opposite reason that the action is much more quick, and tends to a more even deposit all over the negative, thereby preventing an undue aggregation of the particles of silver upon the parts of the negative most acted upon by light. In cases of extreme intensity, it may be still farther modified by a copious flow of the developer, and allowing part of it to run off, carrying with it a good portion of the free nitrate of silver.

This system of working does not entail as much trouble as it would appear upon paper, for all that is necessary is to have two bottles of developer—one containing fifteen grains of iron to each ounce of solution, the other containing sixty grains to the ounce. These, by judiciously mixing a portion of each together, will make a developer of any strength you require, and by so doing you may get almost any character of negative you may desire. The whole matter, then, may be summed up in a few words.

First: make a collodion that will give you the most sensitive, at the same time a not too intense, negative film. Then regulate the intensity by a judicious use of the developer, and you will find it much more pleasant and profitable than sticking to any *one* formula for either collodion or developer.

ARTISTIC COPYRIGHT.

Referring to the notice of the fate of the proposed Artistic Copyright Bill which we gave in our last number (page 342), we regret to have to add to that notice that, had the bill been carried, photographers would have found themselves in a somewhat degraded position as compared with painters and engravers.

When the Lords were in committee on this bill, it was decided that photographers were to be put in quite a different category from the other class of artists named, inasmuch as while the works of the latter were to receive protection for forty-two years, those of the former (photographers) would only be protected for fifteen years.

One of their lordships was understood to have made no secret of his antipathy to photography, which, in his estimation, was a mere mechanical affair, and it was, he considered, doing a wrong to art to give any protection to such inferior productions! Verily, as John Bright has said, there are *some* lords who are not very wise.

PHOTOGRAPHIC JOURNALISM AND PHOTOGRAPHIC EDUCATION.

In connection with the first annual meeting and exhibition of the National Photographic Association of the United States, which was opened in Boston on the 1st ult., a series of lectures was announced to be delivered. From the first of the series, delivered by Professor Towler, and which was exceedingly suggestive, we make a few extracts:—

Photographic Journals.

Finally, the journals have had their share in contributing to the rapid development of the art of photography; for it is the aim and interest of the editors of such publications to make them useful and attractive, and thus all the knowledge that could be obtained from practical operators and intelligent amateurs has been freely and liberally recorded. It is impossible to estimate the amount of instruction that has thus been given gratuitously—we may say instruction drawn from different quarters of the globe; for instance, from Great Britain, France, Germany, Holland, Italy, and the United States. * * * *

I need scarcely revert to the advantages to be derived from honest and well-conducted journals either in art or literature. In photography our journals have been almost the only sources from which information was to be obtained, the only vehicle of communicating new inventions and discoveries. But it is very necessary that such vehicles should be drawn by more than *one* horse; they ought to be at least a coach and four, and well supplied with relays. I mean by this, that an editor must be endowed with exalted aspirations and liberal views, incapable of yielding to bribes to propagate untruths. He must work for the public good and not for patentees and stockdealers. Besides this, an editor must be educated up to the subject he discusses, and not be a mere speculator in other men's wits, and capable only of writing puffs and sarcasms. The honesty of an editor must be commensurate with his power; for a large community model their judgments and opinions after his, and are easily beguiled into the wrong track by a powerful but unscrupulous adviser. Much evil may be propagated, much error introduced, and much wrong effected by a venal and corrupt leader of a journal; whilst on the other hand many crocodiles and other amphibia, that can live both on land and in water, many snakes in the grass, sneaking and cajoling with their wiles, many bloodsuckers and nine-eyed lampreys watching for witless victims, may all be crushed in the germ by an honest editor, who, like

a follower of St. Patrick in the land of Erin, circumscribes their expansion, as the latter does by drawing a circle on the ground with his finger, around a toad, saying:—"So far may'st thou go, but not farther."

A journal is an organ of instruction and information—a sort of reservoir, with its innumerable service-pipes, supplying its readers continually with a palatable beverage. Besides this, a journal is a medium of communication between master and students; but it is sometimes prostituted to the condition of a go-between—an organ of communication between the taker in and the taken in—between a flashy advertisement and duped credulity. Fortunately there is an unfailing criterion of designating the merits of a journal, or at least the real object of its issue; for if the ephemeral or periodical publication is sold for a price less than that which it costs for paper and printing, look out for a wolf in sheep's clothing; there's a screw loose somewhere. On the other hand, a journal of intrinsic worth, whose character is independent, its instruction sound, and its advice unbiassed by any thing but honesty and truth, can demand a respectable remuneration, and with such a character can be the organ alike of dealers and consumers.

Influence of Photographic Societies.

The element which has been more conducive than any other to the cultivation and spread of the art and science of photography is one that is only just beginning to be understood in this country, but which has flourished for several years in Great Britain to perfection—I mean the organisation and activity of photographic conventions. These conventions are patronised by the highest personages in the realm—the Queen, the princes, archbishops, dukes, the clergy, as well as the most distinguished literary and scientific characters. It is quite refreshing to see so much democracy in the midst of so much aristocracy. It is by these meetings and conventions that the doings, thoughts, theories, processes, and speculations of men living far remote from each other are brought to the mill to be winnowed, ground, and sifted, and afterwards distributed as proper food for digestion. It is in these societies that the ways and means of learning photography are concentrated; it is here that geniuses come in collision, and, like flints, strike fire by eliciting truth. The value of societies and conventions is well understood by the members of the medical profession, perhaps better than by any other class of men; they have their organised county societies, their state societies, and their national conventions. The benefit to each member who regularly attends the meetings is marked on his countenance; he walks, too, with a nobler gait; he speaks a better language; has a more extensive practice than his neighbour who has only learned a few receipts, but neither reads a medical journal nor meets his fellow-practitioners in conventions to exchange thoughts and experience. The transactions of these medical associations are full of sound learning; for all extraneous, heterogeneous, and flimsy aspirations are sifted out and left unpublished. Knowing, practically, the value, the pleasure, and erudition to be derived from the associations alluded to, I am earnest in my recommendation of the institution and continuance of similar conventions for the practitioners and amateurs of photography. A few city societies already exist, as, for instance, the photographic societies of New York, that of Philadelphia, of Boston, and of Chicago. These are the nuclei of future greatness.

The first great benefit arising to an individual who has been enrolled a member of a society for the improvement of practitioners and the dissemination of discoveries in any trade or profession, is the humanising of self; all the paraphernalia of pride and of conceit are excluded from such meetings, and, if by chance they find entrance once, they become so unmercifully stripped off and torn to rags that they can never again be worn. Each one invests himself with a garb of humility, and presents himself as a plain, unsophisticated human being, eager to learn from others, whom he regards as his equals. This I call the *humanising of self;* it is the reduction of man to a scale of equality with other men.

The next great benefit to be derived from the periodical meeting in question is the acknowledgment of merit in others, and of their superiority in special departments. A spirit of pomp, of pride, and of conceit, nurtured at home and flattered by his own immediate dependent circle, will seldom allow such an acknowledgment to enter the breast, much less to nestle there and make a permanent dwelling of it. But at the county society, where it is childish to put on airs that would be ridiculed, it would be folly to expose yourself to any feelings of jealousy by rejecting merit. To be able to remove jealousies from your character is a great conquest; and this conquest is sure to be a consequence of your regular attendance at the gatherings of your respective clans. This conquest I regard as the *ennobling of self.*

The next important advantage arising from the organisation of periodical conventions is a tangible one to the purse. You there derive instruction, become better informed in specialities and in generalities, take your lessons in processes from the masters themselves, see performed what others only read about; your taste becomes cultivated, your art more widely developed, and your practice more expansive. All this naturally reacts upon your financial condition, and, controlled by a generous and subdued mind, you become a man of importance and sterling worth.

The final advantage to be derived from these conventions is, perhaps, greater than all the rest; for it is the consummation of all of them and reaches its acme in the public good. The knowledge imparted to the society is *public* property, and is scattered broadcast through all civilised countries through the instrumentality of the journals. * *

In six months after the presentation of a new process before the photographic societies of London, Philadelphia, Paris, Berlin, or Marseilles, the entire globe of the earth is acquainted with it; this process is public property, and each photographer or amateur that reads his own language learns to practice the process and thereby to increase the weight of his purse or the size of his artistic collection.

Preliminary Education.

It is quite essential for photographers to receive a proper preliminary training as for doctors, lawyers, and parsons; for, although it may sometimes happen that some individuals can educate themselves, and shine in their respective arts and professions without the advantage of a previous training, such instances are rare; whereas the examples of distinction are always more numerous on the side of the corps of educated followers. A general education is requisite for every American; but the special branches for photographers are decidedly chemistry, natural philosophy, and drawing. Now I mean by chemistry not that silly system of studying the theory of chemistry by heart from a text-book practised in almost all our schools. This system cannot fail to produce a host of shallow pretenders, flimsy scholars, mere smatterers. Just as well might you teach a cobbler to mend shoes by instruction from books, as instruct students in chemistry by filling their noddles with chemical equivalents and symbolic notations. Nor do I entertain much greater respect for that style of chemical instruction which consists essentially of flashy experiments of noise, colour, and comicalities. Chemistry is *work*, not thought and book learning. It teaches us how to manufacture all artificial compounds of matter; how to separate all natural and artificial compounds into their respective components, or to convert them into other compounds. Technically expressed, chemistry is the synthesis and analysis of matter. This science is of the utmost importance to a photographer, for it supplies him with a rational exposition of every step that he takes, and from every experiment that he may make. A knowledge of electricity, magnetism, galvanism, electro-magnetism, magneto-electricity, in fine, of every subdivision of electricity, as also of pneumatics, hydrostatics, and optics, is essentially necessary for a scientific photographer; for these are, as it were, so many weapons of warfare in scientific discussion, or so many keys to the comprehension of nature's secrets. The *rationale* of the photographic impression is to be found and learned only by the aid of chemical and physical instruction. In like manner our young tyros, or candidates for distinction on the arena of the camera and the print, ought by all means to have a thorough course in drawing, shading, and colouring; and here I must express my indignation against another silly system much practised in our boarding and large day schools, which consists in teaching young ladies and gentlemen oil-painting—yea, painting art compositions before they have learned to sketch a straight line, much less a pump or a cow. A greater agglomeration of absurdities can seldom be met with than in the productions of these native geniuses of the pencil and the slab to be seen in almost every farmhouse of our extended country. It is no rare thing to find, in these exquisite paintings, the sun rising from between two mountains, the one behind the other, as if he were a thing of the earth, a candle in front of a mole-hill. I have seen, too, water-wheels to a gist-mill depicted on a mountain, and the stream that was to turn the wheel a hundred yards beneath. Now, when I insist upon the fact that our young photographers shall learn to draw, I mean nothing of this sort. Let them keep their hands entirely away from the paint-pot, but rather let them begin and draw lines, straight and curvilinear, broken and contorted, for a month or two; then trace single and separate figures of varied forms in their due and natural proportions; next proceed to copy simple drawings of the works of true artists; afterwards walk into the fields, to the farm-yard, to the docks, amongst the shipping, to the battle-field, to the church, and to the theatre, and learn to copy objects themselves in their natural positions. When their apprenticeship is near its close, and their fingers are educated in all the technical formalities of reproducing Nature with the pencil as she is, then is the time with humility to try a higher flight, and aim to sketch an original composition, and to trim it with a poet's fancy schooled in realities. This is a hard school to graduate in, but it is the only one of real value and of true merit—the only one of which each step leads to a higher, until you mount the platform of completion. To daub in oil paints before learning to sketch is equivalent to moralising the Egyptians crossing the Red Sea by a few dashes of red for the waves, and a few blotches of blue for the sky. It is beginning at the end and ending where you ought to begin.

It seems to me that a country like ours ought to institute a college for the special purpose of educating photographic artists both for the army, the navy, explorations and surveying, and for the profession. Such a school would be invaluable. If this were feasible, then to the studies already enumerated others of a more extended character would have to be appended, such as a complete course in modern languages, of mathematics, mechanics, mineralogy, zoology, botany, physiology, and geology. Instruction at such a school or college is what I term the requisite preliminary education of an American photographer, if we intend to shine and surpass other countries in work and composition.

But at present there is no such institution; therefore, the next best is to study and practice the most important branches, namely chemistry, physics, and drawing, with the respective masters, and not dabblers in these departments.

ON THE ATOMIC WEIGHT OF ALBUMEN, AND THE COMPOUNDS FORMED BY SENSITISING A CHLORIDED AND NON-CHLORIDED ALBUMENISED PAPER UPON A SOLUTION OF NITRATE OF SILVER.

IN TWO CHAPTERS.—CHAPTER II.—*Concluded.*

A FEW years back I suggested several subjects for discussion that had relation to the philosophy of printing upon albumenised paper, and respecting which very little, if anything, was known. One of these was to the following purport:—

Does the sensitising a sheet of our usual chlorided albumenised paper upon a solution of nitrate of silver produce (leaving the free nitrate out of the question) two distinct and separate compounds of silver, namely, a chloride and an albumenate? or does it produce one double compound which, for the sake of distinction, I called a chlor-albumenate? Whether this name was good or bad is immaterial, as it served to designate the compound I meant, namely, a compound formed by the chemical combination of chloride of silver and albumenate of silver.

If such a double compound be formed it is evident that, according as the proportion of salting chloride in the albumen is more or less than that required to form this said chlor-albumenate, there will be in conjunction with it either an excess of chloride of silver or of albumenate of silver.

From repeated observations I came long ago to the conclusion that the vigour and tone of a print was more dependent upon the albumenate of silver than upon the chloride, taking them singly, and, therefore, that a high-salting formula did not produce such brilliant prints as a low-salting one did; although, perhaps for that very reason, the paper is more sensitive with the former than with the latter. Moreover, I hold the opinion that the greatest vigour and brilliancy in a print will result from that proportion of the salting chloride which will produce no excess of either chloride or albumenate, but simply produce this said chlor-albumenate.

As I believe I was the first person who even hinted that such a double compound was formed, I naturally feel an interest in the question. But I have never yet been able to *prove* to my own satisfaction whether this double compound be a mere mixture or a chemical combination; nevertheless I have long believed that the latter is the case. If I am wrong in my supposition that such a double compound is formed by the act of sensitising our chlorided albumenised paper upon a solution of nitrate of silver, at all events I do not stand alone in my belief; for it appears that, soon after I proposed this subject for discussion, Dr. Emerson Reynolds, in his valuable *Contributions to the History of Albumen and Certain of its Compounds with Metallic Oxides*, published in THE BRITISH JOURNAL OF PHOTOGRAPHY, Vol. X., in giving a "brief summary of the principal conclusions which a careful examination" led him to form, says, at page 302:—"In the presence of excess of nitrate of silver, albumen containing a soluble chloride in solution furnishes a compound which appears to be a definite combination of albumenate and chloride of silver."

However, it seems that Dr. Reynolds was as unable to satisfy himself on this subject by his experiments as I was to satisfy myself by my own; for, at page 301, after giving an account of these experiments, he says:—"I have made many other experiments in this direction, the results of none of which have been very satisfactory. From their indications, however, such as they are, I should be inclined to say that the chloride and albumenate of silver are not thrown down in a state of mixture, but rather as a distinct chemical compound."

I believe it must be conceded that all experiments tend more to prove that such a chemical combination takes place than the reverse; therefore, we will assume that such a compound is formed by the act of sensitising a chlorided albumenised sheet of paper upon a solution of nitrate of silver. It then becomes a question—In what proportion does the chloride of silver combine with the albumenate of silver? I presume it is atom with atom; that is, one molecule of each compound unites to form the double compound.

But what is the composition of this molecule of albumenate of silver with which I have assumed a molecule of chloride of silver combines? Is it to be considered, according to Lieberkuhn, as consisting of two atoms of oxide of silver and one of albumen? If so, this double compound, which I have called chlor-albumenate, and shall thus designate when I have to speak of it, consists of three atoms of base, viz., oxide of silver, and two atoms of acid, viz., one of albumen and one of chlorine. Or, are we to consider that one of the atoms of oxide of silver in the albumenate, as given by Lieberkuhn, quits it and takes to itself the chlorine from the salting chloride, and combining with it forms this chlor-albumenate? If so, it would then consist of two atoms of oxide of silver—one of albumen and one of chlorine. Methinks this is well worthy of investigation; and I recommend it to those of your readers who may perchance have greater facilities and better appliances for investigating the matter than I have myself, and perhaps greater abilities for so doing.

I have stated—it appears all experiments in that direction tend to foster the belief—that a chlor-albumenate is formed by the act of sensitising a sheet of chlorided albumenised paper upon a solution of nitrate of silver; and I, therefore, think we are warranted in believing such a double compound is produced. It is not so, however, with respect to another combination which is said to be formed by this act of sensitising; for, notwithstanding the high authority from whom it emanated, viz., Dr. van Monckhoven, I think it must be considered, in the absence of direct proof, as being, at the very least, *highly improbable.*

In the same page from which I last quoted, viz., 301, Dr. Reynolds says, alluding to the *Bulletin Belge de la Photographie*, No. 14, page 31:—"Dr. van Monckhoven states that when salted albumen comes in contact with nitrate of silver there is not a formation simply of two distinct compounds of the metal, viz., chloride and albumenate of silver, in addition to free nitrate, *but only a transparent compound of albumen with chloride of silver.* When it is remembered that this takes place in contact with a large excess of free nitrate of silver, the above assertion is rather startling; more particularly so since we well know that albumen has a strong tendency to enter into direct combination with oxide of silver, forming with it a well-marked compound. This view, however, deserves the most careful consideration, coming, as it does, from so high an authority and careful an observer as Dr. van Monckhoven."

The last sentence I fully endorse; indeed every statement, and even the suggestions of a keen observer "deserve careful" investigation but not credence, unless backed by probability. As far as I am individually concerned I never place belief in a statement that I think is improbable, merely because the person making it is considered as "an authority;" for I have known too many instances in which eminent men have lamentably, and even laughably, been in error respecting scientific matters, and that, too, in the very branches of science to which they have given the most attention.

It is well known that when a solution of nitrate of silver comes in contact with a solution of a chloride—say chloride of sodium—a mutual interchange of acids and bases takes place, and the result is chloride of silver and nitrate of soda. Discarding the idea of a chlor-albumenate being formed, it is understood that the same effect is produced when a sheet of sodium-chlorided albumenised paper is floated upon a solution of nitrate of silver. Now, it must take some appreciable amount of time to effect this mutual decomposition, and for the formation of other salts from the constituents of those which are decomposed, however instantaneous it may be.

During the time, then, that it takes to effect the decomposition of the compounds thus presented to each other, and for their several constituents to enter into other combinations, what is to prevent the albumen from combining with the oxide of silver which is presented to it by the overplus of nitrate of silver, for it must be borne in mind that the paper takes up a very large amount beyond what the salting chloride requires? Are we to understand from Dr. van Monckhoven, that the formation of albumenate of silver cannot take place in the presence of the formation of chloride of silver, and that the formation of the latter prevents the formation of the former, although albumen has such a strong affinity for oxide of silver, and there is present much more nitrate of that metal than is sufficient to supply the requisite oxide for both the chloride and albumenate? Now it is scarcely possible for so acute an observer to have mistaken albumenate for albumen; however, it is undeniable that if he did make this improbable mistake he gives us the before-named double compound of chlor-albumenate.

We must now, for the present, leave this truly interesting and important subject, but I sincerely trust that it will be taken up by some of your numerous readers, for we sadly want "light, more light" thrown upon it; and it should ever be borne in mind that, however unimportant and even trifling a new fact may appear at first, it eventually becomes an essential link of the chain leading to highly-important results.

GEORGE PRICE.

PHOTOGRAPHY A PUBLIC NECESSITY.—We must not forget the part which the public themselves, however unconsciously, have taken in raising the sickly infant of photography to its present gigantic stature. Photography is, like food and raiment, a necessity; and necessity educates tailors and bread bakers in all climes. There is no hovel so mean as not to be decorated with a card-picture or a tintype; there is no lover so demoralised that does not wear his lady-love's picture as a talismanic gem next to his heart. The public have already done much in making the photographic art a healthy institution; but they can now exert a much more extended influence over photographers themselves by demanding more art in the card or cabinet picture, and more style in composition; they can, if they choose to do so, make artists of photographers. Of course it is to be expected that photographers will lend a helping hand in the elevation of their art, and eschew whatever is low and non-artistic.—*Towler.*

Contemporary Press.

HISTORICAL REMARKS ON PHOTOGRAPHY.

[Philadelphia Photographer.]

Thirty years ago the processes of Daguerre and of Talbot were published to the world; these processes laid the foundation of that science and art which call us together to-day. There is no science more profound than that of sun-drawing; there is no art more enchanting and gratifying than that of photography.

Thirty years ago, profiles or silhouettes were taken by means of what is called a pentagraph, which in its simplest form consists of a long pole or rod moving on an universal joint, which allowed the pole to be rotated vertically, horizontally, in fact through all the angles comprehended between these two planes. On the longer end of the rod a strong steel darning needle was fixed; into the shorter a black-lead pencil was inserted. The cardboard to receive the picture was attached to a flat piece of wood suspended on hinges from above, and resting by gravity against the point of the pencil as it moved or rotated, whilst the steel needle was carried by the operator around the contour of the sitter, beginning on the crown of the head, passing gently over and beneath the curls, along the forehead, over the ciliary ridge, in contact with the ridges and declivities of the nose, carefully over the lips and their cherry surfaces (this was the *pons asinorum*, over which, if the luckless operator once succeeded without interruption, he might regard himself an artist of the first water), finally along the chin and delicate neck, and over the panting chest to the waist. The swinging-board, that showed the outline so far traced, was here raised, whilst the needle was quickly returned to its original position on the crown of the head. Again: the draughting-board was allowed to fall on the point of the pencil, and the operator proceeded with the needle backwards over the homologue of the modern chignon, and along the neck and shoulders to the posterior part of the waist. *Voila tout*—that's all; excepting when the cardboard was removed from the swing-back, the artist had to close the circuit by joining the back of the waist with the front, according to the rules of art, presenting a graceful curve like a fish-hook. This operation corresponded to posing and exposing in photography, and was wont to occupy about the same length of time, if the fair sitter, or the country lout, did not happen to burst out into an ungovernable laugh or titter when the needle crossed the lips. The next operation consisted in filling the whole surface, within the pencil-tracing, with an uniform body of Indian-ink; and, when this was dry, the model had to sit before the artist, in due artistic style (for the artist never failed to assume all the supposed airs of genius), in order that he might sketch upon the black figure, ears, eyelashes, ringlets, earrings, lace, and drapery in their appropriate positions. These were then worked in with a darker ink rubbed up with gum-water, which heightened the contrast. Touches of gold, on the pendants from the ears, and on the breast-pins, were extras, and demanded an extra price. This operation corresponded to development. To give greater dignity to the proceedings, the sitter was seldom allowed to inspect the work at this stage, but was requested to call the following day at a given hour, stating that the silhouette had to undergo retouching by a certain Monsieur, that is, a French artist in the employ of the establishment, who was so overpowered with work that he never left his private room. The following day the sitter received the likeness, and, in general, was enchanted with it. People were not so fastidious then as now. Such was the mode of taking pictures for the people previous to the year 1839. Silhouettes were also cut out of black paper with a pair of scissors; these were quickly made, but were inferior to those made with the pentagraph, and, consequently, they seldom fetched so high a price. Many examples of the delectable silhouettes are still in existence. I found one the other day that had been cut out in the tunnel under the Thames; it is truly a curiosity, and, as curiosities, I would suggest that a number of such profiles be collected and exhibited at our next meeting side by side with specimens of modern photography.

Comparisons of what we were with what we are present useful instruction. Limiting our considerations to photography alone, we may, with legitimate authority, assert that in no epoch in the world's history, of equal duration, has the advance of any art and science, from its embryo to maturity or apparent perfection, been so marked as the art and science of photography. Beginning with the Daguerreotype, the Talbotype, and the Niepceotype, which sprang up like three mushrooms, side by side, as types of future expansion, let us examine them in their infancy and not in their manhood.

The Daguerreotype, in its origin, was but the ghost of a picture—abundance of spirit in it, but no body. It required much coaxing to be seen at all, and the more brilliant the light that illuminated the picture the less visible the latter became to the vision; like the metallic covering of a cupola suffused with sunlight, it was all glitter. In a few years the Daguerreotype became a perfect sun-picture, but it still retained the one great disadvantage of glitter and effulgency, unless viewed at just one particular angle. Although the Daguerreotype is pre-eminently the most accurately and most sharply defined of any picture, its qualities are too shining for our mental vision, and on this account it has properly been laid aside.

The Talbotype has gone through a regular and progressive improvement. We view it at first as a picture that could not bear the light of day: it became darkened by sunlight. The first step to improvement was the discovery of the fixing solution. At this date we behold the picture of lace, white on a black ground, as also those of engravings, white on a black ground. These were our first negatives. They were made transparent with a solution of wax and other ingredients. They were excellent in their day. But the Talbotype—that is, our modern print on paper—received its master-touch when glass, coated with albumen, gelatine, or collodion, became the negative; but the silver negative or positive, whether on glass, paper, gelatine, albumen, collodion, wood, ivory, &c., is still only another form of Talbotype. Look, then, at our silver prints and negatives now, and tell us whether they can be made more perfect. That seems almost impossible. The negative and the print seem practically indestructible and unchangeable, if prepared properly, according to our present knowledge and experience.

The Niepceotype is really the type of the carbon and asphalt process. It has progressed slowly, but ultimately to a degree of perfection quite unexpected, and to the utmost of our desires. The present carbon print is unexceptionable; the process of preparing it may be simplified, but the print itself can scarcely be improved beyond the degree of excellence attained by Swan's or Blair's processes.

Then look at the photolithographic, the photozincographic, Woodbury's and Swan's photo-relief printing, and the various enamel processes that have arisen out of the Niepceotype, so to say; and, after this look, have we not reasons to be proud of our exalted status in photography?

And what reason can be assigned for this rapid progress? Several circumstances have conduced to it. In the first place, by the generosity and liberality of the French government the process of the Daguerreotype was made public property, so that all men of genius, of education, and of art were at once at liberty to learn this charming art and improve it by their practice. Improvements came rushing in from all quarters, such as quick-stuffs or more rapid sensitisers; for the Daguerreotype was at the beginning a very slow operation, requiring an exposure of many minutes, during which the model's head was fixed in a sort of vice. But the results were too enchanting to be abandoned, and in consequence of these the knowledge of chemists and opticians was called in requisition. Both classes rushed enthusiastically into the phalanx of operators and lent their aid—the former in the explanation of suitable and better chemicals; the latter in the production of more accurate and more rapidly-working lenses. To both parties photography is much indebted. J. Towler, M.D.

Our Editorial Table.

The Aneroid Barometer.

By A Fellow of the Meteorological Society.

London: Houlston & Wright.

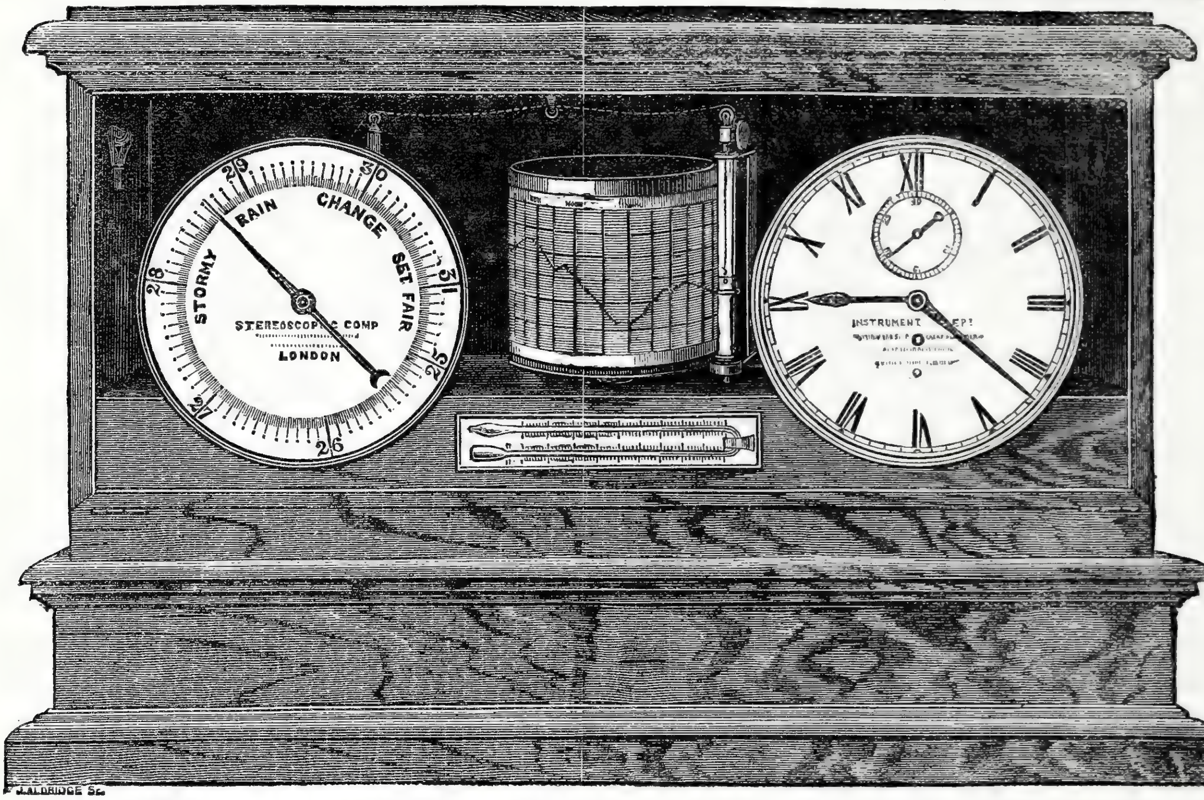
Photography is more intimately dependent upon meteorology than many would at first sight imagine. To the practical photographer the state of the weather is of vital importance. Both professional and amateur photographers are alike influenced by a dull, rainy day. We once formed one of a party of the latter class who left town in the morning on a photographic excursion into the country, but had scarcely arrived at the field of operation before the rain descended with such force and persistence as to confine the party for the day to the cheerless parlour of the village inn, not a single camera having been unpacked. What aggravated the matter was that the slightest attention on the part of any member of the party to the indications of the barometer on the previous evening would have enabled him to note the fact that the instrument indicated that a downpour might be anticipated, and such notification in time should have led to the postponement of the excursion. Certainly an acquaintance with meteorology will not enable us to avert the threatened rain-cloud, but it will apprise us of its approximate advent, and that is important.

The changes of the weather and the coming of the storm depend upon the weight of the atmosphere in any given place, and the barometer, by informing us of the weight of the atmosphere, is an invaluable instrument by which to predicate the state of the weather.

As regards portability the mercurial barometer, the tube of which *must* be at least thirty inches in length, is found to be inconvenient, and hence an instrument as portable and compact as a pocket time-keeper was a desideratum. This was eventually obtained in the well-known aneroid barometer, which has now been brought to a state of great mechanical perfection. This suitable form of barometer had scarcely been brought out when its services as a convenient means of measuring the heights of mountains were discovered and utilised by the tourist. Of course any barometer will do for measuring altitudes; but when it is understood that the aneroid bears, so far as respects portability, nearly

the same relation to the mercurial barometer that the pocket chronometer does to the old-fashioned eight-day clock, its superior claims with regard to convenience will readily be understood.

The principle on which the height of any particular elevation is ascertained by means of this instrument will easily be understood from the following:—The atmosphere, being a compressible fluid, is much denser contiguous to the earth than it is at a considerable distance from its surface; hence, in proportion to the ascent from the earth's surface, so will the weight of the atmosphere diminish. Now, as the pressure of the atmosphere decreases in proportion to the elevation of the place to which the barometer is taken, the height of the barometer follows the same law, and it thus becomes an instrument for determining the altitude of mountains.



It was soon observed* that when the altitudes of the places of observation increased in *arithmetical* progression, the densities or pressure of the atmosphere decreased in a *geometrical* progression. The following approximate table of the density of the air at different heights above the surface of the earth will give some idea of this principle:—

Heights in Miles.	Densities.
0	1
$3\frac{1}{2}$	$\frac{1}{2}$
7	$\frac{1}{4}$
$10\frac{1}{2}$	$\frac{1}{8}$
14	$\frac{1}{16}$
&c.	&c.

According to this law, "a cubic inch of the air we breathe at the surface of the earth will, at the height of 500 miles above it, fill a sphere equal in diameter to the orbit of Saturn."

The little work which has elicited these remarks is a popular and excellent manual on the subject of the aneroid barometer and its uses for indicating changes of weather and measuring the altitudes of eminences. It gives a very lucid description of the principle and mechanical construction of this instrument, and contains a number of altitude tables (from Airey) by which heights of from 12,000 feet downwards may be ascertained by its means. The following instance of its utility in this respect is given:—

"A tourist in Egypt, ignorant of the height of the principal pyramid, ascended it 'armed' with a pocket aneroid, and noting its indications at the base and summit. On returning to his hotel, and consulting his guide-book, the height indicated by the barometer was found to agree exactly with that obtained by trigonometrical survey and by the mercurial barometer."

Mr. James Martin, of the London Stereoscopic Company, lately described, before one of the scientific societies, an hourly, self-recording aneroid barometer, which, we think, would be an elegant and useful ornament in the waiting-room of the photographic artist, and of which we present a diagram and description:—

"This instrument is designed to show the various fluctuations which may have taken place in the barometer in the interval between the stated hours of observation. It consists of a large and powerful aneroid and an eight-day clock, each with eight-inch dials; between these is placed in a vertical position a cylinder four inches in diameter. The circumference of this cylinder is furnished with a toothed wheel, which works in an endless screw at the back of the instrument; it has a paper attached to it ruled to coincide with the barometer scale. This paper, besides being ruled horizontally into inches and tenths to correspond with the barometer scale, is divided vertically throughout its entire length of twelve inches into seven principal and seven minor divisions, indicated by darker and lighter lines. The darker lines represent the noon, and the lighter lines the midnight of each twenty-four hours. The paper thus lasts one week. Near the paper a pencil guided by a rod of metal is moved up and down as the action takes place in the aneroid, and at every hour the pencil is made to mark the paper by simple mechanism connected with the clock.

"By this means a black dotted curved line is produced, showing at a glance the height of the barometer—whether it is falling or rising, for how long it has been doing so, and at what rate the change is taking place—whether at the rate of one-tenth per hour or one-tenth in twenty-four hours—facts which can only be obtained by very frequent and regular observations from an ordinary barometer, but which are nevertheless essential to a reliable 'weather forecast.'"

In our preceding remarks we have said what the aneroid *does*, but not what it *is*. A flat, thin box has a lid of corrugated sheet brass. The air is pumped out, and the aperture hermetically sealed. A spring is now applied to raise up the lid, which, from the vacuum inside, would otherwise sink down into a deep hollow. The force of this spring being constant, the corrugated lid will rise or fall according to the pressure of the atmosphere outside. By appropriate lenses and mechanism this rising and sinking of the lid is converted into circular motion, and a hand accordingly indicates the varying pressure of the atmosphere. So accurate are these instruments now made that we are aware of several instances in which the height of hills or mountains, as indicated by the pocket aneroid, has been within three or four feet of the altitude as determined by the ordnance survey. We may here state, as a "rough and ready" means of calculating an altitude, that if, at the foot of a lofty flight of stairs, the height of the barometer is carefully noted, and the bearer ascend until the hand has fallen one-tenth of an inch, he will, on measuring, find that he has ascended about eighty-five feet. The little manual to which we have here drawn attention is one which we must highly recommend as an excellent accompaniment to either a mercurial or an aneroid barometer. It is intelligibly written, and the reader rises from its perusal much more enlightened on the subject than when he sat down.

* Cassell.

Gold-Toning Bath.—Mr. M. Carey Lea (in the *Philadelphia Photographer*) says:—"A correspondent of the *Photographisches Archiv*, over the signature of 'J. P. S.,' proposes to modify the gold-toning bath which I sent you some time since, by substituting benzoate of ammonia for benzoate of potash, remarking that it is simpler to prepare. The objection to using the ammonia salt is that its degree of alkalinity is very apt to vary. The combinations of these organic acids with the volatile alkali, especially the acid salts with which we have to do here, are apt to gradually pass, by keeping, into uncertain mixtures of acid and neutral salt. It is possible that such a mixture may answer equally well, but there is an uncertainty about such combinations that is disagreeable. If the alkaline benzoates can be purchased, it is as easy to use benzoate of potash as benzoate of ammonia, and, if they have to be prepared by the photographer, the same remark holds good. The formula, as given by the correspondent of the *Archiv*, is—One grain of chloride of gold to each two ounces of water and four or five grains of benzoate of ammonia. He does not state whether he used the neutral or the acid benzoate. It is characteristic of this bath to give beautiful warm, purple-black tones, and 'J. P. S.' confirms this result, and remarks that the bath is very constant in its working. It has most resemblance, in its general characteristics, to the acetate of soda bath. The prints which it yields rank as high for stability as any. As some of your readers may like to try the bath as originally directed, I will briefly repeat the directions:—Dissolve forty grains of caustic potash in two ounces of water, and add as much benzoic acid as will dissolve; filter the liquid, and preserve it for use. For ten ounces of toning bath take half-an-ounce of this solution and add to five grains chloride of gold."

Correspondence.

Home.

PHOTOGRAPHY IN PIGMENTS.

To the Editors.

Gentlemen,—I have read with some surprise the specification of Mr. Pouncy's new patent, the details of which were described at page 329 of your Journal. Mr. Pouncy is a kind personal friend of mine, but photography is a dearer one. If he claims, as he seems to do, the sole right of using a method of rendering the paper or other supporting medium, on which the sensitive pigment rests, temporarily transparent, and printing from the back of the tissue, surely he is "a day behind the fair." Has not Mr. Blair publicly practised and described such a method long ago?

I presume no one will feel disposed to dispute the validity of Mr. Pouncy's patent of 1863, which expires next year. In that specification a novel application of bitumen of Judæa for photographic purposes is described and claimed, and some very fine pictures taken by that process have been exhibited. I myself have printed by this process several proofs which were in no way inferior to the best silver prints, and in some respects superior to them.

But I think he has now gone a step too far. If I can construe rightly the very loose verbiage of a very loose specification, Mr. Pouncy, in one part of his specification, again takes out a patent to protect the process which he patented in 1863. I am not much conversant with the quirks of law, but I am tolerably well acquainted with a common-sense reading of the "Patent Law Amendment Act" of 1852, and some of the most important judgments that have been given in connection therewith. From this Act and the previous statutes not abrogated I gather most clearly that no one can re-patent an invention. The previous patent may be extended under certain conditions which must be complied with, but no new patent for the same thing can be granted.

I trust my friend Mr. Pouncy will not think me captious in objecting to the validity of at least some portions of his recent patent. About three months ago he showed me, in my laboratory at King's College, a great many proofs from negatives by his new patent process. Without knowing anything whatever of his specification, and without any information as to how the pictures were printed, I said they were executed by Blair's process which had been described, or, at all events, was well known to me and had been publicly practised. If I am wrong in my surmise I hope Mr. Pouncy will put me right.

With respect to a regular commercial supply of pigmented tissue for carbon printing, about which I have had several inquiries, I am told that a celebrated albumenising firm will soon be in a position to supply it, of their own make, to the public. Another firm write me to say that they purpose importing the tissue from France, where it is extensively manufactured. The first in the market will have the best "pull," as there will undoubtedly rise up an extensive demand when photographers learn how easy it is to print permanent photographs in carbon or other pigments.

King's College, July 19, 1869. George Dawson.

ANOTHER CAUSE FOR SILVER MATT STAINS.

To the Editors.

Gentlemen,—Having lately seen many inquiries made as to how to avoid the above, and the usual replies as to horny collodion, dirty slides, &c., given in your replies to correspondents, allow me to point out one other cause which has been overlooked, and which may tend to remove the difficulty now bothering some anxious amateurs, namely, that on these very hot days it should be borne in mind that the collodion should be alcoholic, the bath weak, and the developer to match; that the rays reflected from any object partake more of heat than of light, and the exposure must, therefore, be longer than if the weather were cooler; that in some instances—such as taking interiors—the light from the windows will have an orange cast, owing to the red rays being in superabundance and mixing with the yellowish-green colour of the glass, thereby forming a light extremely non-actinic. This, combined with the temperature, high as it is now, will cause a drying of the silver on the surface of the film before the light has had time or force to act on the iodide; and thus, on removing the plate from the slide, even after a short exposure, it will be found to have matt stains in every direction, while the image is but faintly impressed (not at all under the matt stains) should the iodide be in excess. Then the silver will "eat it out" (as it is termed) as well.

When such is the case the better plan is to give up work, as no satisfactory results can be obtained until the heat moderates or the air has been cooled by the setting sun. Very early in the morning, between four and nine, many of the finest effects are to be obtained, both in near and distant scenes, while "early to bed and early to rise makes a man healthy, wealthy, and wise."—I am, yours, &c.,

Ross, July 14, 1869. W. Harding Warner.

[Mr. Warner's letter was written before he could possibly have seen our article in last number, in which it will be perceived that we have anticipated his recommendation of a weak bath by advising the washing of the plate, and applying a diluted solution of nitrate of silver previous to developing.—Eds.]

PAPYROXYLINE.

To the Editors.

Gentlemen,—I have lately been using Liesegang's papyroxyle for collodion. It has many good qualities, but I find one serious defect—the film becomes very rapidly surface dry in parts after taking out from the bath, and development without stains is therefore rendered very difficult.

That this is solely due to the papyroxyle I prove by having made at the same time samples of collodion from other kinds of pyroxyline, and I have been unable as yet to overcome it.

Will you or any correspondent give me a hint as to how I can remedy it?—I am, yours, &c., W.

July 20, 1869.

IMPURITIES IN WATER FOR WASHING PRINTS.

To the Editors.

Gentlemen,—In order that you may understand my position when putting the following questions, I may state that I tone and fix upwards of three hundred prints every night and place them in running water to wash till next morning, when they are removed, dried, and mounted.

Now, from my early education and religious principles, I do not visit my studio or work rooms on Sunday, but leave the Saturday evening prints in the washing water till Monday morning. I invariably find that, when I thus leave my prints in the water for the time mentioned—that is, twenty-four hours longer than the usual period—they are covered over with a species of slimy deposit of a nature similar to that which we see on a stone when placed in a running stream of water.

Query—First: Of what is this slime composed, and how is it produced? Secondly: Is it injurious to photographic prints?

I have not observed any deposit of this kind on the prints when removed from the washing water the morning following the day on which they are immersed, but the extra day's washing produces it in an unmistakable manner.

I shall be glad to know the opinions of my fellow-readers on this subject.—I am, yours, &c., A Professional.

July 20, 1869.

THE VELOCIPEDE AS AN ADJUNCT TO PHOTOGRAPHY.

To the Editors.

Gentlemen,—Mr. T. S. Reeves, in the last number of the Journal, has asked me one or two questions, which I will, as far as I am able, endeavour to answer.

First, as to the comparative advantages of the bicycle over the tricycle, as regards speed and labour, no weights being carried. I must suppose, once for all, that the velocipedes in question are only for one rider; for tricycles and four-wheelers are often made to carry two or more. I hold that the bicycle is to be preferred to the tricycle. First, because it is so much easier to work, either when going a short or a long distance. Secondly: it takes up so small a space on the road that, even though it be rough and stony, the rider is able to pick his way along the side, which would be an impossibility with the tricycle. Thirdly: if riding in a hilly country, the bicycle, being so light, is much more easily propelled up hill whilst the rider walks by its side than the tricycle; for, although a skilled rider on a bicycle can mount any ordinary hill, yet if it be found that it is hard work riding up hill, it is much the better plan to get off and walk. With a tricycle the work up hill, however slight, is very hard. Fourthly: it runs so much smoother and more pleasantly than the ordinary tricycle.

As to the second question—"What are the comparative distances that can be run with the same amount of labour?"—I fear I am not at present in a position to answer, as I have not, as yet, comparatively tried the two in the manner indicated. The greatest distance I have accomplished with my tricycle is thirty miles, which, however, was performed at about five or six miles an hour—a very slow rate in comparison with the bicycle's rate of progression. I could perform the same distance upon the bicycle at about seven or eight miles an hour, though more practised riders would think nothing of doing it at ten miles an hour. I hope shortly to have time to make long journeys, and run against time. I find the tricycle very hard to drive up an incline, and I must own I was very tired at the end of my thirty-mile run.

There are, certainly, several different kinds of tricycles, and Mr. Reeves's may be a better one than mine; but I do not think that when he has *fully* practised bicycle riding he will again use the tricycle, though there are still a great many who prefer tricycles to bicycles.

It is perfectly true about the strain upon the arms, but this is only the case with beginners. When I first commenced to learn I could only go very short distances, and could hardly hold on to the handles, but, in the course of time, that strain has ceased to be felt, indeed is not required, because a skilled rider can go along with his arms folded and without using his hands at all; it is quite easy to go along simply guiding the wheel by holding the handles between finger and thumb.

Saddles are differently made to suit the rider. Roberts and Son, of Bridgewater, make a saddle with a sort of back though not quite like the one your correspondent describes.—I am, yours, &c.,

Harrow, July 19, 1869. W. J. A. Grant.

EXCHANGE COLUMN.

To be exchanged, for a Ross's or other good maker's binocular microscope, an enlarging apparatus.—Address, F. W. Evans, 246, Old Kent-road, S.E.

For exchange: *The Imperial Journal of Arts and Science*, complete, sixty-six parts; a Dallmeyer's No. 1 B *carte-de-visite* lens, with repeating-back camera; a Derogy ¼-plate lens and camera. Any of the above will be exchanged for a good 8 × 5 bellows camera, with rising front and slides for both wet and dry plates.—Address, T. Attwood, Photo., 105, Great Hampton-street, Birmingham.

ANSWERS TO CORRESPONDENTS.

Photograph Registered During the Past Week.—

Archd. Glass, St. Boswell's.—*Portrait of Mr. William Williamson.*

☞ *Correspondents should never write on both sides of the paper.*

Charles Burton.—Nothing yet has appeared which is destined to supersede hyposulphite of soda.

T. T. B.—You mistake. We advocated placing the backgrounds in subordination to the figure, but not necessarily putting them out of focus.

Photo.-Mechanic (Manchester).—A ball and socket is a very convenient arrangement for the top of a camera-stand; but, unless the camera be very light and small, it will not prove steady.

A Newcastle Friend.—As the gentleman about whom you inquire retired from photography five years ago, we do not feel justified in giving you his address unless we receive his permission to do so.

Emma.—The effect will certainly be very excellent; but instead of employing wax for rendering the front picture transparent (which it so imperfectly does) why not use varnish? Copal varnish would answer well, and so would many others.

G. Barwise.—Your note was received too late for reply in our last. We always despatch our last parcel to the printer at nine o'clock on Thursday morning. Colonel Sir Henry James is still alive; a letter addressed "Ordnance Office, Southampton," will reach him.

G. B.—The views are of very different degrees of merit. No. 1, for example, is equal to the work of the best landscape photographer that we know of; No. 3, on the other hand, is exceedingly bad, being hard and devoid of sharpness. No. 2 would have been good but for the spots and comets.

Vero.—1. Write to Mr. Wm. Blair, Bridgend, Perth.—2. We are not aware of the appointment of an agent for the sale of Vogel's lenses in this country. —3. About one grain of bromide of ammonium may be advantageously added to each ounce of the collodion named; but your guarantee for softness lies in giving a full exposure.

A Coffee Experimentalist.—As soon as the plate is removed from the sensitising bath place it in a dish of distilled water for a short time, and, after agitating it, transfer it to another vessel of plain water and wash it thoroughly. After draining apply the preservative, which for your purpose should contain little or no saccharine matter. If thus prepared, the plates will keep good till you arrive at Penang.

Querist.—We are quite unable to inform you where you can obtain the portraits wanted. We have all of them in our collection of photographs, but we have no idea as to where you can purchase any of them. If you merely desire to see the "counterfeit presentments" of these gentlemen, we shall willingly gratify you by allowing you to inspect an album full of them. We regret our inability to aid you otherwise.

F. R. S. writes:—"I want to know how I shall place the negative, the sensitive sheet, and the lens, so as to produce an enlargement twenty-four inches in size from a negative three inches long. A reply in your next will greatly oblige. I intend employing a portrait lens of six inches equivalent focus, which I think should answer well enough for the purpose."—We reply: Place the negative six and three-quarter inches from the optical centre of the lens, and next to the back lens; and place the sensitive paper four feet six inches in front of the lens. The dimensions of the enlargement thus obtained will be twenty-four inches in size.

Argentum.—You ought to have placed a plate of glass over the vessel in which you dissolved your silver; in this way none would have been lost. The "vapoury-like sparks" which you say were copiously given off were, in reality, nitric acid and silver, or, in other words, a very acid solution of nitrate of silver. Apply heat to the solution you have obtained so as to evaporate the liquid, and you will soon find that crystals will begin to form. We could not, in this column, give you the minute directions for making nitrate of silver that you desire. Why not sell your metallic silver to the nearest jeweller or refiner, and purchase the nitrate ready prepared? You will be a great gainer by doing so.

An Old Photo. (London, N.)—It is, of course, impossible for us at such a distant time to judge accurately of the circumstances; but from all that we can see in the original discovery of the collodion process by Mr. Archer and subsequent improvements which he made, we believe that, had that gentleman realised its value, he would have patented it; for, although he presented it as a gift to the world, he afterwards secured by patent what we now consider petty things connected therewith. The fair inference from this is that he regretted that he had not secured the main discovery also, nor can we blame him for indulging in such regret. He saw that it was realising fortunes to many, while he himself remained in circumstances by no means affluent. What wonder, therefore, if he often indulged the desire that he had been more prescient, and had thought of justice to his family as well as generosity to his fellow men. Nobody is wise at all times; and we rather admire than blame the feeling which doubtless prompted him, a poor man, in securing by patent all that he imagined might eventually prove remunerative to himself and his family.

Inquirer.—Any *carte* lens that will take a negative the size of the one to be enlarged from will answer for producing an enlargement. *Carte* lenses of an average focal length are usually employed by professional enlargers. The object of such an extended table of focal lengths as we have given in our Almanac is to enable all descriptions of lenses, from nine inches focal length downwards, to be utilised for this purpose. The size of negative that can be enlarged from is limited by the focus of the lens; but there is no limit to the size of the enlargement when the light is sufficiently powerful or time of exposure no object. For copying a photograph its own size, a doublet, triplet, or rectilinear is better than a portrait lens.

A Jersey Amateur.—You certainly wrote "oxide" of silver; but, inasmuch as it was the *iodide* of silver you meant, we here give you directions how to make it:—Proceed as we directed in last number, but employ a solution of iodide of potassium instead of one of caustic potash. Let the following considerations guide you in the proportions of iodide and nitrate:—If you weigh 166½ grains or parts of the iodide of potassium, and dissolve it, it will decompose 170 grains of nitrate of silver. If, instead of the iodide of potassium, you prefer other iodides, you must dissolve them in the following proportions for each 170 grains of nitrate of silver:—Iodide of ammonium, 145 grains; iodide of cadmium, 183 grains; iodide of sodium, 150 grains—these figures representing the equivalents or combining proportions of these various salts.

J. B.—The writer named by you evidently does not mean that up to the time of his discovering the latest rapid dry process such a process was a desideratum, because we remember that he himself, in a paper read before the British Association in 1862, stated that he had "solved the problem of rapid dry collodion, and produced dry plates as sensitive as wet ones." It is quite true that the process by which such plates were prepared did not appear to find favour with experimentalists. At any rate it did not realise the expectations held out, and was discarded by some of those who had tried it in favour of other processes. We are not prepared to fall into raptures over the "new" process foreshadowed in the printed leaf you have enclosed, until we are satisfied by experiment that it fulfils all the claims put forth on its behalf by the inventor.

Thomas Lyth.—The pseudoscope was invented by Professor Wheatstone, and is intended to effect the conversion of relief; that is to say, if you look at natural objects with it, distant objects appear near and near ones appear distant. Owing to this property the inside of a bowl appears like a globe, and a convex surface appears concave. The instrument is formed of two rectangular prisms, and may be very easily constructed. One of the best methods of illustrating the phenomenon of pseudoscopy is to take a stereoscopic picture of objects having bold relief—for example, a landscape with a near and well-marked foreground—and to so mount them that the right picture shall be at the left side, and *vice versâ*. Now inspect them in the stereoscope, and the effect will be pseudoscopic; the relief will be converted, the distance and the foreground will have changed places.

☞ Mr. R. J. Fowler.—Our esteemed Paris Correspondent has been obliged to seek relaxation for a short time in his native country. We fear that our readers must be deprived of our friend's excellent weekly communications till he returns in, we trust, renewed health and strength to the French capital.

"An Illustrated Lawsuit."—Under this singular cognomen we have received a printed account of a lawsuit in which Mr. Henry Whiting brought an action against Earl Spencer. The "lawsuit" reveals much which will cause the reader to add to his litany a deliverance from the perils of litigation, especially when the defendant has power or influence enough to get the lawsuit changed into a case of "reference." What we have to note is that matters appeared as if they would have gone against the plaintiff, had it not been for some photographs of a public road and garden wall in dispute which had been taken by the plaintiff's brother, Mr. Matthew Whiting, and which, having been put, so to speak, in the witness-box, virtually decided the case against Earl Spencer.

METEOROLOGICAL REPORT,

For the Week ending July 21st, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

July 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
15	30·30	77	59	62	68	W	—	Very fine
16	30 22	85	62	70	79	W	—	Fine
17	30·11	89	67	67	73	E	—	Very fine
19	30·5	75	63	64	67	NE	—	Fine
20	30·17	68	55	54	60	E	—	Dull
21	30·10	—	56	59	68	SE	—	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 482. Vol. XVI.—JULY 30, 1869.

A NEW FORM OF NICOL'S PRISM FOR THE CAMERA.

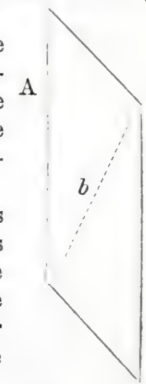
A few weeks ago we drew attention to the advantage arising from the employment of a Nicol's prism in photographing landscapes in order to remove the greater portion of the light reflected from the surfaces of leaves. Most of this light is known to be polarised, and, as a Nicol's prism does not transmit such light, it is therefore only necessary to place one of these prisms in front of the lens of the camera in order to obtain an image on the ground glass free from the "sheen" usually observed in focussing a landscape in which there is much foliage. Not only is this "sheen" not observed on the ground glass, but the blurring which it gives rise to is entirely absent from the negative, and the general character of the latter much improved.

Before directing the reader's attention to a new prism of great ingenuity recently introduced, we here take occasion to say that our esteemed friend, the Rev. J. B. Reade, F.R.S., in his recent researches into the properties of a glass triangular prism when applied to the illumination of difficult test objects in the microscope, has discovered a highly interesting fact, which will be ascertained from the following brief extract from a note which we have received from him:—"In the microscope, to my great surprise and equal pleasure, I find that the *equilateral prism*, whose story I have told, takes the place of a *Nicol's prism* as a polariser. When employing the direct light from the sun the colours in a section of Aberdeen granite are gorgeous." It affords us pleasure to be able to state that Mr. Reade will, on an early date in August, favour our readers with some of his matured experience on the subject of polarisation.

It has been already pointed out that a serious objection exists to the employment of a Nicol's prism for this purpose, and this objection is the difficulty of procuring these prisms of sufficient size. We happen to have several very fine ones in our possession, but the diameter of even the largest is not by any means sufficient for use with the full aperture of a view lens. We will presently give a description of a new kind of prism which has been very recently devised by the celebrated French physicist, M. Jamin, and which possesses the same properties as the ordinary Nicol's prism; at the same time there is scarcely any practical limit to the size of which it may be constructed. Before describing this we may very briefly state the construction of an ordinary Nicol's prism, as some of our readers may not be very familiar with the arrangement of this useful piece of optical apparatus.

A Nicol's prism is represented in section in the following diagram. A is a crystal of the well-known mineral, Iceland spar, consisting of pure carbonate of lime or crystallised chalk. This mineral crystallises in a peculiar form called a rhombohedron, and, when a ray of light is transmitted through the crystal in the manner shown in the diagram, the ray, instead of passing through without any breaking up or by simple refraction, is really split up into two rays, one called the "extraordinary" the other the "ordinary." Under usual circumstances both these rays would be transmitted; but the Nicol's prism is obtained by taking the crystal of Iceland spar and making a section of it through the obtuse angles. The new surfaces so produced are now reunited by interposing a layer of Canada balsam, which cements the two segments and makes the whole appear as one crystal.

But, though apparently unaltered by this treatment, a most important property has been conferred on the crystal; for it now only transmits the extraordinary ray, and that polarised, the ordinary ray being reflected out to the side by the layer of Canada balsam, and now the crystal is incapable, when placed in certain position, of transmitting light which has been polarised by reflection from any polished surface, *e.g.*, of leaves.



In the accompanying diagram A is a section of the prism of Iceland spar, and the dotted line *b* is intended to represent the pair of planes which have been joined by the Canada balsam layer. Of course this junction is not visible in the prisms when properly constructed.

The great cost of large prisms of this kind has always been a bar to their use, though small prisms are very common, and generally employed in the polarising apparatus of ordinary microscopes. The reason for this is that small crystals of Iceland spar of great transparency are easily obtainable, while large pellucid crystals of the same mineral are comparatively rare, and can be cut with much greater difficulty.

In order to supply the physicist with an economical prism of very large size, M. Jamin has devised the arrangement of which we are now about to give some idea. M. Jamin has described the prism within the last few months, and an opportunity now appears to present itself for using it, in a very useful way. Having stated the chief point in the constitution of the Nicol's prism with Iceland spar, there will be no difficulty in understanding the following modification of the original arrangement:—

M. Jamin uses the well-known liquid, bisulphide of carbon, as the material of his prism instead of the Iceland spar in Nicol's old arrangement; but, instead of the layer of Canada balsam, which would be obviously quite inadmissible in the present instance, a plate of Iceland spar is substituted. This plate of the spar can be easily obtained and cut of large size, though the corresponding prism is so costly. A box of any suitable kind is made, brass, blackened inside, being the most suitable; the top and bottom of this box are open at first, but the lower aperture is closed with a glass plate, which may be either cemented in with glue and treacle, or else may be "bevelled in" like the glass of a watch dial. The box is next filled in with bisulphide of carbon, the well-known liquid having such a very disagreeable odour. When filled with the liquid, a fine thin plate of clear Iceland spar is let down into the box of liquid and firmly secured, so that it may occupy a precisely similar position to the layer of Canada balsam in the ordinary Nicol's prism. When this is done the second glass plate is cemented carefully on, and the prism is complete.

This prism acts in a slightly different way on the light which it transmits to the ordinary Nicol's prism, but we need not go now into particulars; suffice it to say that it will not transmit light already polarised if it be placed in a proper position in relation to the plane

of the polarised ray. Moreover, we know that bisulphide of carbon absorbs but a small amount of the chemical rays; we therefore do not very materially diminish the available light in using this particular form of prism.

If our excellent instrument makers will now turn their attention to making a few of these new prisms of M. Jamin, we have little doubt that some may be induced to try them, as they could be prepared of a comparatively large size and at a tolerably low price as compared with Nicol's prisms of the ordinary construction. There could be no difficulty in fitting them to the camera, as the prism could be easily arranged in a proper position in a tube, which could slide over the lens tube and yet admit of rotation of the prism.

PURITY OF BROMIDES.

As iodine and bromine for the most part are found in nature associated together, and are extracted together and separated by fractional distillation, it very frequently happens that bromides will contain iodides, and iodides bromides. Of course, if proper care be taken—if the iodine and bromine are prepared completely free each from the other—the resulting iodides and bromides will be pure, but the necessary precaution is in many cases not taken.

My attention has been especially called to this subject by one of those very disagreeable mistakes from which one may be made to suffer. A number of ounce bottles furnished me by a dealer in chemicals of reputation as bromide of potassium, and labelled all as such, proved to be some of bromide and some of iodide, promiscuously mixed. The examination which this required was naturally extended to a number of other specimens of bromides, with a view to ascertain their purity as respects iodides.

The result was not very satisfactory. Almost every specimen of bromide of potassium, of cadmium, and of ammonium gave indications of containing iodide. There was, however, a very great variation in the amount of this impurity, some specimens being greatly better than others.

I cannot but think this subject very interesting in connection with collodio-bromide dry plates. Different photographers have met with very different results in attempting this process, and, perhaps, something of this may be ascribable to the purity or impurity of the materials they have worked with.

Bromide of silver remains easily in suspension in collodion, and shows comparatively little tendency to fall to the bottom. Iodide of silver is rapidly precipitated; in fact, if the attempt be made to produce an iodo-bromide film by sensitising ordinary iodo-bromised collodion, the mixture becomes curdy at once and a precipitate falls. In trying the experiment more than once, it has seemed to me that not only the iodide went down as a precipitate, but that it carried the bromide with it; it was, therefore, not the mere loss of that portion of the sensitive material, but the entire deterioration of the mixture. So, therefore, it has seemed to me not improbable that, if the iodide be present in less amount as an impurity, it may still exercise an unfavourable influence and diminish the smoothness and equal action of the mixture.

I have thought, therefore, that it would be convenient for photographers to have a simple and effective test by which to measure the purity of their bromides. The copper test has seemed to be well adapted to the case, and is applied as follows:—

In two or three ounces of water dissolve a drachm of sulphate of copper and two and a-half drachms of ordinary protosulphate of iron. Filter, and keep in a corked bottle.

To test a specimen of bromide dissolve a few grains of it in about a drachm of cold water. Add to it two or three drops of the copper solution. If a dirty whitish cloudiness at once appears the specimen is quite impure, the greater or less quantity of precipitate marking the degree of adulteration; but any precipitate showing itself immediately indicates a considerable amount of iodide. If no troubling shows itself set the test tube aside for some hours. If by this standing some light brownish flakes collect at the bottom a small amount of iodide is indicated. Lastly: if by standing the liquid becomes only a little troubled a trace of iodide alone is indicated.

My conclusions have been that in view of the almost impossibility of obtaining a chemically-pure bromide, it is best to fix the criterion at the point of getting an immediate precipitate by the addition of the copper solution, accepting the bromide as fit for use if it gives no immediate precipitate with the copper, but rejecting it if such a precipitate appear, even though it be but slight. When a thoroughly good specimen of a bromide is obtained, it ought to be reserved exclusively for collodio-bromide work, as such purity is by no means necessary for the iodo-bromised plates.

In making an examination such as this, it is always advisable to control it with a supplementary trial, made by actually adding a little of the iodide. In this way we make sure that our experiment is properly conducted and capable of detecting the iodide if present, and we also see the reaction and are prepared to recognise it.

In applying this test I have always found that the bromide exerted a sort of restraining tendency upon the precipitation. Let us suppose that a solution containing iodide of one per cent. be tested, and then five per cent. of bromide be added. In this latter case the precipitate produced by the copper solution will be much less than in the former, although the quantity of iodide present was the same in both; the presence of the bromide, without preventing the precipitate, diminishes its quantity. M. Carey Lea.

ON SUNDRIES.

I do not know how you are getting along in London under this midsummer heat, but here in the "far north" I have been obliged to enter my protest against the weather and to strike work. At this season the field should be left open for a month at least to the more resolute of the silver printers, whom nothing can drive from their post. The carbonist had better leave his pots and pans for a short time, and seek the cool breeze on a mountain top or an invigorating dip in the ocean wave. I can, fortunately, enjoy either the one or the other when the fates permit, and can even leave the camera behind without great reluctance when its presence would only tempt to fog and toil, and a few transcripts of the outer world would be caught at perhaps too much cost. How I pity and honour the men who prosecute photography under all the horrors of a tropical sun!

One is better to see Nature occasionally without a photographic face—to see the old lady as she really is in all her freshness and variety and fulness of beauty, and not merely as she looks on paper, when some idolatrous devotee in the shape of a heliographer seizes a shred of her garment and attaches it to cardboard, and calls it a *perfect gem.*

But, after all, what can we poor photographists do but imitate at great and respectful distance the perfect and inimitable?—glad if we can obtain a sketch that is suggestive, if nothing more, of the grand original; for copyists we must be to a large extent, even in what is called the *creation of genius.* Who can discriminate between what is copied and what is not? The learned critic could no doubt tell us all about it in any given case; but set *two* learned critics to do so, and compare the result! If they agreed in any one point it would be something miraculous. *Creation* is not man's province, but a little *re*creation should not be denied him.

Having thus got rid of one or two observations that presented themselves when I lifted my pen and drew towards me a bit of paper to ascertain whether there was anything at this time that I might usefully call attention to, I feel now disposed to say to those who take any interest in carbon printing that if they perused the article which appeared in The British Journal of Photography of July 16, entitled *On the Solubility of a Variety of Gelatine in Solution of Common Salt*, it might not be lost labour to read that article a second time. Everything that gives us power and control over our materials should be carefully noted, and the ability to thoroughly develope over-exposed prints is a very important matter indeed. Knowing that under-exposed prints are very difficult to manage so as to secure their details, I have generally had a tendency rather to over-expose, and not unfrequently been beaten (without actual boiling, which was not at all times convenient) in endeavouring to reduce the print sufficiently to make a passable picture. A power of farther development by an easy process is, in such circumstances, a desideratum, and it appears that muriatic acid and common salt can be successfully used for this purpose. This is something worth knowing, and I have prints on which I shall be glad to test these materials when I return to camp. It has been long known that acids were very effective in removing bichromates that had been fixed by light, and salt was known to be an excellent article for unsizing paper and rendering it absorbent. Had we been smart enough we might have almost concluded from these premises that it would act powerfully on alumed gelatine. The discovery of a little fact often shows us how obtuse we have been, and teaches us a lesson of humility.

I have lately been pestered with a trouble that I never met with before. This was a sample of bichromate, which left a patchwork of indelible yellow stains in the paper. The Albion Albumenising Company, Glasgow, were kind enough to send me some very thin Saxe paper that I might try it in the turpentine process, and I got

some good pictures with it. But I had made up a new bichromate bath, and the light parts of every print were found, on washing up, to be impressed with yellow stains that would not wash out in the warm water. I first attributed this to something in my pigments, but at last I tried a portion of Mr. Swan's tissue with the very same result. This left no doubt that the fault was in the bichromate; and it is my intention, before I begin printing operations again, to pitch that bath into the waste water sink. At the same time it may not be amiss to try whether a little dilute muriatic acid would obliterate these yellow stains without injuring the print. This will probably show whether the yellow stains are due to bichromate fixed in the paper, or to some foreign body with which the bichromate is adulterated. Possibly the present great heat of the season has something to do with the staining to which I have referred.

I have perused with interest Mr. Dawson's pointed remarks on Mr. Pouncy's patents. I do not suppose, however, that Mr. Pouncy's last patent is meant to include my turpentine process, as practised and published by me. At least I do not read his specification with that understanding, for if the turpentine is to be used by itself, he gives no directions for its use or the prevention of its evaporation, so as to render it practically available. I rather take it that Mr. Pouncy uses the turpentine, benzole, &c., for the purpose of dissolving out of the paper the wax, paraffine, or oil which he has used to render his paper temporarily transparent—a process which involves no novelty in principle, which was attempted by myself about nine years ago, though not with satisfactory results, and which, it appears, had been more successfully practised and also published by Mr. Swan, about two years ago, although I was not aware of this circumstance until lately. If such is not the gist of Mr. Pouncy's patent—if he really mean it to include the same treatment as the turpentine process published by me—then I must plainly tell him that he has been too late in the field, for I could prove by neutral parties, if necessary, that I was engaged on the turpentine process early in the spring of 1868, and long before his patent was heard of; and my process was not confined to turpentine, but included other hydrocarbons, and spirits of similar properties, although, for various reasons, I generally used turpentine, and am disposed to recommend it in preference to the others.

If Mr. Dawson reads Mr. Pouncy's specification differently from what I do, and if people of ordinary intelligence cannot exactly understand what Mr. Pouncy's specification is meant to include, this is only another argument against its validity, for vagueness is fatal to a patent. Mr. Pouncy's patent of 1863 seems to stand particularly open to this objection. It has been stated frequently, by those who ought to know well, that the whole process has not been divulged in this patent—that it is partly patented and partly kept secret. So far as the process is kept secret it may possibly be well secured to the inventor, but only *so long* as he does succeed in keeping it a secret. But nothing in patent law is better known than this—that if the specification does not fully divulge the process, so that any person of ordinary intelligence can practise it from the information conveyed, it is not protected by law.

I am not disposed to encourage any wholesale indiscriminate onslaught upon patents. I can easily recognise a right of property in a true invention, which ought to be respected and protected, and in many cases I believe it might not be for the interests of the public that the patent laws should be swept away. At the same time, there is evidently much need for amendment. The full specification should be lodged at the date of application, and it ought to be examined by competent parties on behalf of the public before any patent is granted. By some arrangement of this kind the patentees themselves would have a better guarantee that their rights would be respected, and the public a greater security that improper patents would not be issued. Much of the present abuse and doubt and uncertainty would be removed, while sufficient encouragement would still be given to inventors to draw out their efforts in matters useful to the public.

I intended in this communication to have said something about a new white pigment that I have had sent me by a gentleman in England, who takes an active and decided interest in pigment printing; but I find I must postpone this subject for a future article, and when, perhaps, from experiment I shall be able to say something more definitely upon its merits. WM. BLAIR.

THE LENSES USED IN PHOTOGRAPHY.

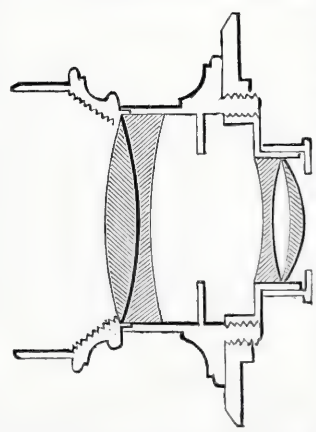
CHAPTER IV.—ORTHOSCOPIC LENSES.

DURING the closing days of the year 1857 the photographic world was roused into a state of mild excitement by the announcement that a new lens possessing extraordinary qualities was about to make its advent. Perpendicular lines were henceforward to be respected, and crooked and perverse drawing were forthwith to come to an end. A flourish of trumpets heralded the coming of this wonderful instrument, and a large amount of profound nonsense was essayed concerning it by some who professed to have received their information in advance.

Professor Derfel, a pupil and former assistant of Professor Petzval (the inventor of the lens in question), at a meeting of the London Photographic Society in December, 1857, spoke in tones of triumph when he undertook to mention a law "quite unknown" to any of the opticians present up to that time—a law which embraced all the conditions to be satisfied in the construction of a system of lenses the object of which was to secure a perfectly flat picture; and in putting the question Professor Derfel modestly said:—"I feel quite certain that there does not exist a practical optician at the present day who could reply; *but I can inform him.*" Then followed a statement bearing on the law in question, which was supposed to convey for the first time to the English public a description of the new lens of Petzval, but which, devoid of technology, simply consisted in having four lenses so corresponding in curvature that when pressed together in close contact they would represent a plane piece of glass with flat sides! However, unfortunately for the reputation of Professor Derfel, this simple description did *not* correctly represent either the construction of the new lens or the law under which it worked.

After its introduction the new orthoscopic or orthographic lens was much sought after. It professed to give a sharp picture over a flat field, and, above all things, to prevent the distortion attendant upon the employment of the lenses previously in use. Let us briefly describe the then new lens, previous to making any critical observations upon it.

The orthoscopic lens consists of a plano-convex or very slightly curved meniscus lens, similar to that in the front of a portrait combination and used in the same position. At a very short distance behind this lens is placed an achromatic lens, smaller in diameter, and concave as a whole; that is, it diminishes instead of magnifies. The first element of this back lens is formed of a bi-concave crown glass, the back being a meniscus flint. The two elements when combined form a diminishing glass which, when used with the front achromatic lens, materially lengthens its focus. A front lens which, when used alone will only cover a 5×4 plate, may by means of the back addition be so lengthened as to cover 9×7 with sharpness and brilliancy.



In the lens thus described the front, it will be observed, is a cemented achromatic, the back being at once smaller in diameter and touching only at the edges. The front lens would bring the rays to a focus much nearer were it not for the back combination, which both lengthens the focus and by its peculiar shape materially flattens the field. This it does in right of the fact that an oblique pencil falling upon a concave lens is powerfully affected by it, being considerably lengthened in focus. Indeed, with a combination of this nature nothing is easier than to have a back lens of such a kind so adjusted to the front as to cause the oblique converging pencils to be much longer than the direct ones that the field shall be not merely flat, but bellied in the opposite direction from that in which photographers are accustomed to see it. The attribute of thus flattening the field to any desired extent is a valuable one in the hands of opticians who can use the power aright.

Much was said concerning the equality of illumination possessed by this lens at the time it was introduced, and much was written to prove its superiority in this respect over the old forms of landscape lenses; but, although we possess some of the best specimens of this kind of lens that have been made, we are quite at a loss to discover their superiority *in this respect* over ordinary lenses. The causes of unequal illumination are—first, the fact that a pencil transmitted obliquely through a round hole (the stop) is smaller than one transmitted directly or centrally through the same aperture; and, secondly, that the pencil thus transmitted obliquely is not merely smaller in diameter, but it has farther to travel and more work to accomplish. This is the case with every lens by which an oblique pencil is transmitted through a circular aperture, and it applies equally to the orthoscopic as to the single achromatic.

The sharpness obtainable by the orthoscopic lens is very great. We recently took a view by means of an old Ross lens of this form

which was so sharp that, by aid of a powerful magnifying glass, we were able to read in the negative every word that was printed on a large placard about three-quarters of a mile distant, the placard being so small in the negative as to be scarcely visible.

The special purpose to be served by the introduction of this lens was the taking pictures that should be free from distortion; hence the name "orthoscopic" or "orthographic."

Notwithstanding the strong claims on the score of its freedom from obliquity that were at one time put forth on behalf of the Petzval lens, there is no mistake whatever about the fact that it does *not* prevent distortion. The peculiar kind of curvature produced is opposite in character to that of the common landscape lens, but as the Petzval lens is constructed it must of necessity give distortion to some extent.

A separation of the two elements composing the back lens will, in some cases, give pictures quite free from curvature, but to secure this other qualities must be sacrificed. It was probably the endeavour to secure the quality of non-distortion obtained in this way, and at the same time to eliminate as far as possible the evils which the modified alteration introduced, that led to the invention and introduction of the triple achromatic lens, which, like its immediate predecessor, is aplanatic, and is capable of defining without a stop, but which, unlike it, projects the picture mathematically accurate.

From the small diameters of the lenses in the orthoscopic combination, an objective of this kind intended to cover a certain field is much less bulky than a landscape lens of the ordinary kind.

What, then, is the difference between the orthoscopic and ordinary landscape lens when tried by the test of actual work? Mr. Lake Price, in his valuable work, *Photographic Manipulation*,* says of the orthoscopic lens:—

"It is eminently calculated for large groups in the open air; since, for this use, it has more intensity of definition and rapidity of action than the single or landscape lens. Though not so rapid as the portrait, its marginal pencils have more power and incidence on the film, consequently the definition of the entire subject is more complete at the edges of the picture. It has also more depth of focus than the latter."

The orthoscopic, for a given focus, is smaller in size, and, where a wide angle of view is not wanted, it permits of a much larger aperture being used. This it does in consequence of the back lens correcting the spherical aberration of the anterior lens. To such an extent may the corrections be made that the lens will carry an aperture sufficiently large to permit of portraits being taken by it in a well-lighted place. If a wide angle of view is to be included, the single landscape lens will answer better, because, there being four surfaces fewer, the image, when formed with a small stop, is necessarily brighter.

THE BROMIDE RAPID DRY PROCESS.

As a supplement to my previous series of articles on the practical working of the collodio-bromide process, I have thought it might be useful to some of the readers of the Journal to publish in a succinct form the latest modifications and improvements which I have made in the details of Major Russell's more rapid dry process. I will endeavour to be as brief as is consistent with clearness, and to omit no detail which I consider of any importance.

The rapid dry process with a sensitising bath is necessarily more troublesome than the less complicated collodio-bromide, which requires no immersion in a silver solution, and can be washed much more easily; but it has some advantages, inasmuch as it may be used for photographing objects for which the other is utterly unsuited. It is available, for instance, in all those cases in which the most sensitive wet plates are generally deemed necessary, and for all these purposes it is equally efficient if the films are prepared with a due regard to their requirements.

In my own practice, which has, however, this season been more limited than usual, I generally carry with me in my excursions two kinds of dry plates, namely, some prepared with collodio-bromide, and others which have been excited in a strong nitrate bath, one set to be used when the length of exposure is of no great importance, and the other set to be employed when the objects to be photographed are likely to move during a prolonged exposure.

In the following observations I shall have to refer occasionally to my recent articles on collodio-bromide, because a few of the operations in both processes are essentially the same and need not be recapitulated.

1. *Cleaning and Preparing the Glass for Receiving the Collodion.*—It may seem superfluous for me to give instructions how to clean and polish a plate, as this necessary prelude to all photographic processes has been so often discussed and settled in a variety of ways which may or may not be equally good; but I have found it necessary to abandon some of the old plans I have recommended, on account of their often having failed to remove all injurious substances from glass surfaces which have been frequently used, and to adopt one—old enough too—which has never failed me. I first immerse the plates in a strong and hot solution of common washing soda. They remain there for no longer time than is necessary to loosen the varnish and the old collodion film, and are at once flushed in abundance of water, and wiped dry. I then select the least scratched side of the glass, and mark it at the corner with a diamond. The plate is screwed into a cleaning frame, selected side of the glass uppermost, and polished with a thin paste made of the finest sifted tripoli and equal parts of alcohol and water. The polishing rubber, which should be used with considerable pressure, is a cork bung covered with three folds of chamois leather. When well polished on one side the plates are put aside without wiping, the thin film preventing impurities from settling on the glass or attacking it. It is better to defer rubbing off the tripoli till they are required for use; then it should be wiped off with one skin or cloth, and the plate finished with a cleaner one. No after polishing is required.

The cleaned side, after being gently brushed with a broad camel's-hair brush, is coated with a weak solution of albumen, prepared and applied according to the full directions I have already given at page 288 (THE BRITISH JOURNAL OF PHOTOGRAPHY for June 18).

Preparation of the Collodion.—All the samples of plain commercial collodion that I have tried by way of experiment answer satisfactorily, provided they are not too thick. If they possess this fault, thin them with equal parts of ether and alcohol. There are, however, in the various collodions considerable differences, which, in my opinion, arise from the greater or less porosity of the films. Nevertheless I never fail with any of them, provided the requisite sensitising and washing conditions are carefully watched and regulated. Recollect, an imporous or skinny film requires to be longer in the sensitising bath, and has to be washed for a greater length of time than a porous one. These are the general indications of the principle which seems to regulate the sensitiveness of bromised collodions excited in a nitrate bath. I shall again have occasion to refer to this principle as I proceed.

Should any one prefer to make his own pyroxyline and collodion, I recommend him to prepare the former at a high temperature in acids of such a strength as to considerably disintegrate the cotton fibre. The thoroughly washed and dried pyroxyline is to be dissolved in the proportion of from four to five grains (the latter weight must not be exceeded) in half-an-ounce of ether (sp. gr. 725 to 730) and an equal quantity of alcohol (sp. gr. 805 to 810), in which have been dissolved five grains bromide of cadmium, three grains bromide of ammonium, and one grain iodide of ammonium. The proportion of bromides and iodide should be the same when a commercial collodion is used. But if any one purchases his pyroxyline, he will, in all probability, find that, although very soluble, it has been made in cold, or comparatively cold, acids. In that case, from three to four grains will, in most cases, be a sufficient quantity to add to the solvents. It must be observed how important it is to have the plain collodion thinner for the bromide dry process than for the ordinary wet manipulations. In fact the film can hardly be too thin provided there is plenty of bromide in it, and it is able to retain the bromide of silver. I have, in this formula, given average proportions of bromide, which, however, may be considerably exceeded, and often with advantage, but then the nitrate bath should also be increased in strength.

Major Russell, if I mistake not, considers any addition of iodide to the bromised collodion objectionable. After many comparative trials I have arrived at a different conclusion. It is true the iodide adds nothing to the sensitiveness of the collodion, nor does it seem to be in any way affected or altered by the alkaline developer. Of the truth of the latter assertion I have not, however, altogether satisfied myself. On the other hand, I find a little iodide does not in the least impair sensitiveness, provided the plates are properly washed. Here are the advantages of a small modicum of this salt. It shortens the necessary time of immersion in the exciting bath, apparently by rendering the film more porous and penetrable by the silver solution; and for the same reason the films are more easily cleared of all the free nitrate and excess of soluble salts in the subsequent washing operations. These are important advantages that are surely worth striving for, especially as there are no counterbalancing disadvantages.

Exciting the Plate.—For the proportions of bromides and pyroxyline which I have given the bath should not be weaker than sixty

* Published by Messrs. Churchill and Sons, to whom we tender our acknowledgments for the wood engraving given in the preceding page.—EDS.

grains of nitrate of silver to each ounce of distilled water, and it ought to be decidedly acid by mixing with it about one drop of nitric acid for every four ounces of solution. The bath should also be bromised by adding to and shaking up with it a very little soluble bromide previous to filtering.

For very potent reasons I have altogether abandoned the use of the dipping bath for sensitising bromised films. This form of trough, while the solution in it gets, after a very short time, nearly saturated with nitro-bromide of silver, affords such a small surface for the evaporation of the ether and alcohol that, between them, crystals are formed in the film, and the plates are virtually destroyed. I have known these obnoxious crystals to injure the plates after the twelfth one has been immersed in a dipping bath furnished with a freshly-made solution. It is the alcohol or the ether that stimulates their formation. To avoid them I now invariably use a *cuvette* or French flat bath, and since I have adopted it I have never been troubled with nitro-bromide crystals in the collodion film.

The trough I have was made by Rouch & Co., from a model sent me from Brussels. The interior of the bath is built up of glass cemented together and made water-tight with marine glue, the whole except the top being encased in wood. It is about thirteen inches square and two inches deep, bearing some resemblance in shape to the common flat-bottomed porcelain dishes. The bottom plate of glass is corrugated, which prevents the back of the collodionised plate from sticking to it. At one end a reservoir is made by cementing a piece of plate glass, about two inches broad, across the top, and this glass is held more firmly in position by being also fixed to the outer wooden frame. The object of the arrangement is to retain the liquid when the trough is tilted up to receive a fresh plate. On the inside bottom of this end there is also cemented a piece of glass, to prevent the plates from slipping down into the reservoir when the trough is tilted up.

My *cuvette* is large enough to sensitise two 8 × 5 plates at one time, and only requires about a pint of solution. When I have collodionised my first plate I tilt up the *cuvette* on end, lay the back of the plate on the corrugated bottom with one of its edges resting against the glass ledge, and allow the silver solution to flood over the film by replacing the *cuvette* on its bottom. I then collodionise another plate, and lay it alongside the other by tilting and replacing as before. In this way no time is lost, and one is kept constantly occupied with the various operations, even if the glass has been previously got ready for the application of the collodion.

To ensure uniform sensitiveness it is important that the films should remain for the same time in the silver solution. With my own collodion, made as above described, and in a nitrate bath of sixty grains to the ounce, I give eight minutes' immersion in summer and ten minutes when the weather or room is cold. This gives the highest sensitiveness of which the plates are capable. A longer immersion is apt to cause fogging afterwards in the development. But with collodion or pyroxyline not made by myself, I have to make some trials in the exciting bath before ascertaining the right time for proper excitation. The time being once ascertained, it will always remain the same for that collodion. Some samples that I have had, and similarly bromised, required nearly twenty minutes before the silver had taken its full effect. I have no doubt whatever that all these differences are dependent on the varying porosities of the films.

In removing a plate from the *cuvette* I raise one end with a pointed silver hook, and after draining for a minute or less lay it in the first dish of distilled water.

The advantages accruing from using this form of sensitising trough are, first, that free evaporation of the ether and alcohol is promoted by such an extended surface of liquid exposed to the air; and when it is recollected that it is the presence of these spirits which, in most cases, determines the formation of crystals in the film, their absence by rapid evaporation is a great point gained.

A wooden cover, fitting very loosely and placed over the *cuvette*, prevents the ingress of dust and, when the bath is not in use, retards evaporation to some extent. Yet, in spite of this, the silver solution will get stronger and stronger. The first washing water of the plates may be used to replenish it, adding silver occasionally to keep up the original strength.

Washing the Plates.—I have not left space in this article to describe this important process so fully as I should like to do; but I may have occasion to refer to it again on another occasion. When a plate is taken from the sensitising bath place it in a dish of distilled water for ten minutes, then into another for the same time; promote into a tub or plenty of common water for one hour, and again into another, and still another, each for the same time, and rinse the plate with distilled water before applying the preservative solution.

The above is a very rough outline of a mode, but not the most effectual one, of washing; it will in the meantime serve to show an intelligent operator how careful he *must* be in this department of Russell's rapid dry process.

In all other respects the instructions which I have given for the "application of the preservative solution," the "prevention of optical halation," at page 289, June 18, and for "development," &c., at pages 300 *et seq.*, should be strictly adhered to. *The only exception is the time of exposure, which ought not to exceed that of the most sensitive wet plates.*

GEORGE DAWSON, M.A., Ph.D.

SENDING PHOTOGRAPHS THROUGH POST.

No photograph can be forwarded *flat* through the post-office if its size exceed twenty-four by twelve inches.

Any parcel under these dimensions will be transmitted, but when it exceeds this size it is rejected.

How, then, should a large photograph be sent through the post? If it be mounted on a thick, stiff board it ought not to be sent in this manner at all, because the rolling-up process to which it necessarily has to be subjected will seriously damage it. Those prints which are too stiff to be rolled up, and too large to come within the inevitable twenty-four by twelve inches, must reach their destination through some other channel than that afforded by the post-office.

If a print be mounted on a board of medium thickness it can be rolled up into a comparatively small cylinder; but the circumferential dimensions of this cylinder depends entirely upon the thickness of the mounting board. Thin paper may be rolled up on a roller no thicker than the stick of an ordinary umbrella; many kinds of cardboard, on the other hand, will be completely broken and destroyed if wrapped upon a roller under four inches in diameter.

The great majority of photographs will stand to be wrapped round a rod two inches in diameter without being crushed or damaged. But a wooden rod of these dimensions, and perhaps two feet in length, will necessarily involve a serious outlay both in prime cost and in postage, and it is of some importance that a roller of a lighter and cheaper nature should be obtained.

The conditions required in a good posting roller are—first, that it shall be rigid; and, secondly, light. Both these qualities are secured in a tube composed of several folds of stiff brown wrapping-paper, pasted together around a wooden or other mould. If the paper be originally stiff and hard, and the cementing substance be gum arabic, a tube of great rigidity will be obtained. To such an extent may this stiffness and rigidity be carried that we have known of a telescope tube being constructed in this manner, to which was adapted an object glass of three and a-half inches diameter, and which was so free from tremor as to divide, when mounted, the double stars—which are a test for an object glass of this diameter. For experimental purposes connected with the optics of photography we have often made short pieces of tubing in the manner described, and can vouch for the absence of difficulty connected with this branch of manufacture.

Stiff and strong paper tubes, however, can be purchased ready made, of any diameter, and cut to any length.

It has often been said that everything can be obtained in London, if you only know *where* to apply for it. The enlightened buyer of old gems and curiosities will proceed at once to Wardour-street and its vicinity, instead of searching haphazard over London; the coach dealer will gravitate towards Long Acre; the connoisseur in horological instruments will be "at home" almost anywhere in Clerkenwell; birds and beasts belonging to the "fancy" or pet order claim the Seven Dials as their legitimate home; literature, in its mercantile aspect, flourishes in Paternoster-row in the east, and York-street, Covent Garden, with its surroundings, in the west But where, or from what class of tradesmen, can stiff paper tubes be obtained? This is a question to which even no wholesale stationer can furnish an answer.

Pyrotechnists, no matter whether in London or elsewhere, require for their productions of the rocket class, stiff and light tubes of millboard. These are made expressly for this purpose, of a variety of thicknesses and of almost any length required or desired. From pyrotechnists, then, or makers of fireworks, may these large and stiff tubes be obtained, which we recommend as being so suitable for aiding in the safe transmission of photographs through the post-office. Their stiffness and rigidity are materially increased by wrapping the photographs *closely* and firmly round them, each layer adding to their strength. A cork, or a disc of millboard, inserted at each end, or at intervals throughout the length of the tube, will add much to its strength without, in any appreciable manner, affecting its weight.

We recently received through the post a few photographs which had been wrapped round a number of common bottle corks placed end to end, and retained in position by means of a thin piece of paper pasted round them.

We also occasionally receive prints wound round a rod of wood, the ends of which are left thicker than that portion around which the prints are wrapped. These are very well for prints on thin paper, and nothing answers better; but when the stiffness of the mounting board is such as to necessitate a roller of large diameter, use those which we have just described to be recommended above all others.

ON INTENSITY.*

Sometimes there is difficulty in procuring sufficient intensity in the negative; at other times there is a tendency to too much of it. Let us consider these two states of the negative in their order.

I. *There is a Want of Intensity.*—It will be well here to take into consideration the various conditions that tend to thinness in the negative; these may be attributed to three principal causes:—

A. *The light and temperature.* B. *The state of the bath.* C. *The nature of the collodion.*

Over the first *(the light)* we have very little control. In very dull days, or in days when the sun is obscured by a yellow fog (as in Indian summer), it is often difficult to obtain sufficient intensity. The only remedy we would suggest would be a wide diaphragm and plenty of exposure; even the use of an intense collodion does not avail very much, since it generally increases the tendency to hardness. It will be best, when things are in this state, to look well to the diffused light in the operating room. I know of nothing so detrimental to a proper gradation of light and shade in the negative as a flood of diffused light pouring down between the camera and the sitter. Remember, as much as possible all light should be directed towards the subject. Carefully shield the camera from sunlight, and even from direct top or side light. If, during the present summer weather, you have a flood of light pouring down from above, as strongly directed towards the camera as from it, you can expect nothing but poor negatives, thin and weak and inclining to fog; so arrange sloping blinds that the camera will be as much in darkness as possible, and your model well and judiciously lit up.

The *temperature*, too, has a great influence on the intensity. With the thermometer below 50° you must use artificial means to produce heat. Nor is it of much use to warm the bath alone; you must also make the dark room, solutions, and the glass room also, all of a comfortable heat. If you are sure that all these conditions have been attended to, you may then proceed to consider the state of our second heading.

B. *The nitrate bath.* In winter the bath should never fall below forty grains for our collodion. In summer it may well be allowed to fall to say thirty-five grains. Nowadays, that all collodion contain more or less bromide, a stronger bath is required than formerly, and the more bromide in the collodion the stronger the bath needs to be. In summer, however, the film is more readily sensitised; and as there is a great tendency to streaks and stains in hot weather, it will be well to work with a bath not too strong when the temperature rises high.

The amount of acid in the bath has a considerable influence on the intensity. A neutral bath always gives a stronger deposit (other things being equal) than an acid one. A very acid bath never yields an intense negative. If the bath is at fault, or supposed to be, concerning the intensity, I should proceed to test where the fault lay in the following manner:—1st. By the hydrometer ascertain the strength. If in winter I should make up to forty grains or above; in summer I should be satisfied with thirty-five, or even less. I should then test for acid by dipping a piece of litmus paper in the bath; if it reddened very quick and very red I should say it was too acid, and add a few drops of a solution of carbonate of soda to partially neutralise, and filter. But if the litmus paper reddened but slowly, taking from one-half to one minute to turn the paper of a purple-red colour, I should say it was just right; on the other hand, if it did not redden the paper at all, I should say a drop of nitric acid would do no harm. The above are general directions for testing the state of the bath; of course, they presuppose the bath otherwise in good condition. They may be summed up in the few following words:—

A bath will yield intense negatives when—

1. It is in proper order, yielding a clear, clean, transparent negative.
2. When the temperature is not below 55° nor over 70°.
3. When it is at least forty grains strong in cold weather, and thirty to thirty-five in warm weather.
4. When it is not too acid nor yet too alkaline.

There is still another condition of the bath when it is difficult to obtain proper gradation in the negative, even when to all appearance proper precautions have been taken, and that is when the bath is just on the balance between good and bad; often, when a bath is in this condition, the light being good and the subject good also, you get a splendid negative, but, perhaps, in an hour you fail to please yourself completely. If you expose short they come up chalky; if long the tendency is to fog. If you have it to appearance all right, only weak, and you try to strengthen you stain or fog, and cannot help it. Generally the bath requires complete overhauling, and may be put in the category of a disordered bath.

Better make a new bath in a case of this kind and repair the old one, since nothing satisfactory will be likely to be got from it.

C. *As to the influence the collodion exerts on intensity.* Bad collodion is simply *bad*—no remedy for that.

But collodion may not be bad that does not yield intense negatives; indeed, it is often the best collodion that is least intense. It may be premised that almost all collodions contain enough iodiser, so we will not advise an addition of that. But new collodion is less intense than old, thin collodion than thick. You may improve it, then, if very new, by adding some old collodion, and, if very thin, by adding some more gun-cotton, or mix with a thicker collodion. Sometimes a new collodion, not too thin, may be made to yield quite intense negatives by simply adding a few drops of the tincture of iodine or even a drop of acid to the bath, since these additions have a tendency to prevent fog, and allow of a longer exposure and longer intensifying with the developer without veiling. On the same principle collodion always gives more intensity as it gains age, since it admits full exposures and full development without staining.

We omitted to mention the influence of the developer in regulating the intensity. But we have alluded to this so frequently as to make it almost unnecessary. We will just briefly state a few things without explanation in this place.

A strong developer with little acid favours thinness.

A strong developer with much acid is more favourable to intensity.

A weak developer always favours intensity; the more the acid the more intense the negative.

Moving the developer on the plate tends to intensify.

Keeping the developer perfectly still on the plate tends to fulness of detail and thinness.

The developer may be made to yield more intense negatives by the addition of a little gelatine. It will be well to know how to do this.

To one ounce of acetic acid add half-a-drachm of Nelson's patent gelatine and allow to dissolve, shaking frequently for a few hours. You will have at hand a solution of the utmost value for regulating the intensity. Remember that one drop of this solution is equal to ten drops of pure acid, and be guided accordingly. If you wish to prepare a developer that will yield an intense negative—a copy, for example—add to the usual iron solution half the usual quantity of acid, and from two to six drops of the *aceto-gelatine* solution to every ounce of developer; it will very much increase the intensity. You must be guarded, however, in the addition of this, since but little need be added to produce a great effect.

The other part of our subject—too much intensity—we will leave for our next. Again: we must explain that our imperfect notes are not intended as guides to the finished photographer, but to his younger brother, the beginner; if they bring to the memory, however, of the more accomplished something he has for the time forgotten, perhaps he will excuse us for introducing them here.

* *Canadian Journal of Photography.*

STUDIO AND APPARATUS,

Being Remarks by Herr Schrank on a New Work by Otto Bühler.

If we call to mind those small convenient books in which, some few years ago, was collected together all that the photographer considered worth knowing of the art-science, and if we place in comparison therewith the present array of special works on photo-chemistry, photographic optics, and even those on special processes, such as the tannin process, microscopic photography, &c., we may then form an idea of the progress that has been made in developing the photographic art. It appears to us like the swelling of a stream which had its origin in a thin jet of water rushing through the heights of its source, and spreading itself by degrees into a great lake upon the plain below. And, in point of fact, we have now reached that stage in which photography, after having surveyed every other profession in itself, has gained such an ascendency by reason of its importance and culture which men like the Duc de Luynes might well imagine of it, but which is not yet recognised by the general public. It may with certainty be affirmed that all those reproducing arts, such as lithography, copper engraving, wood cutting, &c., have been virtually supplanted by it, and are now only maintained in their very highest and lowest performances.

Corresponding with this mission and promoting it, photographic literature has become so extensive that the practical photographer can do little more than glance over it, noticing only the most important facts and discoveries to be found in some special works, and from which he is enabled to derive information on certain obscure points. It can scarcely be expected that any single author can be relied upon in all the different walks with the same certainty.

Herr Otto Bühler's book, to which we now invite attention, embraces in some degree implement instruction for the photographer; and what renders it exceedingly valuable is that it is replete with illustrations. The publisher has annexed thereto an atlas consisting of seventeen folio

plates, containing no less than 486 carefully-worked figures. The composer has a talent for organisation, and hence the varied materials are arranged in as concise a form as possible.

It is divided into three principal classifications:—

I. The glass-house and optical apparatus.
II. The laboratory and chemical apparatus.
III. The photographic workrooms and technical apparatus.

From its nature the book could only be a collective work. It is well to draw a distinction, however, between a repertory which is prepared by an able man who has the capacity to sift thoroughly and critically his material, and a collection of rubbish in which everything finds a place, which has either been published in technical works or any journal treating of such matters, and by which a reader is apt to get confused.

Bühler has favoured us with his own leading ideas at the head of each classification, and the chapters on Principles of Lighting, Influence of Position and Surroundings of the Glass-house on the Lighting, and Principles of Arrangements are cleverly written.

As an exemplification of the construction of glass-houses, minute drawings are given of Albert's, at Munich, and Raps, at Cologne, which have never before been described, besides twelve other studios. The optical part, which occupies 120 pages, is a popular work of itself, and gives a delineation of almost every objective yet brought into use, mentioning with impartiality the capabilities of each. This strict impartiality makes us feel that other authors may have written occasionally from interested motives.

The book contains more than its title promises, and deserves a special place in the library of the photographer. The author ought, at all events, in a short supplement to include the latest results, the most reliable method of silvering, and the most recently-constructed studios which, during the finishing of his rich atlas, have become known to the public.

To give an idea of the scientific manner in which Herr Bühler acquits himself of his self-imposed task, we give the following chapter out of his book.

Position of the Studio.

The first point to be taken into consideration in the erection of a glass-house is its astronomical position. We mean thereby the angle which it should make with the meridian of the place, or, in other words, the placing of the principal window in regard to one of the four quarters of the heavens.

A studio in which the direct solar ray falls at any one of those hours of the day when it is usual to photograph has always its disadvantages. It is not only necessary in such cases to make extensive arrangements in order to divert the disturbing light, but requires a very practised eye to recognise and obviate its prejudicial influence. And that is not enough: the intensity of the light changes so frequently, and often in such studios becomes so steep, that long practice is requisite to ascertain the proper time of exposure in each particular case. If, therefore, the locality admits of it, let it be (at least, in our latitude) where the sun itself at midday of the summer solstice does not stand (for any time) above 66½° above the actual horizon. The studio should be so built that during the proper hours for photographing it is perfectly inaccessible to the direct solar light. There are certainly many studios where the solar light is intentionally admitted, and many artists know even how it is possible to obtain excellent effects in a studio with full solar light; but the artistic endowment which can work under such circumstances is rare and the practice it necessitates very long. We advise, therefore, the safer and far more convenient way; for the difficulties in photography are quite sufficient, and there is no occasion to increase them intentionally.

On the northern half of the earth's sphere only the north side of the heavens is free from sun, and thence an even proportion of light is imparted. No remarkable change in quantity or quality is experienced, and hence it is that painters make particular choice of a north light for lighting their studios and models. The north light influences photographic plates in like manner, just as the dispersed light does at any time or any other spot of the firmament, and beyond the great advantage which its repose and evenness are in the studio (imparting a soft and harmonious modulation of tints), it balances the disadvantage of a slight difference in the time of exposure necessary in consequence of its somewhat less intensity.

The photographer will therefore so place his studio that the back of the model is turned towards the south and its face towards the north; and the normal light can always be let in, as occasion requires, from the north-east or north-west, whilst the pure north light serves to render it clearer. In cases where this is not possible, let the normal light enter from the north, and turn the back of the model, as required, either to the south-east or south-west. Some prefer the one and some the other.

This is not all. Care must be taken that the studio be sheltered as much as possible by high walls, &c., from the solar light in the south. In winter—that is, during the winter solstice (21st December)—the sun at midday does not reach higher than 23½ degrees above the actual horizon, or 66½ degrees from the zenith, and the point of sunrise and sunset lies more towards the south, rising at east-south-east, and setting at west-south-west.

At the time of the spring equinox (21st March), the sun rises exactly in the east, at noon is about 45 degrees above the horizon, and sets exactly in the west. It is the same at the autumnal equinox (21st September); but from that time the sun always moves farther forward, so that on the 21st June the sun rises at east-north-east, at noon culminates in an angle of 66½ degrees, and sets in the west-north-west.

SILVER RESIDUES.

Great misunderstanding appears to exist on the subject of wastes, both as to the mode of saving them and also as to their value when saved. Nor is it to be wondered at, since very little has been written on the subject, and what has been written has been either too prolix for the general reader or too general and not concise and particular enough.

And first, as to their value. Chloride of silver ranks highest in this respect, yielding from fifty to seventy-five per cent. of its weight of pure silver, worth from one dollar to one dollar thirty-five cents per ounce.

When the chloride is less pure or not sufficiently washed from the salt the value is much less, possibly not yielding more than thirty or forty per cent. of silver. Paper clippings, properly reduced to ashes from filters, &c., yield from ten to forty per cent. of pure silver, according to the strength of solutions they are saturated with and the cleanliness with which they have been saved. A few minutes devoted to the study of this important branch of photography will not be misspent.

1. Then it is of the utmost importance that paper clippings, filters, and all papers impregnated with nitrate or chloride of silver, should be saved in as pure a state as possible—free from pins, pieces of ferrotype plates, dirt, clay, nails, glass, and indeed all foreign substances. Metals deteriorate the value of the reduced silver very much, and mixed with the ashes give a false idea of their weight, and the seller has a fictitious idea of their weight and value, consequently is disappointed, not from any fault in the refiner, but from his own carelessness in collecting the residues. There is another thing, too, worthy of notice. All paper, not impregnated with silver, should be carefully kept out of the stock, since they produce simply paper ashes of no value, are bulky in the refining pot, require more flux, more fusing, and consequently add greatly to the expense of reduction, and thereby diminish the returns. Nay, they do more; they are positively deleterious, and very much lessen the value of the ashes. I have no hesitation in stating that if a pound of good ashes are mixed with a pound of useless ashes the returns will be reduced one-half. When the ashes contain much useless material, the flux in the melting pot, instead of being thin and flowing, is stiff and pasty, and it is difficult in the extreme to separate the small granules of silver from the stiff pasty mass. *See, then, that all your paper savings are kept clean, if you wish to get the best value from them.*

2. In what state are they best sent to the refiner to get the greatest returns? I answer, carefully reduced to ashes. It takes considerable time and attention to do this, and as it is not much trouble nor difficult to do you had best do it at home. A wood stove does it capitally. Carefully clean out the stove, then take a handful of the *dry* silvered paper, and lay it in front on the bottom of the stove; set on fire, and then carefully feed as it burns down; be cautious so to regulate the draft that none goes up the chimney. When it is all burned stir well with a piece of iron, to allow the air to get free access to the charred mass, and allow to remain in the stove till quite reduced to ashes. Remember, as I stated before, that charcoal from the paper very much reduces the value of the ashes by adding to the expense of refining. When cold you can weigh them, and they are ready for sending to the refiner. You can send ashes by express, or even mail, for one-tenth the price you could send the paper itself. The paper is very bulky, the ashes not so.

Another thing worth knowing is that a small quantity is not so valuable in proportion, other things being equal, as a large one. I would never sell less than half-a-pound of ashes at one time to gain the highest price.

3. Great care seems to be the rule in all photographic operations *(we ought to be patient men)*. In saving your chloride from the nitrate, you cannot be too careful. Make a saturated solution of common salt in water *(hot* water is best). This ought to be filtered through a piece of cloth into the old silver solution you wish to reduce, the stronger the silver solution and the stronger the salt solution the easier the operation. When they are weak the chloride is light and very difficult to collect. When they are strong you will be surprised to see how stiff and firm the resulting chloride is, and how easily separated from the liquid around it. Continue to add salt solution till no more chloride is thrown down. To be sure of this (after having thoroughly stirred the mass and allowed to settle), pour off a small quantity of the solution from the top into a clean glass; add to this a few drops of the salt solution. If no precipitate is formed you may conclude it is all turned into chloride, and proceed to wash away the nitrate of soda from the chloride of silver. Pour carefully off the clear portion, and pour boiling water on the chloride remaining; stir well; allow to settle; pour off, and repeat two or three times; *it will then be* ready to dry and weigh. Collect carefully, for this pure chloride is valuable.

Things to observe: Have your nitrate solution as strong as possible. Have your salt solution very strong; add enough salt to precipitate all the silver, and wash (for ease) with warm water.

4. To save the chloride from your print washings, procure say a ten or twenty-gallon cask water tight; take out one end, about one-fourth from the bottom, or, better, about the height of a pail; insert a wooden tap, price 10 to 12 cents. This is your apparatus. At the tinsmith's procure say five pounds of clippings of zinc; fling them into your barrel; it is now ready. When you are about to tone throw in your first and second washings from your prints, and drain the prints each time to the last drop. Now and then add a handful of salt; stir the contents of the barrel daily. When nearly full allow to rest for twenty-four hours, and then, without stirring, but tapping the sides gently to detach any portions of chloride adhering, draw of the liquid down to the tap, and throw away. Proceed to fill up anew; continue this for six months or a year, and you may then turn out the contents, first baling carefully off the water, and then collecting the dirty mass of nearly pure silver at the bottom on a strong filter to wash and dry.

Observe: Never stir the contents of the barrel for at least twenty-four hours previous to drawing off the liquid at the tap. Tap gently on the barrel all round an hour before emptying off, and see that you have always enough salt and zinc to reduce the waste silver from the solution.

5. The developer solutions, drained frem the plate, are worth saving. Develope over an earthenware or gutta-percha flat bath; pour the savings each evening into a large bottle, with a little salt to perfect decomposition. When full proceed, as in the case above, to pour off the useless liquid at top, reserving the precipitate at bottom for further treatment. When you have a quantity of residue throw on a filter to get rid, by careful washing with hot water, of the salt and iron.

Unwashed developer drainings, simply dried, consist principally of iron, and *are worse than useless* for the purpose of refining. It is simply a waste of time, crucibles, fire, and flux, since it produces no return. Remember, the more and purer the silver solutions to be reduced the less fire, labour, fluxing material, and the fewer crucibles it requires, and consequently the less expense is entailed and the greater the returns.

Pure residues, however small in quantity, will always yield some return. A large quantity of impure residue, though yielding considerable silver, may make no return, since the cost of refining may be so great as to swallow up all the proceeds.

Within the limits of this article it is not possible to include all the means of saving practicable. Let me urge, in conclusion, save what you do save in a cleanly manner, free from adulteration, in the smallest bulk, to obtain the best returns.

Residues from Toning Baths.—Have two bottles that will contain half-a-gallon each. Into one pour the used toning baths till nearly full. Then dissolve two drachms protosulphate of iron in an ounce or so of water, and acidulate slightly with muriatic acid. Add this to the bottle of toning solutions; shake well. It will immediately turn nearly black. Allow to rest for twenty-four hours; tap the bottle slightly, to precipitate the particles of gold adhering to the side. Permit to rest a few hours, to allow all to fall to the bottom; then pour off the clear portion. This bottle may be refilled many times in succession before collecting the wastes. The use of the two bottles is to allow time for precipitation after adding the iron before pouring off. By using them alternately all the gold may be saved very easily. When you wish to collect the residues pour all on a filter; wash thoroughly with cold water, then dry it for sale. If for use you need not dry, simply redissolve. Precipitate with iron once more; wash well; dissolve for the last time in *aqua regia*, as at first, evaporate nearly to dryness two or three times, to get rid of the acid, and it is ready to make the toning bath again.

In these dull times and low prices every penny saved is surely a penny gained. Save your wastes.—*Canadian Journal of Photography.*

Contemporary Press.

ON CLEANING GLASS PLATES FOR PHOTOGRAPHIC PURPOSES.

[Humphrey's Journal.]

Although every photographer is quite aware that a perfectly-cleaned plate is necessary to the production of a good picture, still many are the sins committed in disregarding this fundamental precept. Sometimes carelessness, but more frequently the unsatisfactory method adopted for cleaning the glass, is the cause of failure which from time to time attends the production of a negative; for I have known photographers who were of opinion that the more a plate is rubbed the cleaner it becomes, and in this belief they have laboured by the sweat of their brow for a full quarter of an hour in diligently polishing an 8 by 10 inch plate.

That this view is an incorrect one need scarcely be stated, for, with too much rubbing, the plates are not only not clean, but actually become dirtier than they were at the commencement, because the cloth with which they are polished absorbs perspiration from the hand, and thus soils the glass instead of cleaning it. How difficult it is to remove perspiration from glass may be judged by placing the warm hand upon the surface of a plate, and then essaying to remove all traces of the finger-marks left thereon.

In the present communication I propose to give the exceedingly simple and sure method adopted by me, which will enable an operator to clean in the most perfect manner thirty plates measuring eight by ten inches within the space of an hour; and I strongly recommend the system for employment by all photographers. An absolutely clean plate is requisite in every negative process, and therefore the subject is one of wide-spread importance. What, then, is the best mode of proceeding? I answer, that neither the employment of tripoli powder, rouge, nor iodine is desirable, but that the end is most efficiently secured by applying an acid to the plates to remove all grease and dirt, and finally washing them in clean water.

By using tripoli and other substances impurities are almost invariably conveyed to the plate, for minute particles are, during the operation of polishing the glass, rubbed into crevices and fissures in the surface scarcely perceptible to the naked eye, and likewise attach themselves to the cut edges, especially if these latter have not been ground; thus not only is the plate but imperfectly cleaned, but the silver bath becomes impaired by the introduction of impurities. For cleaning new plates I proceed in the following manner:—

Upon a rough, unplaned board the plates are laid side by side, convex surface uppermost; a mixture consisting of equal parts of sulphuric acid and water is prepared in a saucer, and, by means of a pad of old linen or flannel, rubbed upon the surface of the plates which are turned over, and the acid applied to the reverse sides. Many photographers immerse their plates altogether in acid, but this is an operation which I do not recommend, inasmuch as more acid is required, and the purpose to be effected (viz., the solving and removing of the dirt and grease) is much more perfectly performed by rubbing to and fro upon the surface.

When the last plate has been treated with acid I lay them all (beginning at No. 1) in a large vessel of water, changing the latter once or twice, and washing the plates separately with a cloth. If the plates have been properly washed the water will flow equally and without impediment over their surface when removed from the vessel, and this is a sure sign of the absolute purity of the plates. The principal part of the operation follows next, viz., the drying, which must be very carefully attended to, for it is only possible to obtain a perfect result when the whole surface of the plate is damp; if the glass has dried in places before being rubbed with the cloth the result will be imperfect. The old linen used for drying and polishing ought, previously to its employment, to be boiled with soda crystals, for the purpose of removing any grease contained in the fabric. Two or three of the plates are placed to drain upon filter-paper, but should not be allowed to stand long before being taken in hand upon the drying-table, which is covered with several thicknesses of linen, worn soft and porous by long usage. Several pads of soft linen are laid convenient to hand, and with the first the greater part of the moisture is removed from the glass placed upon the table, convex surface uppermost; the plate is then quickly shifted to another and dried part of the table-cover, and, with a second cloth, rubbed briskly and heavily until all trace of moisture has disappeared. The glass is then reversed, and the same operation repeated.

It is important that the operation of printing should not be completed at the spot where the plate is first laid on the cloth, as the latter, being damp at that point, will moisten the second cloth used, which will thus be incapable of drying the glass surface. Plates cleaned in this manner are in every way ready for use, but may, if it be considered desirable, receive a further polish with collodion or alcohol.

Old plates should be cleaned by immersion in water, and washed without employment of acids, and then cleaned in the same way as new ones. If the old plates have been varnished they must be placed for twelve hours in hot, strong soda lye, and then cleaned, also without acids. Care must be taken to remove the old collodion attaching to the edges, which is best done by means of a piece of soft leather.

The cleaned plates are best stacked close against one another, without any insertion of paper between them. L. G. Kleffel.

THE PROPOSED ABOLITION OF THE PATENT LAWS.

[Daily News.]

On Saturday night Sir Roundell Palmer presided over a conference of working men on the Patent Laws. The speeches made and the resolutions carried were alike remarkable. To the chairman fell the duty of advising the meeting as to the best course to follow. This was done in a speech which, if lacking nothing in ability, was fraught with surprises. Openly and without reserve Sir Roundell stood forth as a champion of revolution. He acknowledged that at one time he thought the Patent Laws were defensible in theory and advantageous in fact. But his opinions had undergone a transformation. Abuses rather than benefits constituted, in his opinion, the products of the system. He thought the poor inventor reaped no profit, while the nation suffered a positive loss, by the operation of the Law of Patents. He proclaimed the necessity for a sweeping measure, and contended that nothing short

of total and immediate abolition of the Patent Laws would restore to England her prestige as the home of industry. If it is surprising to witness Sir Roundell Palmer taking a step so bold and advocating a measure so thoroughgoing as this, the attitude of the majority of his hearers is scarcely less so. As a rule, when the word to advance is given by a man of high character and high position, a large section of the people readily obey an intimation which is regarded as a command. It argues much for the good sense and caution of the working men whom Sir Roundell Palmer addressed that they were neither swayed by his arguments nor constrained by his example.

Several speakers condemned the Patent Laws in form, while approving of them in substance. They desired protection for their inventions, and rewards for their skill, in a more direct and tangible fashion than the grant of letters patent. It was proposed to found a "National Mechanical Inventors' and Designers' Co-operative Institution," for the assistance and remuneration of inventors. Mr. Richardson, the originator of this scheme, told the meeting that he had requested Mr. Gladstone to allow Greenwich Hospital to be employed as an inventors' museum, and that the Premier's reply, though courteous, was rather vague. Another speaker denounced the monopoly enjoyed by the Post-office, and desired by the Government in the case of the telegraphs. This, he thought, was a still greater evil than the monopoly which the Patent Laws conferred. By another it was alleged that the real grievance and defect lay in the fees levied upon those who obtained legal protection for their inventions. His remedy was the free grant of patents, and the imposition of a tax upon the profits of the patentee.

Mr. Macfie, M.P., took advantage of the opportunity to repeat to the working men the statements with which he has favoured the public in a pamphlet, and Parliament in a speech. His belief is that a section of the Statute of Monopolies is systematically set at nought. That historic declaration against monopolies such as those with which Queen Elizabeth had cursed her subjects, and in favour of patents such as those granted by Queen Victoria, contains the condition that no patent shall be valid which raises the price of the commodity to which it relates. There is something ludicrous in the supposition that a patentee has the power to raise the price of that which it is his interest to cheapen. A little inquiry—we do not say reflection—would convince Mr. Macfie that the condition under which a patented article can alone command a sale is its actual or relative cheapness when compared with an article in common use. Before Watt improved the steam-engine, Newcomen supplied engines which drained mines far more cheaply than when the power of men or horses was exercised, draining them too, in some cases, when manual or animal power was ineffectual to produce the desired result. Watt offered to supply engines which were at once less costly and more effective than those of Newcomen. Thus he got the monopoly of the market. But while he gained profit and fame, the purchasers and users of his engines were gainers also. Judging from his writings and speeches, Mr. Macfie is under the false impression that the possessor of a patent can compel the public to buy from him, to the exclusion and detriment of his neighbour, who sells a non-patented article. Again, we say that inquiry would disabuse him of this supposition. In like manner, his assertion that the Patent Laws of this country put her manufacturers at a disadvantage, inasmuch as English manufacturers cannot compete with the foreigners who produce the same commodities unburdened with royalties, is a mere chimera of Mr. Macfie's imagination. If an invention be a really valuable one, it can be protected in foreign countries as perfectly as in the inventor's native land. The laws of all European States are framed so as to admit of reciprocity in patenting inventions, and of these facilities the majority of our patentees avail themselves.

Perhaps even more singular than the summary recommendations of Sir R. Palmer and the doctrines enunciated by Mr. Macfie, was the conduct of Mr. Galloway, who, it appears, had made the journey from Newcastle-on-Tyne in order to move the first resolution. As put into his hands, this resolution was to the effect that the Patent Laws were "a hindrance to genius, science, and progress, and the progress of the whole civilised world, in however simple a form they may appear;" but when moved by him the resolution declared, "that the meeting, having heard the statements for and against protection of inventions by the existing Patent Laws, is of opinion that protection is absolutely necessary as a right, by which inventors may be secured, a true legitimate right in their inventions."

The reason assigned by Mr. Galloway for this change in the programme was not complimentary to so distinguished an orator and advocate as Sir Roundell Palmer, or to an aspirant for distinction in Parliament like Mr. Macfie. He could so little agree with these gentlemen, that at the last moment he disregarded their counsel, and asked the meeting to sanction what they had denounced. Not only was this resolution carried, but another, of a more uncompromising character, was adopted. This was to the effect that an amended Patent Law, giving efficient protection to inventors at a low cost, would be of the greatest value to the country, and would enable it to maintain its supremacy in the arts. These proceedings are very instructive, for they reveal the opinions which animate working men. As the maintenance or abolition of the Patent Laws is emphatically a working-man's question, it is gratifying to find that the prevailing spirit is favourable to the trial of improvements prior to the adoption of any revolutionary scheme.

Although Sir Roundell Palmer favours the repeal of the Patent Laws as the one course to be adopted, others advocate as a substitute the grant by the nation of rewards to meritorious inventors. This is Mr. Macfie's pet project. He thinks that £200,000 might be profitably expended annually in the purchase of inventions. Against this proposition we cannot protest in too emphatic terms. It commends itself to many inventors, for hundreds would prefer to forego the labour and risk of working a patent, if a good round sum could be got for the sale and disclosure of an invention which might prove to be worthless altogether when tested on a large scale and for a lengthened period. A century ago the plan had a full and a fair trial. Seventy thousand pounds were distributed in Parliamentary rewards to those who were credited with having invented something novel and useful. Dr. Irvine got £5,000 for making sea water sweet and wholesome, yet years elapsed before the distillation of sea water was practically accomplished by Dr. Normandy; so that this sum was thrown away. A Mr. Foden got £500 for discovering a paste which was supposed to be a substitute for wheaten flour, and Dr. Smith £5,258 for preventing contagion by means of nitric fumigation. In 1740, Johanna Stephens received the parliamentary reward of £5,000 for her cure for the stone. When the secret was disclosed, the remedy bought at so high a price was found to consist of a compound whereof the principal ingredients were calcined egg-shells, snails, soap, and honey.

These are samples of the way in which the nation's money was lavished in giving premiums to imposture. Does anyone imagine that if a system of national grants were now adopted the consequences would be more satisfactory? It may be said that more pains would be taken to avoid these mistakes; but what security should we have that other errors equally grievous would not be committed? The niggardliness is as much to be dreaded as the lavishness of Parliament. For example: Crompton's mule and Cartwright's loom were inventions for which Parliament voted grants of money. To the former the paltry and inadequate sum of £5,000 was awarded; on the latter £10,000 were bestowed. Instead of being extremely grateful, Cartwright remarked that as his invention had cost him his whole fortune, he could only thank Parliament for having returned him a dividend of 8s. 6d. in the pound.

We are glad to think that neither the revolutionary measure of Sir Roundell Palmer nor the system of national grants proposed by Mr. Macfie has any chance of being speedily carried into effect. Our patent system is very defective, but its defects admit of easy remedy. It is a case for reform, not for revolution. Of this the Government is convinced. We have good reasons for stating that among the measures to be brought forward next session, a Patent Law Reform Bill is certain to be included. The subject is ripe for legislation. Let us hope that when the Attorney-General takes the matter in hand he will deal ruthlessly with abuses, and display courage in proposing or sanctioning desirable innovations.

Correspondence.

Home.

THE FADING OF SILVER PRINTS UPON ALBUMENISED PAPER.

To the Editors.

Gentlemen,—In the leading article *On Albumen and Some of Its Compounds*, at page 347, it is said:—"When a silver print fades we are still completely in the dark as to the exact nature of the light-coloured body produced. *That the sulphur present in albumen has much to do with the change is tolerably certain;* but that it is wholly responsible for the mischief is probably more than doubtful."

The idea enunciated in the words I have put in italics is very prevalent amongst photographers; but it is so totally opposed to my own experience of the matter that I deem it necessary to say a few words on the subject, more especially as I believe that such a deduction is not warranted even by theory.

According to Mulder's percentage analysis of albumen—namely, carbon 53·5, hydrogen 7, nitrogen 15·5, oxygen 22, sulphur 1·6, phosphorus 0·4—the sulphur is but a tenth more than one and a-half part in the hundred; therefore, upon theoretical grounds alone, I think we are perfectly warranted in coming to the conclusion that a constituent which bears the almost infinitesimal proportion of one part and six-tenths in a hundred parts of egg-albumen, has no power to cause the fading of a compound in which the other constituents of the albumen are ninety-eight and four-tenths in the hundred parts.

But, setting theory aside, my own practical experience has led me to come to the conclusion that the sulphur naturally present in egg albumen has nothing to do with the cause of the fading of silver prints upon albumenised paper.

Some years ago I made many hundreds of experiments with silver prints upon the albumenised papers of various makers in order to ascertain, if possible, the cause of fading. Some of these prints were not only thoroughly fixed but were also well washed; others were thoroughly fixed and but slightly washed; others, although well washed, were but

imperfectly fixed; whilst others, again, were not only imperfectly fixed, but received very little washing.

In all those multitudinous experiments with various albumenised papers and various baths I never found a print to fade when it had been thoroughly fixed and well washed, no matter whether it had been previously toned or not; and I believe that toning does not in any way promote the permanence of silver prints.

I have likewise never found a print that was permanent when it had been either imperfectly fixed or slightly washed, whether it had been toned or not; and I have ever found that prints fade more or less early according as their fixing or washing has been more or less incomplete.

Not long ago I destroyed some hundreds of these faded and, in many cases, almost totally obliterated prints.

Now, it is well known that there are very many silver prints upon albumenised paper that have been printed for years and yet they show no symptoms of fading nor any detorioration in brilliancy, and the whites of which are as pure as when the prints were first produced.

This could not by any possibility be the case if the sulphur naturally present as one of the constituents of egg albumen was the *cause* of the fading of silver prints upon albumenised paper, as fading, when it does occur, commences early. I, therefore, maintain that the sulphur has nothing to do with the matter, and I believe that the sooner the idea of its being the cause of fading is got rid of the better it will be for the advancement of the art.

I also believe and maintain that a silver print upon albumenised paper, *when carefully produced*, is as permanent as is the paper upon which it is printed, whether the print be toned or not. Can any one gainsay what I here maintain? If so, let him speak, and bring forward undeniable proofs that I am in error.—I am, yours, &c.,

July 26, 1869. GEORGE PRICE.

POUNCY'S CARBON PRINTING.

To the EDITORS.

GENTLEMEN,—A great deal of correspondence is taking place just now as to the proper place of honour to be accorded to Mr. Pouncy for his exertions in the cause of carbon printing, but the discussion seems to turn on the question of priority of invention.

There is no doubt whatever that Mr. Pouncy was early in the field, but whether he was the first, as he claims to be, to produce a carbon print must, like many other first productions, from the nature of the case, remain a vexed question. Be that, however, as it may, great merit is, undoubtedly, due to him for his exertions in the commencement; but, when discussing the place of honour he is to hold, there is another point which seems lost sight of, viz., the merit of the productions themselves. At the present time he is far behind his competitors. I have had an opportunity of inspecting Mr. Pouncy's latest works, as exhibited by him a few weeks since in London. Having watched Mr. Pouncy's early efforts, and believing there was great promise in what he was doing, I was much disappointed to find how little progress he had made, and how inferior in character the productions shown were as compared with those of Swan, Edwards, Woodbury, and other labourers in the field of carbon printing. Whether the process is capable of further development or not I cannot say, but at the present time, in Mr. Pouncy's hands, it does not turn out anything satisfactory. I am willing to give Mr. Pouncy every honour for what he has done, and he has worked hard, but his competitors, probably basing their exertions on his early labours, have followed where he led until they have passed him in the race, and have gone ahead of him beyond all comparison, leaving him nowhere. Historical justice demands this when Mr. Pouncy's claims are under discussion.—I am, yours, &c., CARBO.

[It is probable that our correspondent, who is quite competent to judge of the respective merits of photographs, refers in the above to a recent exhibition of Mr. Pouncy's pictures, which was held at the establishment of Mr. Tweedie, Strand, London. Respecting this exhibition, it is, we think, a matter for regret that the process was not on that occasion more worthily represented, by better specimens being submitted for exhibition. From what we have heard of the capabilities of the process from Mr. Pouncy and his friends, we prefer indulging the belief that the pictures exhibited on the occasion referred to were not favourable examples of what it can do; certainly those we saw were not equal to silver prints of average quality.—EDS.]

PHOTOGRAPHERS *IN TRANSITU.*

To the EDITORS.

GENTLEMEN,—After returning from abroad, one of the things to be fetched up is reading the Journal. I am too late to be of use to Mr. Drake, who inquired how to guard his dry plates against being opened by custom-house officers; but, having been lately through the ordeals of France, Italy, Rome, Austria (Tyrol), Switzerland, Prussia, Belgium, and Charing Cross, I can assure others that there is much less danger than formerly.

"Oxoniensis" advises that the officers be courteously told what the boxes contain. He is only smiling in his sleeve, for he knows that it is just the idioms of courtesy that are the most difficult to acquire in any—above all, in many—languages. The risk is certainly not as great as usually imagined, and yet, even had I always a courier (as unfortunately I was obliged to have the last time) to "courteously explain," I would not go without warnings on the boxes against their being opened hastily.

There are many chances in travelling of not being able oneself or by friend or intelligent agent to open and explain. The luggage may be separated or sent on or home. Even at an octroi barrier (of all absurdities) a disaster may occur, as I well know, from a soldier mounting the omnibus and actually opening a basket of dry plates without the owner inside the vehicle being aware of the outrage on law and usage. I have heard, too, of an amateur being obliged to make declaration that his box contained the finest kind of Bohemian glass, and to pay duty accordingly to escape inspection.

A correspondent of yours proposes yellow glass at the sides of the box; but it is obvious that no one could see through even the one dry plate next to it. The glass should be in two pieces (about two inches by one and a-half will do) in the top and two in the bottom. Then the officer can look right through, and, seeing the edges of the plates, will rest content.

I send you a copy of the warnings in French, Italian, English, and German, which I have had on my own boxes. You would do a good deed by your subscribers and constant readers if you would reprint them, or something better, in screaming type and on thinner paper than mine, and offer to send them "on receipt of two stamps." Setting up type to an individual is expensive. Writing—the English style especially (mine say)—is not easily read by lamp or candle light abroad. Printed matter in the officer's own tongue he will notice immediately.—I am, yours, &c., J. J. COLE.

Hornsey Rise, July 23, 1869.

PLAQUES PHOTOGRAPHIQUES.
Si la boite est ouverte les plaques seront
COMPLÈTEMENT PERDUES.
Messieurs les officiers de la Douane sont priés d'avoir la bonté de regarder dans l'intérieur au travers des verres de couleur.

VETRI PREPARATI PER LA FOTOGRAFIA.
Se la cassetta viene aperta i vetri sono
INTIERAMENTE ROVINATI.
Si prega l'officiate della Dogana ad avere la bonta di osservare a traverso dei vetri colorati.

PHOTOGRAPHIC PLATES.
If the box be opened the plates will be
UTTERLY RUINED.
The officers of the Custom House are respectfully requested to examine the inside through the yellow glass.

Präparirte Photographische Platten!
Wenn die Kiste geöffnet wird, so sind die Platten verdorben, und vollkommen werthlos.
Die Herren Zollbeamten werden höflichst ersucht die Platten durch das gelbe Glas zu untersuchen.

SURFACE STAINS.

To the EDITORS.

GENTLEMEN,—I think there is always a crumb of comfort in the hour of trouble or affliction in knowing that we do not stand alone, but have some companions in our misfortune.

As an amateur photographer, I believe for fourteen years, I have suffered all the ills that photographic flesh is heir to, more especially the annoyance that has recently occupied the attention of yourselves and many writers in the Journal, viz., silver matt stains.

During the past twelve months I have devoted the whole of my spare time to discover the cause of, and, if possible, provide a cure for, this great photographic trouble. I am happy to say I have completely succeeded on both points.

Now, if you will pardon the presumption of an amateur, I will tell you how I overcome my enemy. You were perfectly right as regards the cause, but not quite so with regard to the remedy. The bath and the plate-holder are the joint cause of the evil. I had long been aware of the peculiar film or scum that forms on the surface of the silver bath, and have used the means you pointed out for its removal, namely, drawing strips of paper across the surface; but this did not remove the evil, only in part. The markings became smaller, but their numbers were greater. I account for this by the fact that the scum covers the whole surface of the bath when left at rest, but, on drawing the strip of paper across the solution, the scum becomes broken up, as it were, into small fragments, attaching themselves to the sides of the bath, ready to float off again on the first movement of the solution.

I think, to remove this scum effectually, it must be done at one move-

ment. The following is my plan:—Cut a piece of cardboard the exact shape and size of the inside of the bath; fasten two or three pieces of white blotting-paper to the cardboard, and at each end fasten a strip of wood by means of sealing-wax to form handles. Having set the bath upright, gently lower the cardboard down to the surface of the bath, when the whole of the scum will adhere to the blotting-paper, leaving no trace behind.

Now for the plate-holder. I have discarded the wooden holders, as being the cause of much mischief, and, in their place, have holders cut out of thick plate glass without joints, having holes drilled at the corners for a stout silver wire for the plate to rest on. After a day's work I place my glass plate-holder in a dish containing a solution of cyanide, and well wash under the tap; they are then ready for future use, free from any impurity. Since adopting this method I have never been troubled with the slightest mark of that kind, nor have had a dirty plate that could not be clearly traced to careless manipulation.

The only excuse I can offer for thus intruding upon your valuable space and patience is that I love our beautiful art, and wish it God speed; therefore, I think it would be wrong to withhold the smallest scrap of experience that might, perchance, form a handle for some professional man to lay hold upon and work out for some good.—I am, yours, &c., JOHN FIELDER.

1, *Frederick-street, Gray's Inn-road, July* 25, 1869.

IMPURITIES IN WATER.

To the EDITORS.

GENTLEMEN,—If my brother "Professional" (see page 357) whose sabbatarian principles are so strong as to prevent him from permitting a water tap to be turned on on Sunday morning, preferring that the water, which I presume he does not use by meter, shall run to waste for twenty-four hours—if, I say, my brother "Professional" will bear with me I shall endeavour to give him my ideas on the subject.

I do not know what kind of water he uses, but it must be *very* impure if it precipitate slime on prints after thirty-six hours' immersion. I have never considered the water in which my own prints are washed (that supplied by the New River) as very pure; but since reading the letter in question I have had a dozen of prints immersed for four days without any slime being discernible.

The Thames water, one would say, is dirty enough, but it only contains twenty-one grains of solid matter—chiefly carbonate of lime—to the gallon of water. This is independent of mechanical impurities.

Marsh and lake water contains much more organic impurities than river water, and it is on the organic impurities that the slimy deposit depends.

The best way to proceed in an endeavour to discover, not the nature of the impurity—for it is organic—but its extent, is to evaporate some of the water in a platina capsule, and apply sufficient heat to char the product, which will emit smoke and a peculiar odour.

What I should recommend as a cure would be, first, to cause the water to come as much as possible into free contact with air. It is well known that the action of air upon water causes the organic matters to become oxidised and insoluble, followed by their subsidence. It is probable, nay evident, that this interesting (although sometimes undesirable) operation has, in the case of "Professional," taken place in his washing trough, consequent upon some churning up, fall from a tap, or trickling—all or any of which would bring the air into contact with the organic matter, and, by oxidising it, cause it to be precipitated as slime. What I would advocate in this case would be the causing the organic matter to be oxidised *before* it reaches the washing tank. The means of accomplishing this will suggest themselves to "Professional."

But I would strongly enforce the necessity of filtering the water immediately before its admission into the washing tank. A bed of alternate layers of gravel, sand, and charcoal, placed in a large box, will permit a large volume of water to pass, and will have a powerful influence in preventing the passage of organic matter. The smallest pinch of black oxide of manganese, or an infinitesimal dose of sulphuric acid added to the water previous to its passing through the filtering bed, will tend materially to purify it.

I have spoken of the advantage derived from allowing the water to trickle or fall from a tap, so as to permit the air to be brought into contact with the organic matter. In cases where such a mode of procedure would not be expedient, the same end may be given by forcing air into the water by means of a pair of bellows.

For my own part I quite disapprove of the long washing of prints. There are print washing machines by which the sole object of washing—the elimination of hyposulphite—can be effected quite as well in a few minutes as by a mere soaking in water for as many days; and knowing this to be the case—as my "professional" brother must do—it would surely be for his advantage, both spiritually and commercially, were he to use the means of rapid washing here referred to. Spiritually it would conduce to his benefit, inasmuch as he could then enjoy his Sabbath day's rest without the danger of his heart being immersed among the slimy prints in his washing tank; and, commercially, he would be a gainer by the rapidity and perfection with which he could turn out his work, free from either slime, smears, or soda.—I am, yours, &c.,

London, July 27, 1869. ANOTHER PROFESSIONAL.

Miscellanea.

RELATIVE PRICES OF PHOTOGRAPHS.—A correspondent of the *Liverpool Mercury* writes thus:—"It has struck many people as singular that they should be enabled to visit eminent photographic establishments, and perform a sitting expressly for their own portraits—to be completed in twenty-four copies—for the sum of 8s. 6d., while they cannot get a single copy of the portraits of public personages or views of different localities or places of interest, which are necessarily produced in thousands, under 6d. or 1s. each. In a commercial sense I, in common with others, cannot see the reason of this discrepancy, and, in a pictorial aspect, think it very detrimental. It is an exceedingly rational and pleasant occupation to procure a representation of every celebrated or well-known person as it is of any place or spot of celebrity, association, or memory; and as folios filled with such photographs ought to be accessible where sufficiently good or accurate engravings are entirely beyond reach, I, on my own behalf and others, should be glad if you could lend some assistance in your columns to the achievement of this popular want. The calculation is very simple. If two dozen copies of one's own portrait can be had splendidly executed for 8s. 6d., surely single copies of such numerously-printed productions as those specified should be available at equal, if not considerably lower, rates."

PARIS ACADEMY OF SCIENCES.—At a late sitting M. Dumas read a paper, by Dr. Bouchut, on the advantage of examining the eye for a diagnostic of diseases of the spinal marrow. Adverting to the results of nearly a hundred observations made in the course of the last seven years, showing that certain defects of circulation, secretion, and nutrition in the optic nerve and retina are connected with a diseased state of the brain and its envelopes, Dr. Bouchut arrives at the conclusion, supported by observation, that affections of the spinal marrow operate a change in the circulation requisite for the nutrition of the eye, thereby producing a papillary hyperhemia followed by atrophia, the observation of which affords a valuable diagnostic, the eye and spinal marrow being in communication with each other by means of the great sympathetic nerve.—A paper was received from M. Fabre, on hydrogen combined with palladium. Incidentally he states that, in the course of his experiments, he has remarked that mercurial emanations prevented the electric current from passing, and therefore played the part of a non-conductor. Hydrogen in a gaseous state produced a similar effect. Another curious fact observed by M. Fabre was that zinc, cadmium, and platinum moistened with hydrochloric acid, thus constituting galvanic couples, far from causing an increase of temperature, as is generally the case, rather determined a perceptible refrigeration.—M. Henri Ste. Claire Deville presented two papers from pupils of the new laboratory for research instituted by the Minister of Public Instruction, M. Duruy. One of these papers, by M. E. Grant, treats of the acetic derivations of mannite; the other, by M. de Clerment, describes a new substance, which he calls acetate of chlorine. It has the property of being instantly decomposed by contact with zinc.—*Galignani.*

HEAVY PENALTY FOR SENDING DANGEROUS GOODS FOR SHIPMENT.—Messrs. Bahr, Behrend, and Co., Preeson's-row, were summoned at the Police Court, Liverpool, before Messrs. J. B. Brancker and J. Bland, magistrates, for having, on the 16th instant, caused to be taken into the Wellington Dock for shipment certain goods of a dangerous quality, to wit, a case containing collodion, upon which case they neglected to distinctly mark or state the nature of such goods on the outside. The information was laid under the 21st and 22nd Vic., s. 215, the extreme penalty for the offence being £20. Mr. Pinfield, from the office of the dock solicitor, appeared to prosecute.—Inspector Tomlinson stated that on Friday, the 16th instant, he received the following note from the defendants:—"Please note that we are shipping to-day, per Rosetta, in said (Wellington) Dock, one case collodion, with which please take the necessary precautions required in bye-law." On going to the dock he found the case marked "glass, with care," and nothing else but the address, "Mr. R. W. Thomas, chemist, London." He looked at the case on the following day, when it was put on the ship, and they had evidently taken care of it then, as it was marked in large letters that the case was to go on deck. He told the police-officer to take special care of it. He also told one of the parties who had sent the case for shipment that it ought to have been marked, and it was in consequence of that the direction named had been put outside. Police-officer No. 700 gave similar evidence. The defendants' representative stated that the firm sometimes sent goods in that way—caps and other goods—and it had never been their practice to mark the cases. Besides, the officials must have known what the contents were, as he had sent them the shipping note. The firm repeatedly received goods of that kind in the same way by the London and North-western Railway, who must have known the character of the contents of this case. Mr. Bland said if the company had known the contents of the case they would not have carried it. That very question was discussed at the board the other day. The defendants' representative stated they had some doubts as to the dangerous nature of the goods. Mr. Brancker said they must have thought the contents dangerous or they would not have sent the notice to the police to take special care; and as they had neglected to mark the same outside, the bench would impose a fine of £10 and costs.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A cloth background 8 × 6 feet, brown, suitable for the Adam-Salomon picture, will be exchanged for one the same size, suitable for vignettes, blue or light grey.—Address, Graham & Suter, 7, Upper Parade, Leamington.

A very compact pocket camera, quite new, with two double backs for plates $3\frac{1}{2} \times 3\frac{1}{2}$, fitted with Grubb's stereo. lens in screw adjusting mount, will be exchanged for a Dallmeyer's No. 1 triplet, or 1A, or 1AA wide-angle rectilinear lens, or a Ross's doublet.—Address, Capt. Ball, 15, Queen's Gate-place, Kensington, W.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photographs Registered During the Past Week.—

James Hargreaves, Burnley.—*Portrait of Rev. E. C. Maclure.*

P. P. Skeolan, Harrogate.—*Three Portraits of Rev. Fox Thomas.*

A. E. Lesage, Dublin.—*Three Portraits of His Grace the Most Rev. Michael Kieran, Primate of all Ireland.*

Thos. G. Perry, Trim, Co. Meath.—*Two Views of "Dean Swift's Cellar," or Stella's Well.—View of Remains of Dean Swift's House.*

☞ *Correspondents should never write on both sides of the paper.*

B. B.—Your iron solution is *much* too strong. Reduce it by more than one-half.

A Patentee.—We know nothing more of the process than we have published in the specification.

H. H. Wood.—When in a formula "parts" are stated, it may mean grains, drachms, ounces, or any other quantity you prefer employing.

Lay Clerk.—A good, if not the *best*, kind of eyeglass for focussing is that known as a Ramsden eyepiece. It consists of two plano-convex lenses, mounted a little distance apart, with the convex surfaces next to each other.

James Fisher.—We know of no better agent for preserving albumen than camphor. A lump, about the size of a pea, placed in a small bottleful will cause the albumen to retain its freshness and good properties for a long time.

T. W. H. (Brixton).—To photograph the dogs on a 7 × 6 plate you should employ a whole-plate lens, which is capable of covering this size, with a large stop. In this bright weather, three seconds should afford ample time for effecting a full exposure.

A. M'W.—The four and a-half inch lens of the maker named is so good that we cannot suggest a better for the purposes mentioned by you. The same class of lens will also prove good for the larger-sized picture, and with equal-sized stops will work more rapidly than the triplet.

A Manchester Friend.—We have had no experience with the morphine process since we last expressed our opinion concerning it. It is scarcely probable that we shall have an opportunity of experimenting with it during the present season, and we know of no person who is working with the process.

"Papyroxyline."—Dr. Liesegang is not the inventor of pyroxyline composed of paper, which has been made since nearly the introduction of the collodion process. So far as we know he was the first who gave it that distinctive designation. It was formerly called "paper pyroxyline," as the other forms of this body were called "cotton pyroxyline" or "linen pyroxyline."

Caloscopic (Manchester).—The lens about which you inquire under the name "caloscopic" is the same kind of lens as that which we have described in an article in the present number, under the heading "orthoscopic" lenses. If we mistake not, Voigtlander called it by the latter name, Ross by the name "orthographic;" and Horne and Thornthwaite by "caloscopic." They are all of the same kind, by different makers.

J. M. C.—When intensifying, do not use more silver than is just sufficient to secure the desired density. The proportion of citric acid to the pyrogallic should secure absolute immunity from the discolouration referred to, and we cannot conjecture how such a stain occurs, unless the pyrogallic acid is very bad or you apply it in too strong a light. Have you tried the effect of a preliminary application of a weak solution of bromide of potassium? If not, do so.

Sigma (Waterford).—To a considerable extent, old worn-out and faded prints can be restored by placing them in a solution of bichloride of mercury. We possess several which we have thus restored, while others, again, were destroyed by the treatment. We have never yet noted with sufficient care all the conditions requisite for obtaining successful results, but shall do so when we next experiment in this direction, and sum up our observations in a short article.

"Strike Light."—We cannot, at present, throw any more light on these markings than is to be found in our article on the subject in page 336. We are also unable to afford you the information wanted concerning the meetings of the "Amateur Association." Mr. Melhuish, the Secretary, will at once inform you if you drop a note to him. You cannot, we suppose, allude to the Amateur *Field Club?* In the latter case, we could have afforded you all the information you might desire.

A. B. C.—We are not responsible for any statements in either our Exchange Column or advertising pages. In all cases you must use your own judgment.

George Bell, Junior.—1. The picture is tolerably good, but you will readily surpass it after a few more trials.—2. You ought to whiten the positive by means of some alabastrine solution, which is composed of bichloride of mercury dissolved in water.—3. The lemon or lime juice which you can so readily purchase from the grocers or Italian warehousemen will answer the purpose perfectly.

Carboniensis.—You somewhat misconceive our remarks. The process of Mr. Pouncy, which was published by subscription, was one in which gum, bichromate, and carbon were applied to the paper. The process now worked by him is so different that we must request you to read the specification again. It is a process for producing photographs in printers' ink, asphaltum being employed. It is this process which is patented, and the patent is still in force, and will be for a year longer.

S. Welsh.—It is your friend who is right, yourself being wrong. It is said that when chloride of silver is prepared by the action of chlorine gas upon finely-divided silver or silver leaf it is sensitive only to a very slight extent, indeed, so slightly, that a sample of it has been kept exposed to the sunlight in common air for a considerable time without any change being apparent. On the other hand, chloride of silver which has been prepared by precipitation darkens with great rapidity.

Artist.—Your own knowledge of art should have suggested to you the means of securing the effect desired. Place the sitter in an elevated position, and pull down the blind of your window until it is level with the face. Now have a large mirror lying on its back on the floor, between the sitter and the window, in such a position that it will receive the light from the sky and reflect it *upwards* upon the sitter. This reversion of the lights and shadows will give you precisely the effect you require. Of course the lighting of the interior must harmonise with that of the figure. It is a pity that photographers do not aim more at snow effects than they do.

Crayon.—1. The ground plan of the studio is good. It would be better to have the walls a little lower, say from twelve to eighteen inches.—2. The most luminous rays are the yellow, the most chemically active are the blue. You should make or obtain a large prism, and admit a ray of sunlight into your room through a hole in your shutter. By causing this ray to fall upon the prism it will be decomposed into a beautiful "solar spectrum," and, if this spectrum be received upon a sheet of sensitive paper you will not fail to observe how rapidly it will become dark at the blue end of the spectrum, and even a considerable distance beyond the blue. One hour spent in an experiment of this nature would afford you a great deal of real pleasure. You may extemporise a window shutter by a few sheets of brown paper, and you may make a prism by building one of small glass plates and filling it with sulphide of carbon.

Cottonopolis sends us a long letter on reporting photographic meetings. It appears that he has been at the trouble to devote a week to the amusement of comparing our reports of the various photographic societies in London with those of a contemporary, and finds that, with verbal differences, there is no point of importance contained in one which he finds omitted from the other. They are different, yet the same; and he argues from this that they are accurate. He is right. We invariably endeavour to present such a report of the meetings of the metropolitan societies as shall convey to our readers the pith of what transpires, without putting them to the trouble to unburrow it for themselves, which they would have to do if we published a full or *verbatim* report of everything that was said. Thus it is possible to give in three or four lines, such a digest of five minutes' talking as shall *better* convey an idea of what was said, and the conclusion arrived at, than if we printed every word uttered by each speaker.

Royal Pictures.—We understand that the Queen has commanded Mr. Woodward, the Royal Librarian, to edit a series of exterior and interior views of Windsor Castle, together with descriptive text. These views, which will include several of the private apartments, are said to be from photographs printed in permanent colours by a new process. The volume will be published by Messrs. Moxon, Son & Co.

METEOROLOGICAL REPORT,

For the Week ending July 28th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

July 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
22	29·98	88	56	67	78	SW	—	Bright
23	30·08	80	57	60	67	NW	—	Cloudy
24	—	—	66	64	73	W	—	Cloudy
26	29·84	81	58	64	76	WSW	—	Cloudy
27	29·88	76	57	60	68	WNW	—	Overcast
28	30·00	—	57	58	61	W	0·06	Raining

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 483. Vol. XVI.—AUGUST 6, 1869.

A COMPACT DARK BOX FOR FIELD WORK WITH WET PLATES.

A few weeks ago we proposed to describe a small dark box for field operations when wet plates are employed, as in taking instantaneous views, or doing work in which we do not wish altogether to trust to dry plates. We will now redeem our pledge, and very briefly describe the arrangement which we have used ourselves with much comfort. The box we are about to describe was devised many years ago by Mr. Grubb, F.R.S., the well-known patentee of the aplanatic lens, and, though containing no novel contrivances, is so compact and convenient in the field that our own experience of its use induces us to state its construction generally, in order that those engaged in wet-plate work may take a hint or two on economy of space in dark boxes and convenience of manipulation, combined with the absence of any necessity for breathing the confined air of the dark chamber under any circumstances.

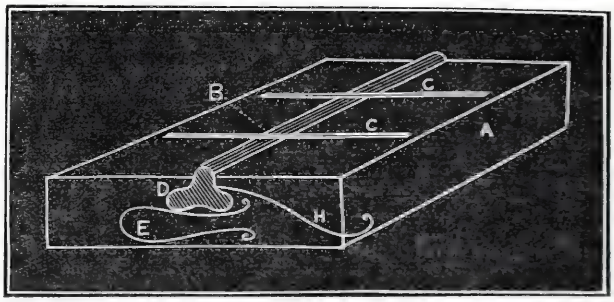
We will first describe the exterior of the box, and then the internal arrangement.

The box is nearly square, and measures externally fourteen inches each way. One of the sides is loose and hinged, so that it falls down when a button which secures it in its place is turned. When the box is arranged for use, this is the side at which the operator stands. We will call this the back of the box. The front or opposite side has let into it a pane of yellow glass about six inches wide by four. The movable back has also a small pane of yellow glass, and external to this is a pair of grooves in which slides the wooden plate of a face-piece similar to that described at page 347, so that when the back is raised to its proper position and the box closed, the operator looks comfortably into the box at the same time that his face, fitting to the aperture, prevents access of unnecessary light; moreover, the operator cannot breathe the atmosphere of the box. On top is the handle by which the whole is carried, also a groove in which the camera can slide if it be desired to use the box as a stand, and the opening for the introduction of water to the cistern. To the right and left of the operator are the two apertures, fitted in the usual way with sleeves through which the arms can be introduced and manipulations carried on with perfect ease. We may add that, when not in use, a plate of wood slides in front of the glass window, and a similar one takes the place of the face-piece at the back, while the carriers of the sleeves can also be removed, and their places supplied by similar slips of wood.

Having described the outside of the box we now come to the inside, placing it before us in such a way that its back has been let fall on its hinges, and the open box is now before us. Immediately to the left, and under the opening for the hand, a slit is cut in the bottom of the box, through which the gutta-percha bath for stereoscopic plates is passed until its top checks it. The opening of the bath is therefore but just above the floor of the box. A movable platform, about eight inches long, and the same width as the bath, is laid on the floor of the box and arranged by wooden slips of such a height that it can slide along the bottom, and, when pushed to the left, that one extremity shall cover the top of the bath completely, and so prevent injury from dust, splashing, &c., while the platform is itself convenient for receiving a pad of blotting-paper on which to drain the plate after the removal of the latter from the bath. The dark slide is fitted on a shelf on the left side, immediately beyond and above the bath. The slide is caught on its shelf by means of a button which keeps it securely in its place, while freely admitting the introduction and removal of sensitive plates.

The next point in order is the developing tray, which we need scarcely say is placed directly below the window, in the front of the box. The developing tray measures eight inches by six, is two inches in depth, and provided with the little oscillator, an engraving of which we give below.

A is the pan, japanned for convenience; across it runs the stout wire B carrying the two supports for the plate *c* and *c'*. The bar can be moved freely in a pair of collars fixed to the sides of the pan. At the left extremity of the bar B is attached the little triangular piece D, and to this is affixed the wire handle *h*. It will be seen that



the triangle D is attached by its apex to the crossbar B, while its two rounded angles rest on the upper surface of the spring *e*, so that when the triangle is moved by the handle *h*, the spring obliges it to return to its original position, as shown in the diagram. Obviously, when a plate is laid on the supports *c* and *c'*, it can be rocked by means of pressure on the handle, but otherwise the plate is retained by the action of the spring in a horizontal position. This little trough is so placed in the box that the handle *h* is to the left of the operator, while his right hand grasps the vessel containing the developer.

The bottles containing the developer and fixer fit at the right hand side of the developing dish. The right upper portion of the chamber is occupied by a water cistern, which delivers the stream of water by means of the usual flexible tube.

When not in use the chamber easily holds all the paraphernalia of the photographer, camera, plate box, &c.

In working with the box the plate is coated in the air and placed on the dipper, which latter is held in the right hand, which has been passed through the sleeve. The box is now closed by buttoning the back in its position, immersing the plate, and then proceeding in the ordinary way.

During development it is often satisfactory to get a good look at the negative, and, as this cannot be done with the interposed yellow glass, a slight alteration of the back enables us to accomplish this with ease. The mode of doing this is very simple. The face-piece, or rather the wooden plate which carries it, slides in a groove before the yellow glass fitted into the back of the box. Under ordinary cir-

cumstances the operator would be able to look into the box through the glass window only; but, if about two inches of the wood of the box immediately above the coloured glass be cut away, this aperture, although usually closed by the plate of the face-piece when the latter is pushed down completely in its groove, yet, when thus lifted a little out of the groove, the operator can look directly into the box through the hole cut in the wood. The advantage of this is that when the hands of the operator are engaged in the development of a plate, he can push up the sliding face-piece with his nose, and then look directly into the box; at the same time, his own face prevents access of any white light to the interior of the chamber.

We may only add that this little dark box, when divested of the fittings requisite for wet-plate work, answers admirably as a changing box for dry plates.

ON THE BURSTING OF COLLODION BOTTLES.

From time to time serious accidents, arising from the bursting of bottles containing ether, collodion, &c., have been recorded in these columns—these accidents leading in many cases to fires, and in some to personal injury and even death.

As this is the season when such mishaps are most likely to occur, I beg to lay before your readers a few facts with which, as I have never seen attention directed to them, some are, perhaps, unacquainted, and which, if borne in mind, will much diminish the chance of this kind of accident.

Some time back, while taking some photographs in a rather warm room, my attention was aroused by the repeated ejection of the stopper of the collodion bottle. This happened with nearly every one of the plates. A few minutes after coating, away went the stopper with a puff. On replacing it, all was quiet until another plate had been coated, when, in a few minutes, off it went again.

The question immediately occurred to me—Why should the stopper be blown out at all? The thermometer was standing many degrees below the boiling point of ether; so that, if that liquid had been let up into a barometer tube, the force of its vapour would have been insufficient to expel the mercury, which would have stood several inches higher within the tube than without. And again: Why, after having been replaced, was not the stopper again expelled in the course of a few minutes, instead of remaining quietly in its place until another plate had been coated?

A moment's reflection sufficed to answer both of these queries. It is a law in physics that when a volatile liquid is introduced into an enclosed space, it fills that space with an atmosphere of its own vapour having a tension proper to the temperature; and that if the space be already occupied by another gas, the tension of the vapour is superadded to that of the gas. Thus, when we coat a plate with collodion, the place of the collodion poured, as well as of the dense ether vapour which flows out in considerable quantity at the same time, is taken by atmospheric air. We close the bottle at a time when the pressure inside and that outside are equal, but all the space occupied by the newly-introduced air is void of ether vapour, a supply of which immediately begins to be formed, and this goes on until the density proper to the temperature is reached, when, of course, the addition to the gaseous contents of the bottle produces an increase in the pressure within. If now we raise the stopper for a moment so as to permit the escape of the excess of the gaseous contents of the bottle, but replacing it before there has been any fresh admixture of atmospheric air, we, of course, equalise the pressure within and that without, and they would remain equal as long as the temperature continued the same, were it not for the fact that, when the pressure was relieved by our loosening the stopper, the ether vapour expanded as well as the air, and consequently was no longer of the density proper to the temperature. The ether will, therefore, again give off vapour until it has supplied the deficiency, and is once more covered by vapour of the density proper to the heat. This, of course, again produces a pressure within the bottle; but as it has only required a comparatively small addition of the vapour to rectify matters, the pressure now produced is very much less than it was the first time.

We see from all this that if, when we pour ether out of or into a bottle, we take the precaution to leave the stopper in quite loose for a short time after, until matters within the bottle have been finally adjusted (which will occur almost immediately if the liquid be agitated with the air above it), we need never have any bursting pressure at all until the temperature rises above that of the liquid at the time the bottle was closed; and then, of course, there will be much less than there would have been if we had started with a strong pressure through inattention to the above facts.

In order to determine what degree of risk we incur by carelessness on this point, I have made experiments to ascertain the amount of pressure generated in this way. Having selected a strong bottle of about five ounces capacity, I introduced a pressure gauge and poured in a small quantity of ether, closing it with a greased stopper to prevent leakage. The thermometer stood at 62° F. The bottle was allowed to stand perfectly still, and the pressure continued to rise for about half-an-hour, at the end of which time it amounted to six pounds and eight-tenths per square inch.

Having confirmed this result by numerous trials, I have since repeated the experiment at higher temperatures. At 76° a pressure of eight pounds per square inch is easily reached. At 82° a pressure of ten pounds and three-tenths was attained; and at 86° it amounted to about eleven pounds and a-half per square inch. Now, these pressures are far beyond what glass bottles of any size, especially if not round, can safely be exposed to; and though, of course, I do not say that in every case these very high pressures are reached, still always when we pour ether or collodion from or into a bottle, and immediately insert the stopper, there is a more or less near approximation to them.

It should also be recollected that if a bottle does not burst, but merely forcibly ejects its stopper, it may give rise to a serious accident if the stopper, in falling, should break either the bottle itself or another containing a dangerous chemical. It should be remembered that it is not necessary to run these risks, as, if the space above the surface of ether in a bottle contained nothing but the vapour of that liquid, there would be no bursting pressure at all until the temperature had risen above the boiling point, 96°.

R. W. Artlett.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER V.—HISTORICAL MEMORANDA CONNECTED WITH THE MENISCUS LENS.

When we stated [*ante* page 324] that, on the question of plano-convex *versus* meniscus lenses for photographic purposes, Mr. J. T. Goddard had been among the first to assert, ten years ago, the superior claims of the latter, we had no idea that Mr. Thos. Sutton would have felt hurt that we did not mention *his* name in connection with this subject.

It appears that in his now defunct journal, *Photographic Notes*, Mr. Sutton had devoted an article to a demonstration that, for certain qualities, a deep meniscus lens was better than those which were sold at that time. From his *Dictionary of Photography* we learn that it was given in his *Notes* of February 1st, 1865. He now says:—

"No sooner had I published the theory of the deep meniscus lens, which had never been published before since the world began, than the two leading opticians set to work to apply it, and one of them brought out the single 'wide-angle landscape lens' on this principle, and the other the doublet, composed of two deep menisci. I find that, in one of my letters to Mr. Ross of that period, I actually suggested putting two achromatic deep meniscus lenses together, convex side outwards, with a stop between, and called it a new doublet, with the remark that it would probably prove a very valuable combination.

"When a man is actually *the* first to publish a demonstration of a valuable property of a particular form of lens, and to suggest its adoption in preference to the existing form, his work should not be altogether ignored by a writer who professes to give a history of the said lens.

"The question is not who first made or used a deep meniscus lens in photography, but who first *demonstrated analytically* its peculier property of flattening the field, and thereby caused its general introduction in preference to the flat single lens. If those who had used it before gave it up for a different form of lens, it is a proof that they did not understand its properties. If Mr. Goddard had made one and tried it before the publication of my article, why did he not go on making that form of lens, for there happened just then to be a great demand for such an instrument?"

Now, what meaning are we to attach to the foregoing? Is it not to be fairly inferred from it that in consequence of Mr. Sutton's demonstration of the properties residing in that particular form of lens, Mr. Dallmeyer on the one hand, and Mr. Ross on the other, "no sooner" read it than they at once set to work to introduce new lenses formed on that principle? Let us see whether or not they really did so.

Mr. Sutton's demonstration was published in February, 1865. Mr. Ross's doublet was described in our Journal in September, 1864. It does not, then, appear that the latter could be indebted to the demonstration of the former. Moreover, Mr. Sutton himself, in describing in his *Dictionary* the same doublet, says that it was invented by Mr. Ross in 1863, and that the lenses are of the deep meniscus form. This date, it will be observed, is considerably antecedent to

February, 1865. Had we been inclined to take advantage of Mr. Sutton's mistake, we could have adduced proof that both singly and as parts of a combination deep meniscus lenses were long ago much more extensively made than he appears to be aware of; nay, we might be ungenerous enough to "demonstrate" from his own writings that he was aware of the existence of the deep meniscus lens at a date long prior to his own demonstration. However, to prevent a recurrence to this subject, it may be better here to state that the American globe lens, which Mr. Sutton himself describes as a combination of two equal achromatic *deep* meniscus lenses, was introduced in 1862, and was examined by Mr. Sutton nearly two years previous to the time of his discovering, or at any rate "demonstrating," the properties residing in it.

Having cleared Mr. Ross of his alleged indebtedness to Mr. Sutton for the exterior form of the elements of his doublet, a word or two will perform the same office for Mr. Dallmeyer. A particular form of lens for including a wide angle was introduced by this optician at the request of a distinguished amateur, Mr. Russell Manners Gordon, who, having stated his requirements, had the means of accomplishing them supplied by Mr. Dallmeyer, the special features in his new lens being its *internal* construction and not its external form, which of course was meniscus, for the simple reason that no other external form can possibly be adopted for supplying the requisites so demanded.

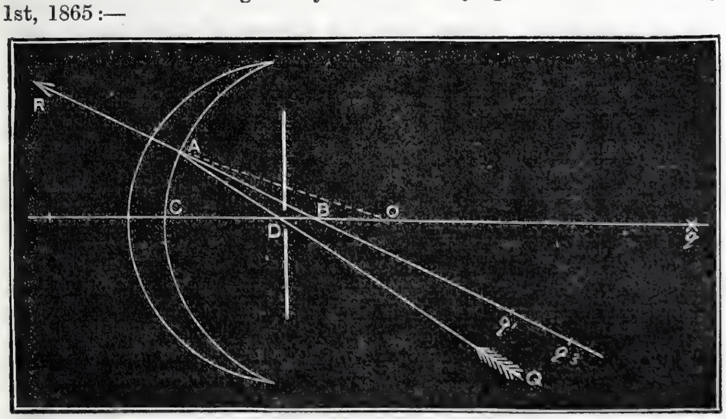
From the above it will be seen that in stating that "at that period"—namely, February, 1865—he "actually suggested putting two achromatic deep meniscus lenses together, convex side outward, with a stop between," Mr. Sutton really suggested a lens which was at the time in the market, and manufactured by at least two different makers.

One remark more and we have done: if the question be who first demonstrated analytically the peculiar property of the meniscus and its superiority over the plano-convex in flattening the field, we really must still ignore Mr. Sutton's claims to priority as a writer in 1865 in favour of the Astronomer Royal, Mr. G. B. Airy, who, in 1821, communicated a paper *On the Spherical Aberration of Eyepieces* to the Philosophical Society of Cambridge (see the transactions of that body), in which he treats of the properties of the meniscus lens as applied to the camera. We have in our possession several deep meniscus lenses which were purchased at periods long prior to the date given above by Mr. Sutton.

We regret that we have not the *Notes* of Feb. 1st, 1865, to which to refer, but we have pleasure in giving the "demonstration" referred to, as it appeared in the *Dictionary of Photography*, notwithstanding the fact of its appearing after the properties to which allusion has been made were recognised and acted upon by practical opticians:—

Deep Meniscus.

When the front surface of the achromatic meniscus is made very deep instead of being nearly flat, as in the cases just discussed, it is possible to render the image of distant objects absolutely devoid of curvature. This very singular and unexpected property of the deep meniscus was discovered by Mr. Sutton about two years ago; and the following demonstration of it was given by him in *Photographic Notes* of February 1st, 1865:—



The above figure represents a single uncorrected deep meniscus lens A C, of which C q is the axis, O the centre of the front surface, B the centre of the back surface.

The hollow surface is presented to the objects, and light is supposed to pass from right to left, as in all Cambridge optical treatises. The radii of the two surfaces, as well as the lines C q, A q_1, A q_3, will, therefore, be affected by the sign plus.

The stop is placed at D, so that the extreme oblique pencil Q D A may, after refraction, have its new direction A R, when produced backwards, pass through B, the centre of the back surface. The incidence, therefore, of the refracted pencil upon the back surface of the lens is direct, and has no obliquity.

The angle of incidence of the extreme oblique pencil at the front surface is Q A O, and the angle of refraction B A O.

According to the usual notation, let the angle Q A O $=\varphi$; B A O $=\varphi'$ O C $=$ O A $=$ r; and let μ be the refractive index from air into glass.

Now when a pencil of parallel rays is incident upon a hollow surface, such as we are considering, the pencil becomes divergent within the glass. When direct and axial its geometrical focus is at q; when oblique its primary focal line is q_1, and its secondary focal line q_3. We are going to prove in what follows that q_1 is nearer to the point A than q_3; and also that A q_3 is less than C q. Consequently, the oblique pencil will be more divergent within the glass than the direct axial pencil; and after emergence the oblique pencil will therefore have its focus (or circle of least confusion) further from the lens than the geometrical focus of the direct axial pencil, so as in fact to flatten the field.

Using the common notation, and bearing in mind that our pencils are small cylinders, the formula for the direct axial pencil becomes

$$\frac{\mu}{C q} = \frac{\mu - 1}{r} \quad . \quad . \quad . \quad . \quad (1)$$

and the formulæ for the oblique pencil become

$$\frac{\mu}{A q_2} = \frac{\mu \cos \varphi' - \cos \varphi}{r} \quad . \quad (2)$$

$$\frac{\mu \cos^2 \varphi'}{A q_1} = \frac{\mu \cos \varphi - \cos \varphi}{r} \quad . \quad (3)$$

We have to ascertain first whether C q is greater, equal, or less than A q_3; and, next, whether A q_1 is greater, equal, or less than A q_3; bearing in mind that $\sin \varphi = \mu \sin \varphi'$

First, let us compare the equations (1) and (2) in order to see which is the greater, C q or A q_3. This will be ascertained by comparing the second member of equation (1) with the second member of equation (2); or, which is the same thing, by comparing the respective numerators of those fractions. Now it appears that

$\mu \cos \varphi' - \varphi$ is greater, equal, or less than $\mu - 1$

according as $1 - \cos \varphi \quad . \quad . \quad . \quad \mu\,(1 - \cos \varphi')$

$\quad$,, $\quad 2 \sin^2 \frac{\varphi}{2} \quad . \quad . \quad 2 \frac{\sin \varphi}{\sin \varphi'} \sin^2 \frac{\varphi'}{2}$

$\quad$,, $\quad \tan \frac{\varphi}{2} \quad . \quad . \quad . \quad . \quad \tan \frac{\varphi'}{2}$

But the first member of this inequality is greater than the second; therefore, by comparing equations (1) and (2), it will be seen that C q is greater than A q_3.

Again: by comparing equations (2) and (3), it is evident, on inspection, that A q_3 is greater than A q_1; because the second term of these equations is the same in both, and the cosine of an angle is always less than unity.

Hence it appears that the axial pencil within the glass diverges from a point q which is further from C than either of the focal lines q_1 or q_3 of the oblique pencil from A. The oblique pencil has, therefore, greater divergency when passing through the interior of the lens than the axial pencil; and, since the incidences of both pencils upon the back surface of the lens are direct, it follows that the image of the extreme marginal object of the view will be formed at a greater distance from the marginal part of the lens than the image of the central object of the view from the centre of the lens. So that by giving a suitable concavity to the front surface, and putting the stop in the right place, the field for distant objects may be rendered absolutely flat.

Observe further that the quantity by which A q_3 is less than C q depends on the magnitude of r; and that it becomes greater as r becomes less. Hence the more hollow we make the front surface the flatter the field becomes, until at last it may be turned inside out and rendered convex to the lens instead of concave.

In the image formed by the deep meniscus lens the primary focal line of the oblique pencil is *farther* from the lens than the secondary focal line; whereas, in the common form of meniscus view lens, the secondary focal line is farthest from the lens. This is a very important difference, and greatly in favour of good marginal definition in the deep meniscus lens.

The amount of hollowness which should be given to the front surface, in order to render the image quite flat, is such as would yield a flat interior surface between the lenses of the achromatic compound. At any rate, this is approximately true.

DRY PLATES AT THE NORTH POLE—SIMPLE CARBON PROCESS.

In the German correspondence published in the *Bulletin Belge*, Dr. Vogel makes an announcement that is full of interest.

You are aware (he says) that Herr Harnecker's dry plates have contributed greatly to the success of photography without water, and

which has led to its being cultivated and developed in no slight degree. The adaptation of Herr Harnecker's processes is about to be submitted to a very delicate test, but no one doubts that the issue will be a gloriously triumphant one.

Herr Harnecker is about to furnish the expedition to the North Pole with some hundreds of his prepared plates, which will be exposed on the frozen sea, and developed by him on the return of the expedition. You see it is not a matter of experiment in the studio; there is something to be proud of even in the attempt.

Let me not forget (says Dr. Vogel) to mention the charming carbon proofs that Herr Grasshoff has executed according to a method published by me some months since, and which is as simple as possible.

He prints on carbon paper and washes the print in the dark with cold water; then he places it on wet albumenised paper, the albumen of which has been coagulated by immersion for five minutes in rectified alcohol and subsequent drying. The whole is pressed together, dried, and developed with hot water. The image being already on the albumenised paper, there is no necessity for a subsequent transfer. As it is not necessary in this process to employ caoutchouc or any kind of albumen, it is evident that it is one of great simplicity. The beauty of the proofs thus obtained must bring the carbon process into more general use, it is so advantageous in every point of view.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

From the specimens that I have seen, I incline to believe that the mechanical photo-printing process of Herr Albert will tend very seriously to revolutionise photographic printing where large numbers are required. The results may be generally stated to be equal to the best photographic prints on paper devoid of glaze. The process has been patented, although not in this country; but there appears to be little doubt that the specification conveys a very inadequate idea of the process as worked. In its broad principles it is easily enough understood. A plate of glass is coated with bichromated gelatine, it is exposed under a negative, and then developed into a feeble relief by treatment with water. When rolled in with ink some portions of this surface take the ink and others do not. But by what means to obtain the impression is now *the* question. Herr Albert is too keenly alive to his own interests to be very communicative on this subject. He tells us that the printing is effected by means of a press, but he displays a becoming reticence upon all matters of details. Meanwhile Mr. Woodbury, who of all other experimentalists may be assumed to understand the capabilities of processes of mechanical printing of the kind in question, has published a scheme by which he thinks successful results ought to be obtained, viz., by employing an absolutely true and flat press. It were much to be desired that Mr. Woodbury would add to the laurels he has already won in this special field of research by bringing to a successful issue a method of printing analogous to that of Herr Albert. Notwithstanding the apparent softness of the gelatine printing surface, above a thousand impressions, it is said, have been obtained from a single plate.

I observe that Mr. Pouncy and his process have received some attention during the past month. A kind of antagonism seems to exist between Mr. Pouncy and the majority of photographers at large. Why should this be? If, as appears to be the general idea, he has got hold of a good process, but is unable to bring it to a desirable consummation by his own efforts, why does he not invite the assistance of men who may be better manipulators than he appears to be himself, although inferior in fertility of invention? There would be no degradation in securing such co-operation; for the brain to conceive and the hand to execute are not necessarily the inheritance of one man. I do not say that the inventive and manipulative faculties are not co-existent in Mr. Pouncy; but if he himself imagine this to be the case he ought, for his own sake, to seek the aid of others. His process has now been a considerable time spoken of; it is sound in principle, notwithstanding the annoyance which must of necessity ever attend upon the development of pictures by such mal-odorous solvents as benzole and turpentine The specimens hitherto submitted have not satisfied photographers; but why, I repeat, should this be the case? Let him have the capabilities of his process fully developed by bringing it before the London Photographic Society and inducing a discussion on it, and then let him back this up by supplying, at such a moderate price as not to prove restrictive or prohibitory, the requisite tissues and materials to enable photographers all over the country to practice it. By taking this course I venture to say that in a few months its various capabilities would be evolved much better than is likely to be the case so long as it remains in the hands of a man who, being its inventor, may be inclined to look with tenderness upon faults which in other hands might be entirely excluded from it. From these concluding remarks you will see that I do not attach great importance to the statement that a company has purchased Mr. Pouncy's patent with a view to work it. If, as a writer in your pages has said, the patent expires *next year*, it is scarcely probable that it will be purchased at this late hour.

The problem of printing on canvas appears to have been solved in a satisfactory manner by some of the members of the Edinburgh Photographic Society. The canvas as prepared for artists need only be rubbed over with a weak solution of spirits of wine, followed by a wash of the gelatine and lac emulsion so successfully introduced by Mr. Davies, and then be silvered and printed in the usual way.

Apropos of a recent communication on photo-enamels by MM. Geymet and Alker, why do not persons who are fond of experimenting in this direction try to obtain ceramic photographs by means similar to those employed in carbon printing? Exquisitely delicate carbon prints can be obtained on plain or opal glass, and their technical qualities would not be inferior were one or more of the metallic oxides suitable for this purpose made to take the place of the carbon in the sensitive film. Here is an outline of one among many others which naturally suggest themselves as furnishing means for carrying the idea into force:—Provide a sensitive tissue, as in Swan's process, with finely-ground oxides in lieu of the carbon. Expose in a printing-frame, then immerse in cold water and transfer to the enamel tablet, pressing it in close contact by means of the "squeegee." Now immerse it in warm water, remove the paper of the tissue, and develope in the usual manner by the warm water. When the details are sufficiently well out the picture is ready for placing in the muffle. This, as I have said, is merely the outline of a process of enamelling by which results might be secured quite as satisfactory as those obtained by the process of Geymet and Alker.

Mr. Sutton is about to publish a pamphlet in which he is to describe a rapid dry collodion process, the principles of which are also applicable to the wet process. So far as I understand its nature it differs from those now in use mainly in the absence of free acid during excitement and development. A special collodion for the purpose is to be supplied by a particular firm; the purest trebly-crystallised nitrate of silver only must be used, the common nitrate of silver not answering the purpose. The preservative is composed of a solution of neutral gelatine rendered alkaline by means of carbonate of soda. The ordinary gelatine of commerce, being in most cases acid, will not answer. A special gelatine will therefore be supplied with the collodion. The developing is effected by alkaline pyrogallic acid. This is an outline of the process which, as I have said, is to be published in the form of a pamphlet at half-a-crown. What is somewhat curious is, that notwithstanding the fact of the pamphlet not yet being published, and the necessary special chemicals not yet being procurable, some of the correspondents of one of your contemporaries have, according to its editor, been trying the new process with the greatest success. Who described the process to these successful experimentalists? Who supplied them with chemicals? Seeing the market is not yet open nor the book published, is there "another Richmond in the field?" or is Mr. Sutton's pamphlet really published, notwithstanding the publisher's intimation to the contrary? If the promised details have not yet been published and the special requisites supplied, and yet success has been achieved, what advantage is to be derived from their introduction? I suspect that there is a mistake somewhere, but I shall not try to unravel it. Meantime I shall be glad when I receive the promised details of Mr. Sutton's new process, and shall not fail to give them a careful trial. I hope he will shortly publish it.

I lately spent a short time with a gentleman who is connected with the scheme for supplying cheap magnesium, of which we have heard a great deal of late. There is no doubt that the various rumours are quite true. A very cheap method of making it has really been discovered, and a full account of it will soon be published in your pages. The metal will be supplied at a very low price, and it behoves lamp makers to forego their rivalries and concentrate their united energies upon the task of making and introducing such a lamp as will yield a steady flame. When this desideratum is achieved we shall have entered upon a new era of artificial illumination. It is, perhaps, too soon yet to speak of this source of illumination in connection with portrait taking; but I cannot avoid observing that the failures in this direction hitherto experienced (and in my opinion all the attempts hitherto made partake more or less of failure) arise from the fact of the sitter being subjected to the direct glare of the blazing metal.

What photographer possessing taste or sense would place his sitter in the direct rays of an intense sun? Yet this is what has hitherto been done when taking portraits by the magnesium light; and are we, then, to wonder when we are told that magnesium portraits are "hard," "devoid of delicacy and gradation," "that there is something the matter with the eyes," "that the shadows are too black," and so forth? How, in the name of common sense, can it be otherwise? What, then, is the remedy? Simply this: let the sitter be lighted by means of a large white mass—say a sheet—which will radiate the light supplied to it by the magnesium upon the sitter in a similar manner as in the daytime the solar light is radiated from the sky or the clouds. Thus, and thus alone, will photography by the aid of magnesium be made to cope successfully with photography in daylight.

Circumstances having taken me into the neighbourhood of Newington the other Sunday, while there I had the pleasure of hearing a peripatetic preacher institute an analogy between photography and saving grace. As this analogy may be as novel to some of my fellow-readers as it was to myself, I transcribe, for their edification, a portion of it from my note book:—"As is hacid in the world of matter, so is grace in the world of mind. The photographist takes his glass plate, that is your heart; he cleans off the dirt from it, that is sin. If there's an old picture on it he removes it by hacids, so must you remove the old Adam by grace. Well, when the plate is clean it is ready for receiving the new picture, but it must first be made sensitive by means of hacids, that is quick'ning grace; he then puts it into a cam'rar or box, that means your closet—meditation and prayer; then he lets the light through a glass upon the plate, that is the word—"we see through a glass darkly." He must again put the plate in hacids, to develope the picture; in like manner the christian character is developed, that is, made visible, by grace. Last of all, the picture is fixed with hacids; so with the believer, who is fixed and kept firm and steadfast in his faith by the hacid of restraining grace. When the photographist's work is done he expects his reward; so when a believer's work is done he also gets *his* reward. But without hacids a photographist cannot take the portrait. 'Hacid! hacid!' must be his cry; hacid, hacid, is his Halpha and Homega. So with a believer, whose battle cry must be 'grace! grace!" This is a verbatim report of the words containing the simile which greeted my ear; but I thought at the time that, in the hands of a really competent person conversant with both phases of the subject, a much more clever analogy than that to which I then listened might be instituted between the taking of photographs and the renouncing of wickedness. It is really curious to note the vague notions that prevail with respect to the chemicals requisite for the production of a photograph. Like the preacher just quoted, many imagine that every chemical, more or less, must rank under the generic appellation of "acid."

A new company is in course of formation for the purpose of working the carbon processes of Mr. Pouncy, and supplying the requisites for working Mr. Sutton's process, to which I have already alluded. Owing to the fact that the company is yet only in the course of formation, there is some little obscurity in the announcement that it has already purchased Mr. Pouncy's patents. The names of Mr. Sutton, formerly of Jersey, now of France, and Mr. Gostick, of London, are mentioned in connection with the company which "is formed for the purpose of carrying out commercially certain important new processes and inventions, and for continuing the advancement of photography by buying and working any approved inventions." The capital wanted is £10,000, to be raised in a hundred shares of £100 each. With good technical and business men to manage affairs, and with a broad basis of operation, such a company as that in question might, if energetically conducted, make its mark even at the present time, when all new companies are looked upon with some degree of suspicion. It will depend upon the managers whether or not it prove a success or a failure.

PHOTOGRAPHY AT THE GOVERNMENT WORKS IN BERLIN.

The following is a process of reproduction described by Mr. L. E. Walker, and stated to be in daily practice at the Government works in Berlin, and which has been very much improved upon since it was first adopted:—

The drawing to be reproduced should be traced on thin paper, or rather on transparent paper, with an ink or pigment as dark as possible, so as to be impenetrable by the actinic rays.

The negative is prepared as follows:—Take some good smooth salted paper, sensitise it, and expose it to ammoniacal fumes from ten to fifteen minutes. Place your drawing then in the printing-frame, with the image upwards; then put in the sensitised paper and shut the frame. With a fine sun an exposure of from one and a-half to two minutes is sufficient to take the image perfectly. If exposed for too long a time the light strokes are apt to become damaged. The excess of silver is washed off, and the proof is slightly strengthened and finished, like other proofs. It is then washed and hung up to dry, and in such a manner as to curl up as little as possible. The negative is now ready to furnish, rapidly and successfully, as many positives as may be desired, precisely similar to the original.

In order to obtain a positive, the negative is placed with its reverse side in contact with the plate of the press, covered with sensitised sheets, and printed.

The paper is salted by plunging the sheets for two or three minutes in a bath composed of—

Salammoniac	$2\frac{1}{2}$ grammes.
Gelatine	$2\frac{1}{2}$ to 3 ,,
Hot water	480 cubic centigrammes.

They are then hung up to dry in a warm place.

The next operation is the sensitising, which is effected by covering the sheets with a slightly acid solution of ammoniacal nitrate of silver, about one to sixteen. They are then dried regularly, and subjected to ammoniacal fumigations. The ammonia-nitrate of silver is obtained by adding the ammonia drop by drop, and stirring it in a solution of silver until that which was precipitated in the first instance becomes re-dissolved; then nitric acid must be added, also drop by drop, until the whole becomes slightly acidulated.

For fixing, strengthening, and washing, dissolve first one gramme of chloride of gold and one gramme of chloride of platina in 1750 cubic centigrammes of water; neutralise by means of carbonate of barytes. Shake well, and leave it exposed for four or five days in a warm place until the liquor is ready to be used. This is the provisional bath. Two or three hours before it is used add one cubic centigramme of a solution of chloride of gold for each albumenised sheet, or one-third of a cubic centigramme for each sheet of ordinary paper. The tone of the strengthening is altogether a matter of personal taste.

Mr. Walker considers this bath very economical, because it is capable of preservation for a month.

Such is the process in all its simplicity. Before the albumenised paper became known, instead of a negative a piece of multiplying paper was used. At the present time they make a virtue of necessity, but it is in another sense. In point of facility and economy this process recommends itself in a remarkable manner.

THE REUTLINGER STUDIO.*

I HAVE to apologise for not keeping my promise, made in your April issue, to furnish you soon the further details of the construction of my *atelier*, as well as the different formulæ which I use in my chemical manipulations.

After leaving the dark room, we enter an adjoining room in which the negatives are retouched, and where, in fact, all the retouching is done. This room faces, likewise, north. The artists who attend to the retouching of my negatives are provided with a kind of desk the retouching is generally done with a lead pencil, but sometimes a brush and India-ink are employed. These desks are of the same kind as those employed by painters, and can be raised or lowered according to fancy. The upper part is cut out to facilitate the placing of the negatives, and below is a mirror which reflects the light through the picture.

The printing department is one story higher, and cannot claim much merit, as I lack the space to construct a proper apartment for it. The fact is, I have to do my printing on the roof of the house, so you can easily imagine that I have, at such a height (six and a-half stories from the ground), to contend with many difficulties. As I have not the right to make permanent fixings, I can simply place boards in such a position as to form a platform on the slanting roof, and at the edge a wire screen is provided, which will catch any frames that should happen to fall or slide down the inclined sides of the roof.

As regards the printing itself, it is divided into three parts. As the paper cannot be placed in the frames on the roof itself, there is, for this purpose, a room provided, which is about fifteen feet distant from the printing-place. One party places the paper in the frames, another carries the frames from the room to the roof and back again, and a third one superintends the printing proper. While writing on this subject, I must not forget to mention how I have arranged that my printers always know how many prints they have to make of a

* *Phil. Phot.*

negative—a work that is not always properly controlled in large establishments. The printer receives from every negative the first rough copy; these he sews together in the shape of a small pamphlet, and on the back of the picture is made a memorandum by the person who examines the proofs, and who notes down how many good prints have been taken from it. When the whole number which has been ordered is filled, the picture is torn out, and the negative returned to the store-room. Each negative has a strip of paper attached to it, on which the number of prints to be taken, as well as the number of the negative, is written down.

I consider my way of storing negatives preferable to the one employed by most photographers. Generally, they are placed in large closets provided with racks, in which the negatives are placed. This takes, in the first place, a great deal of room, and, in the second place, is rather expensive.

I had boxes made thirty-one inches long, twenty-one inches wide, and twenty-six inches high for *carte de visite* negatives, and each box will hold fifty negatives. The interior is provided with twenty-five partitions, and each partition will hold two negatives placed back to back. These boxes are placed on shelves. They are provided with iron handles to facilitate lifting, and on the outside is a paper containing the register numbers of the contents, so that any desired negative can be found in a few moments.

The following are the formulæ which I use in my daily practice:—

COLLODION.

Ether	600 parts.
Alcohol	400 „
Cotton	10 to 12 „
Iodide of ammonium	6 „
„ cadmium	4 „
Bromide of ammonium	1 part.

And a little pure sodium.

SILVER BATH.

Nitrate of silver	8 parts.
Distilled water	100 „

SILVER BATH FOR INTENSIFYING.

Distilled water	1000 parts.
Nitrate of silver	40 „

DEVELOPER.

Sulphate of iron and ammonia	50 parts.
Common water	1000 „
Acetic acid	50 „
Alcohol, at 36 per cent.	30 „

For the printing process I use—

SILVER BATH.

Nitrate of silver	15 parts.
Distilled water	100 „

TONING BATH.

Water	1000 parts.
Acetate of soda	30 „
Chloride of gold	1 part.

FIXING BATH.

Water	1000 parts.
Hyposulphite of soda	200 „

CHARLES REUTLINGER.

DIAPHAN.*

THE name *Diaphan* I give to a process that has appeared before the public during the last ten years under a variety of names; for a new name given to an old process converts the old process into a new one. This selfsame process has been patented in Australia, England, and the United States. Notwithstanding this it is public property, for it has been practised from time immemorial.

I would not dare to bring it before the public now as a new process, if I had not a special object in view, which object is to guard the public—that is, the photographic fraternity— from being duped. The picture in question is exceedingly attractive, and many of my friends have been so far enchanted with it as to pay dearly for the right of producing the diaphan, when they might have obtained it for a few shillings if they could only read. I have no doubt that those very friends who have paid their thirty-five dollars for the secret possess the work which contains a full description of the process.

The diaphan is a coloured photograph of great beauty, but no art; and it requires no artist to lay on the colours—a child can do that part of the operation. The man that is running through the country and selling county, town, and room rights, says so. He is right. There is no art required. He might still add that the process is neither new nor his property. He does not go so far as this; on the contrary, I believe, he asserts that he obtained the process in Paris. That, of course, is enough to entitle the process to honour and acceptance.

* *Phil. Phot.*

Now, let us see if I can recollect how I used to make the diaphan. In the first place you print two prints of the same negative on plain —that is, arrowroot or gelatine—paper. You will find instructions how to make such paper in the *Sunbeam*, or you can get it from your stock-dealer. Albumen paper does not answer for the production of the diaphan—at least, not for one of the prints, which is to be rendered quite transparent. The negative must possess good contrasts, without being harsh; and the prints must be printed, toned, and fixed in the usual way, and be quite bright when finished.

We will now proceed to the next step. Take one of the prints and immerse it in a colourless varnish, such as is used for the preparation of tracing paper used by surveyors, engineers, and draughtsmen. There are several formulæ for such varnish. This consists essentially of colourless Canada balsam and spirits of turpentine; to this sometimes gum mastic is added. The varnish must be of such a nature as to remain colourless for years. This perhaps is, in reality, unattainable; for all such preparations are apt to turn yellow when exposed to the air. The print, after thorough immersion and soaking, becomes quite transparent. It is taken out and hung up to dry.

Now comes the colouring part of the operation, which a child is to perform and can perform.

Rub on a ground slab of marble or of glass a cake of pink madder. Do not spare your colour. Let the child cover the face, ears, neck and arms—that is, all the flesh parts—with this colour uniformly all over the surface as far as the outlines on the *back* of the transparent print. Do not be afraid of laying on too much colour. The child understands this part better than the artist, who, in general, is rather stingy with his colour—not so the child.

If the hair of the model is auburn, red, or yellow, rub up a quantity of this colour on the slab, so that the pencil can be filled with it, and thus transferred to this part of the portrait, and laid on uniformly with a dashing boldness, but on the *back* of the print as before. Paint the dress, the gloves, the shoes, stockings, &c., each in its appropriate colour, in an artistic, slap-dash manner, without fear of consequences, so long as you do not overstep the boundaries of the objects. The child understands this and makes no attempt at shading; for this is unnecessary, existing as it already does in the photograph itself.

Now we proceed to the final operation. The two prints are now superimposed, the coloured print on the uncoloured print, and in such a careful manner that the superimposition is perfect—that is, that eye is placed over eye, nose over nose, ear over ear, finger over finger, &c., in fact so accurately that they produce in combination but one single picture. In this condition they are pressed and mounted together between too plates of clean glass, which are closed around the edges with gum-paper or cement. This combination finally may be covered with a matt and ornamental edging, and fixed in a frame or case, as may be desired.

Without any jesting, the diaphan is a very pretty picture; but there is no need of paying the piper so dear for a process which is public property.

In three years the diaphan will be again quite forgotten: another set of men will occupy the galleries. We shall then see, perhaps, an Italian or a Greek peddling the process as a new dodge of Greek painting, or of antique art exhumed from an artist's studio at Pompeii. And thus time rolls on, resuscitating ancient art by the turn of the wheel. J. TOWLER, M.D.

CARBOLIC ACID IN THE BATH.—A correspondent of the *Philadelphia Photographer* writes as follows concerning his experience with carbolic acid in the negative bath:—"I think it is the best preservative of a bath I have ever tried, having used a two-quart silver solution containing carbolic acid for over four months (and dipping on an average ten plates a day), with the greatest imaginable success, it working beautifully up to the last, and I only stopped on it, on account of the excess of alcohol and ether. Adding more carbolic acid and boiling it down, the largest amount of dirty deposit I ever saw come from a bath was the result. I added the proper quantity of water, set it in the sun for a few days, dropped in about fifteen drops of nitric acid, and the results for the last two months have been excellent, and the bath shows yet no sign of failing. For those of your readers who may wish to test this, let me remark, that it is necessary to boil the bath to dryness after adding the carbolic acid (one drachm to a quart is about right, I think). After boiling, dissolve again and filter. The solution will be of a rich red-yellow colour. Set it in the sun for a few days, make slightly acid, and it will be fit for use."

COMPOSITION.*

Landscapes.

A subject like this, to which the attention of photographers is more and more drawn, cannot be passed over in this manual; but the limits to which it is necessarily restricted will permit of a brief discussion only of a few important points.

Cultivated taste has learned that the representation of a landscape gives a completely satisfying effect to the mind most easily by complying with certain general conditions which have been reduced to fixed rules. Too slavish a compliance with these leads directly to mannerism and sameness, but some acquaintance with them cannot but be of the highest use to every intelligent photographer.

Lines of Direction—Balance.—In examining any picture we may discern certain lines of direction. These lines may be of one prominent object, or may depend upon the directions of the principal portions of a succession of objects.

It is a rule that these lines of direction should *support each other*, as in *fig.* 1, where the longer line is supported by the shorter. The longer line, for example, may be that of a distant range of mountains, and the shorter that of a tree in the foreground; or both lines may depend partly upon distant and partly upon near objects—it is immaterial. The essential point is only that the characteristic lines of the picture shall balance each other. But if the lines be all in one direction, as in *fig.* 2, or even if not quite parallel there is a want of

FIG. 1.

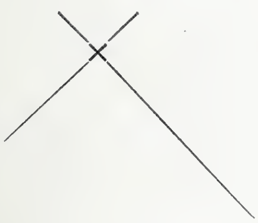
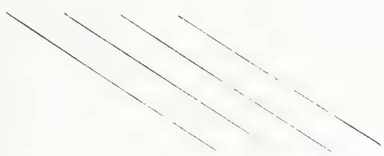


FIG. 2.



balance, and the idea of weakness and of falling is given. Moreover, the effect of the repetition of direction is generally unpleasing, though it is occasionally used to convey the idea of receding distance. In any case, however, it is necessary that these lines should be balanced)

A succession of perpendicular (see *fig.* 3) or of horizontal (*fig.* 4.

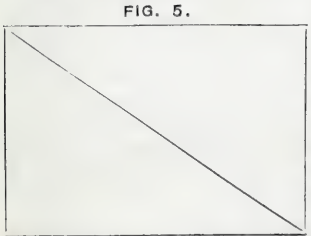
FIG. 3.

FIG. 4

ines is, for the most part, unpleasing. As an example of the former, we may take a row of straight-stemmed trees, the effect of which is infinitely less pleasing than if their directions are diversified. Parallel horizontal lines are rarely allowable; sometimes, however, they are employed by artists in "parallel perspective"—that is, where buildings are represented in full front view.

The Diagonal Line.—According to the direction into which the principal lines of the picture fall, the composition is distinguished into angular and circular. The diagonal line, the simplest form of angular composition, is exceedingly well adapted for representation of perspective, especially when, to get a better range of effect, the distance is placed at one side of the picture.

FIG. 5.



It is by no means necessary that the principal line of direction should proceed directly from one angle to the other. This angular line of direction should always be *supported*—that is, the eye carried along it should not be dropped vaguely, but fall upon some object, which, though it must be distinct, need not be large. This object is termed the "*ruling point.*" An inspection of landscapes and groups executed by artists will show how far ingenuity has often been taxed to hit upon some object of this sort in which to terminate a line of principal direction. In one of Leslie's paintings one figure is made to rest a hand (rather awkwardly) upon a table, in order that the hand may furnish such a termination. In country scenes a dog or a fowl, or any other small object in keeping with the general subject, will be introduced into the foreground. A little examination will show that its exact position has been determined by a line of principal direction, and that the object has been placed at its exact intersection with the ground. The universality of this practice seems to indicate that it is correct; the principle is evidently that, after the eye has been carried from one to another of the striking features of a picture, it should not finally fall blankly upon nothing, but that there must be some sufficient object upon which to rest. In most cases the resting point or ruling point is made dark on a lighter ground, though in some cases a lighter object than those that surround it is used.

A beautiful and familiar instance of the balance of opposing lines of direction is seen in mountains, the opposite sides of which rest on each other like an inverted ∧. So a gap between two mountains gives lines that balance each other in the form V.

Circular Composition.—Curved lines of direction are often introduced with very fine effect. Views of lakes, or of curved reaches of rivers, will be apt to fall into this form, and it is also seen in many compositions of rural scenery.

The Foreground.—The foreground is the portion generally most under the photographer's control, and those who desire to obtain the greatest success will spare no pains in the selection of this part of their picture.

The foreground should be diversified. A level, unbroken foreground of grass or meadow cannot be expected to give a good effect. It weakens the effect of the distance, and deprives the picture of much of the character that it ought to possess.

A portion of the foreground should be occupied by some dark object, whose effect will be materially enhanced if brought into immediate contrast with some of the highest lights of the picture. The best effect is for the most part attained by placing the dark object in the foreground under the farthest distance. This gives great tenderness and softness to the distance, causes it to recede from the foreground, and at the same time supports it by lending firmness and foundation to it. Too much attention to this point cannot be given by the landscapist, who will, however, often have his patience and ingenuity taxed to the uttermost to find anything like a satisfactory foreground to his pictures.

The Distance.—The distance should never find its place exactly in the middle of the picture, which by such a disposition becomes divided, as it were, into two equal halves.

A peculiar pleasure is given when the eye is conducted from the foreground to the distance by lines of direction. These lines may be one or both banks of a river or stream, a picturesque road, or other object. The leading should be rather by broken and diversified lines than by straight ones.

A certain pleasure is communicated when objects in the middle distance are repeated in the farther distance. Such a repetition is not to be by the same object, but rather by some other object in strict keeping. This rule is closely allied to one in painting. It is laid down in painting that if a particular colour be introduced in one place only it has the effect of a spot or blot; the colour must be carried through the picture, or at least part of it, by recurring here and there. As in colours so in objects. If trees are seen in the foreground or middle distance, the eye is gratified by seeing them reappear in the distance. If a cottage or other building be a conspicuous object in the foreground, the eye likes to see something similar in the distance.

The effect of a high light in the extreme distance is greatly enhanced by placing a dark object in the foreground directly under it. This acts partly by throwing the distance farther back, and partly because the light becomes lighter and the darkness darker through contrast.

Contrast.—Some of the highest pleasures which the eye is capable of enjoying depends upon contrast. Contrast is of various kinds. Of *light*, where the artist throws his deepest darkness against his highest lights, thus strengthening both. Of *size*, where the greatness of the majestic oak is made more apparent by the shrubs or bushes at its base. Of *form*, where the grand elevation of the mountain is further ennobled by the level lake or plain at its foot. Of *character*, as when the graceful lines of pine trees are contrasted with rugged roughness, as in Alpine hills. Of *season*, as when winter snows look down from the mountain upon summer verdure in the valleys beneath. Of *mass*, as when light clouds, the lightest of all visible objects, rest upon mountains, which, of all natural objects, give the most striking effect of weight. In a word, the beauty of contrast is that which most completely pervades all nature. All our ideas are formed by comparison, and contrast is comparison in its most vigorous form.

* From Lea's *Manual of Photography.*

Repetition.—The repetition of lines of direction, as has been already said, is for the most part unpleasing. Introduced into a group, it gives the effect of a range of figures on a frieze, or the composition of a pre-Raphaelite painting. In landscapes it is equally objectionable.

But the repetition of objects themselves is often very pleasing. The echoing of a near object by a distant one has been already spoken of; but perhaps the greatest beauty of repetition is where we see objects mirrored in calm water. Few persons are so utterly destitute of the sense of the beautiful as not to appreciate, however imperfectly, the charm of this exquisite reflection. The commonest object may in this way be rendered beautiful and attractive. A log, a branch, a boat, insignificant in themselves, immediately acquire a charm by being repeated in the water. Often the inversion that accompanies reflection materially adds to the charm by the variety which it affords, or by forming, as a reflection often does when looked on in connection with the object itself, a charming symmetrical figure.

Atmospheric Effect.—When a scene in nature, embracing objects at various distances from the spectator, is depicted upon a flat surface, we are enabled to distinguish between objects near and distant in two different ways.

One of these is *linear perspective.* By virtue of it distant objects are diminished in size and brought closer together, thus giving to the eye the information that they are proportionately remote.

But the effect of linear perspective is greatly enhanced by another agency, to which the name of aërial perspective, or, better, atmospheric effect, has been given.

The atmosphere in its usual condition is not wholly transparent, but interposes an exceedingly delicate veil, imperceptible indeed as respects neighbouring objects, but becoming more evidently distinguishable as the distance increases. The eye is thus greatly aided in judging distances, which it unconsciously computes by the extent to which the softening effect of the atmosphere reaches.

If this softening effect of the atmosphere be studied, it will be found to act as follows:—

1. *It diminishes contrasts.*—Dark shadows lose something of their darkness, high lights of their brightness. This opposite effect of the atmosphere on light and on shade needs some explanation. Lights lose parts of their brightness by reason of the slight opacity of the atmosphere through which they pass. But the darkness of the shadows is partly lighted by the light which falls, not on them, but *on the atmosphere through which they are viewed.* We have a familiar example of this in the sky itself, which is only the deep shadow of the outer darkness of space viewed through a not perfectly transparent medium, which medium is itself lighted up by the sun. In clear weather the sky is deepest in colour, because there is less opacity in the atmosphere to receive and reflect the sun's light. On a high mountain the sky is darker still, and at very great elevations appears almost black.

2. *It obliterates details.*—Smaller objects and parts of objects easily distinguishable when near by, cease to be so in proportion to the distance to which the object is removed, and of this the eye takes due note and recognises the cause.

3. *It softens outlines.*—The dead limb of a tree near by, for example, cuts boldly and sharply on the sky, but the outline of a trunk upon a hill in the middle distance is already somewhat softened, and the outlines of distant mountains are still more so.

Consequently atmospheric effect tends to give soft greys and middle tints to distant objects, and to efface all sharp contrasts of light and darkness. Lines also cut each other less sharply. In nature we find a very wide range of variety as to this influence. When the air is very free from moisture, as on some of the arid plains at the base of the Rocky Mountains, atmospheric effect almost disappears, and distant objects appear unnaturally and deceptively near. It is not too much to say that the capacity of the eye for judging correctly of distances is actually destroyed. From this extreme we may pass through every degree to the other, when the air is so laden with mist that near objects seem farther and distant objects disappear altogether.

It is a curious fact, and one of the highest importance for the photographer to understand, that both the process which he uses and his lenses themselves may have a great influence on the amount of atmospheric influence which will appear in his pictures.

There are certain photographic processes by which the distance is rendered with more sharpness than others. In the common wet process, for example, the tendency is to slightly increase the actual atmospheric effect in the scene photographed. In the glycerine and honey process the atmospheric effect is always increased to a greater extent than by the wet process. With the dry processes the distance is more apt to be sharp cut, and clear.

The lens has likewise something to do with this rendering, though its action has been by some writers a good deal exaggerated; it is the size of the diaphragm used that has more to do with the atmospheric effect than the lens itself.

A large diaphragm will always tend to *increase*, a small one to *diminish*, aërial perspective. This is caused in two distinct ways, co-operating to the same result. For a small diaphragm will always greatly increase the depth of focus, so that when the focus has been taken, as it always must be, on near objects, a small diaphragm will cause the distance to be in sharp focus also. This will increase the detail of the distance, and as it has been already shown that one way in which atmospheric effect shows itself is in tending to obliterate detail, the greater depth of focus necessarily tends to counteract the effect of the atmosphere. Again: a small diaphragm always tends to harshness of contrast, and it has been also shown that aërial perspective especially shows itself by diminishing contrast. Clearly, therefore, aërial perspective will be produced in direct proportion to the size of the diaphragm. This explanation tends to throw additional light upon the fact that a large stop materially aids the effect of distance by placing objects in their proper planes of distance from the eye.

It is, however, sufficiently apparent from what has been previously said, that lenses will differ somewhat amongst themselves, independently of the diaphragm, as to the rendering of atmospheric effect, inasmuch as some have greater depth of focus than others.

Those photographers who are accustomed to plant their cameras in front of any conspicuous object, satisfied if it covers enough of their plate—and, if they can get a clean negative of it, will naturally, in the same spirit, endeavour to get the same sharpness in the distance (so far as practicable) as in the foreground — such will be found working with small diaphragms and acid baths, and getting technically perfect negatives which will yield prints that no one cares to look at a second time—prints which are a reproach to photography.

It must at the same time be very clearly understood that the writer is as far as possible from wishing to say that a photographic landscape should show a clean cut foreground, and a hazy, woolly-looking distance. No rules must be carried to excess, or the truth and beauty that result from them are destroyed by exaggeration. That objects several miles away should be as distinct and sharply cut as those near at hand is unnatural, or at least occurs in certain regions and in peculiar states of the atmosphere only, with which we have not here to do. It cannot be right, therefore, and it certainly is not pleasing to an educated eye, that they should be so represented in a photograph or in any other form of delineation. As already said, the landscape painter, with this matter under his absolute control, always softens the distance.

A QUICK DRY PROCESS.*

I recently received a letter from a gentlemen engaged in aërial photography making inquiries of me (by introduction from yourself) of the best method of taking instantaneous negatives on dry plates. It appears that he has been using the wet process, but his work requiring some little time to elapse between the sensitising of the plates and the exposure, found in consequence considerable trouble in keeping them in a suitable condition to make a clean and perfect negative. Presuming there might be a dry process that would answer his expectations, he wrote to me, asking for my experience and advice in the matter. I therefore answer his inquiry with a formula that I have no doubt will satisfy his desire, and at the same time make the Journal a means of communicating the same to others who may wish to work a very satisfactory quick process. The formula is based on the old honey process of Maxwell Lyte—a man to whom many of the old photographers are under many obligations. He gave to the craft the metagelatine process; the phosphate of soda toning bath; was one of the first to recommend the use of bromides in collodion; and the first who recommended and brought into use bromide of ammonium in collodion.

In using the formula below, it is taken for granted that the nitrate bath has been prepared with care, and that all the chemicals, especially the honey, are pure. The honey is, however, better old than new; a pure sample having formed crystals of grape sugar will give the best results. The development is by the pyrogallic acid method; the solution to contain the least quantity of restraining agent possible to work a clean negative with:—

Honey	4 ounces.
Water	6 „
Nitrate of silver	100 grains.
Alcohol	4 drachms.

* Phil. Phot.

This solution, after standing some time, is to be filtered bright, and on after-sensitising the plate it should drain for about one minute, and then the honey solution should be flowed over it twice or three times, letting it drain into a separate vessel, to be returned into the stock-bottle after the day's work is done, to be used again at the next opportunity, first filtering as before. The plates will keep for an hour or two in warm weather, and are the most sensitive of any that I have had experience with, being in fact quicker than the wet process. They require great care in developing, but to one who is used to the dry-plate practice will give no trouble. It is best to give the plate a substratum of a very thin solution of albumen, as the film is very apt to slip. I do not recommend a powdery collodion for this process, nor in fact for any dry plate; but I do find that collodion that works best wet is also best for the dry. The substratum has altogether obviated the necessity of a powdery film.

J. J. BARDWELL.

Meetings of Societies.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Society was held on Tuesday evening, the 27th ult., at the Free Public Library, William Brown-street,—Mr. J. Henderson, Vice-President, in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. J. S. Tyerman was elected a member of the Association.

Accounts were given of the two excursions. The first to Chirk, on the 7th ult., was very satisfactory, and many good views were taken there. The members expressed their appreciation of the kindness and thoughtfulness of their President on that occasion, who, in addition to his invitation to the members to dine with him, presented to each a print of the group photographed by him at Chirk. The group was taken on an ordinary collodio-bromide plate, and was most successful. A hearty vote of thanks was passed to the President.

The Rev T. B. BANNER complained of the laxity of members in not conforming to the Secretary's wish to make known to him their intention or otherwise of going to the excursions, without which no approximate notion could be formed of the probable number of the party until the last moment.

Mr. HIGGIN gave an interesting account of the Miller's Dale (Derbyshire) excursion on the 21st inst.

The CHAIRMAN deemed it advisable to have another excursion before the summer expired, but considered one excursion during any month as much as business and other engagements would permit of.

Mr. HUGHES advocated arrangements being made by which the Association could visit different localities in company with the Naturalists' Field Club, and this idea was warmly supported by Mr. Murray and others who were connected with that body, the advantages offered being cheapness and convenience of transit, but nothing was decided upon.

The sweepstakes for the best picture taken on the excursion to the Valley of the Weaver last month was drawn by Mr. Higgin, being awarded by the appointed judges, Messrs. Hughes and Murray. The prints were afterwards presented for the Society's album.

During the evening prints were exhibited by the Rev. T. B. Banner, Messrs. Guyton, Murray, Higgin, Mawdsley, and Henderson, the latter gentleman also contributing some fine prints of Californian scenery taken in the Yosemite Valley.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A GENERAL meeting of this Society took place on the 2nd ult.,—M. Balard in the chair.

The CHAIRMAN announced that the Exhibition at the Palace of Industry, which was to have closed on the 31st of July, is to be kept open till the end of October next.

M. Baldus exhibited two proofs of photographic engravings intended for his collection. One of them was obtained by him in 1850, and the other figured at the Paris Exhibition of 1855. M. Baldus also exhibited a heliographic engraving representing a detail of the ceiling of the Louvre.

M. Ch. Cros presented a pamphlet published by him, entitled *Solution of the Problem of Photography in Colours.*

M. Marion presented a pamphlet which he had just published, bearing the title of *Initiatory Catalogue* of the old and new processes.

M. Marconi presented to the Society some positive proofs obtained by a process which consisted in immersing sheets of albumenised paper in a particular bath, of which he did not give the preparation, and the effect of which was to coagulate the albumen. The sensitising took place afterwards in a silver bath of two or three per cent.

M. Blanc had addressed the following note to the Society, on the washing of dry collodion proofs:—"I have endeavoured to utilise, for the washing of dry plates, the property which zinc possesses of decomposing solutions of nitrate of silver. For this purpose I divided a box of zinc into five compartments, forming five vertical baths, and for the last three years I have washed my dry collodion plates in this box. I filled the first compartment with rain water and the others with ordinary water, making the plates pass through them successively. They are thus washed rapidly and completely. The only precaution to be taken is that of rinsing the plate, on leaving the silver bath, with a little rain water. That, however, is not absolutely necessary, and I have frequently omitted doing so from the want of a sufficient quantity of it. This box having a lid, permits the operator to leave his laboratory and return at pleasure. Besides occupying a small space, it is very economical, and has not cost me more than five francs for half-plate glasses, and the box will contain ten plates by placing two, back to back, in each of the compartments. For persons who may desire to make them, the following are the dimensions for the half-plate size:—

Height	20	centimètres.
Length	30	,,
Width	15	,,

It would be difficult, I believe, to find any other combination which admits of five baths being united in so small a space."

M. DAVANNE observed that the decomposing action of zinc upon nitrate of silver set at liberty a precipitate of metallic silver in a state of minute division, which adhered to the side of the bath, and which the photographer should be careful to avoid transferring to the collodion layer.

M. CLOUZARD addressed some observations to the Society on the employment of baths of varnished wood. The first wooden vessel which he made use of became often unglued when cold by the sole action of the silver bath. This bath had been glued with strong size. Though varnished with the greatest care moisture had reached the glue, and little by little dissolved it. Perhaps the bath mentioned on a former occasion by M. Gobert had been glued in the same manner; but, having discovered the difficulty, he (M. Clouzard) caused a vessel to be fastened with a mixture of one part of marine glue and four parts of gum lac, in thick solution, with turpentine. Further, he nailed this bath with brass nails, which were much less liable to be attacked than iron. In addition to this precaution he also glued the junction of the sides—a triangular moulding, which prevents the filtration at the sides, gives solidity, and renders the cleansing easy, the acute angles of the bath being filled thereby. He had tried the following means for giving to the varnish greater thickness:—He first sized, with glue and gum lac, a sheet of thick blotting-paper, which he then varnished until it shone; the body of varnish with which the wood was covered was equal to the thickness of a sheet of blotting-paper. According to all probability a body of this thickness will preserve the wood from any attack of humidity. He thought since that, instead of varnish, the wood might be impregnated with gutta-percha, caoutchouc, or paraffine. These substances are not more impermeable than the varnish, but they resist better the agents employed in photography; for the cyanide dissolves varnish, and, according to the experience of M. Gobert, ammonia dissolves it also.

A MEMBER remarked that if the substitution of brass nails for iron had in reality the advantage pointed out by M. Clouzard when speaking of acids, that advantage disappeared when treating of the nitrate of silver, which the copper dissolved as rapidly as iron.

Dr. Ozanam presented and operated with his apparatus for reproducing by photography the beatings of the heart and pulse. He also presented therewith the following note:—

"The mathematical precision with which light fixes, instantaneously, the form of objects, has made me desirous, for a long time, of applying photography to the faithful reproduction of the course of the blood in the vessels of the human body. I am now going briefly to explain by what means I have succeeded in realising this idea, by means of a new registering apparatus.

"It was necessary, in the first instance, to fulfil four conditions, in order to arrive at the desired end:—

"1. To reproduce the artery, artificially, by a tube or vessel, the transparent sides of which would allow the light to penetrate freely and in such a manner as to be seen.

"2. To imitate the blood by a liquid column, the level of which might be influenced each moment by the impulsion of the blood, and which, rising or falling in the tube without wetting or colouring its sides, did not interfere with its transparency.

"3. To inscribe the undulating line represented by the liquid surface, by means of an apparatus bearing a paper or glass ready to receive the impression of light everywhere that the lowest level of the liquid permitted it to enter.

"4. To enclose these different elements in a dark chamber conveniently placed for the operator.

"These four conditions are obtained by the apparatus which I have the honour to submit to the Society, and which I have had constructed by M. Bréquet."

A small camera thirty-five centimetres long, twelve high, and four in depth, contains the whole of the instrument. It is quite portable, and divided at half its height as by the lid of a box. During the preparation all elements of the apparatus are perfectly open. About the middle of the length a cursory tube covers and uncovers at pleasure a longitudinal vertical slit, very narrow, and by which alone the light can penetrate. It is along this slit that the artificial and transparent artery is placed, composed of a tube of glass, the cavity of which, one millemetre wide, encloses mercury to simulate blood.

(To be concluded in our next.)

Correspondence.

Foreign.

Montgomery Co., Pa., July 17, 1869.

By the extracts given in the photographic periodicals, I see that Mr. Blair claims, as a special novelty in carbon printing, the idea of rendering the support *temporarily* transparent by the application of a volatile liquid. Mr. Blair is an ingenious and indefatigable experimenter, but if, as I understand it, this idea be claimed as novel at the present day, there is certainly a mistake. I tried it several years ago, and, after experimenting with it at intervals, published it some time ago. I cannot cite page and line, as I have just now no photographic journals at hand. I tried various substances for rendering the paper transparent, and found nothing equal to *essential oil of sassafras.* Some sorts of paper—for example, the thin, hard, French letter paper—were rendered so perfectly transparent that when laid over a card portrait the latter was scarcely more affected than when seen through glass. In half-an-hour or so the essence had wholly disappeared, and the paper had returned absolutely to its original condition.

But in applying this idea I found (and, I think, mentioned in print) exactly the same difficulty that Mr. Blair now speaks of. The bichromate solution penetrated unequally into the paper, and the print had a granular effect, which was evidently greater by a good deal than could have resulted from any granularity in the paper itself after treatment with the essence.

At the same time I remember trying *wax*—that is, using waxed or paraffined paper, to which the wax, &c., had been applied *before* the sensitive pigment. You will easily understand that the object was by filling the pores to keep the bichromate on the surface, and so avoid the granular effect due to its absorption. But then I was met by another difficulty—insufficient adherence of the pigment to the waxed surface. You will understand that, in using the wax, my idea was eventually to dissolve it out with some suitable solvent, in order to restore the paper to its normal opacity. My mind was so full of this idea that I experimented also with a large number of varnishes for rendering the paper transparent.

I do not see the use of further argument on the pyroxyline question. I stated certain facts with respect to the preparation of pyroxyline as having been communicated to me by an intelligent and skilled manufacturer, adding that I believed his opinions to be correct. After all that has been said, if I were now about to prepare negative cotton I should certainly act upon my informant's views, which I believe to be altogether more reliable and correct than Mr. Dawson's. As a specimen of the random assertions with which I have been met, it has been affirmed that I presumed to express opinions on the subject without having ever prepared pyroxyline!

In the matter of collodio-bromide plates, also, Mr. Dawson affirms that plates cannot be prepared smoothly by my formula. It would have been altogether better for him to have said that he could not so prepare them. I have found no serious difficulty. It is a little easier to extend a collodio-bromide with a less proportion of solid matter, such as I at first published; but, having carefully compared plates prepared in that way with those made in the manner that Mr. Dawson objects to, I found the latter give a considerably increased sensitiveness and detail, and I had no hesitation in adopting it for my own, as I very easily got into the way of getting it smoothly over the glass. I do not doubt that when Mr. Dawson shall have worked at collodio-bromide as long as I have done, he will acquire greater facility in the manipulations.

In a journal that has just reached me Mr. Sutton, under date of July 2, announces that he has obtained a new dry process of extraordinary sensitiveness. I hope this is really a novelty, and not a mere modification of the collodio-bromide. The degree of sensitiveness claimed by Mr. Sutton, namely, obtaining a good negative by fifteen seconds' exposure with an opening of one-tenth the focal length, is certainly not remarkable. My own collodio-bromide process exceeds that. It is, in my belief, the most sensitive dry process known. It has several distinctive features which separate it entirely from *all* processes formerly published. One is that the plate, after sensitising, *is not washed*, but is immediately plunged into the "preservative" bath. This not only saves much trouble, but also makes the operator *entirely independent of the character of the water he uses*, and bad water is known to be a most annoying source of failure with dry-plate work; but the non-removal of the nitrate materially adds to the sensitiveness of the plate.

Another distinctive feature, and, like the foregoing, an original idea, is the addition to the preservative bath of a colouring matter to prevent blurring. Red litmus is what I use, and this colour not only does not in any way affect the sensitiveness of the plate, but rather adds to it.

No one, I think, who gives a fair trial to these improvements will ever consent to give them up, and the process of which they form a part is, in my belief, the best dry process known.—Very truly yours,

M. Carey Lea.

Home.

PHOTOGRAPHIC LENSES AND NICOL'S PRISMS.

To the Editors.

Gentlemen,—"Three times of asking" is an ecclesiastical formula I well understand, and I have now been "asked" three times to describe a practical method of avoiding the reflections from foliage caused by polarised light.

I have made some experiments, and not unsuccessfully, by placing a Nicol's prism between the lenses of a portrait combination. The experiments are in progress, and I hope on an early day to give your esteemed correspondent some satisfactory information.—I am, yours, &c.,

Bishopsbourne Rectory, Canterbury, Aug. 3, 1869. J. B. Reade.

SURFACE MARKINGS.

To the Editors.

Gentlemen,—I have read with deep interest all the Journal has, of late, contained respecting "surface stains," being one of the unfortunate ones who have been sadly bothered with them.

I have just been reading, in the present number, our friend John Fielder's remarks, &c.; but I find that, like the other ills that flesh is heir to, the same remedy will not effect a cure in every case.

Removing the scum and drilling holes in the plate-holder for silver wire I have tried, but without permanent success. Many things I have tried have been successful for a time, and I then rejoiced in having found a remedy; but soon my hopes have been overthrown, and I have been at sea again. I believe, with Mr. Fielder, that the bath and the plate-holder are the causes of the evil; but *how* they are so, I am at a loss to know.

I find that if a fluted dipper be used, the marks are ribbed like the dipper; if a plain one, I get marks like a smear from a dirty finger or thumb. One porcelain dipper which I could for a time use when all the others failed, at last turned out like the rest, and brought a sort of waves.

What puzzles me is this. I always have the marks about the same distance from the *bottom* of the bath—about an inch or so. The only way I can overcome it is by having the stop on the foot of the dipper about the same distance from the end, thus keeping the plate from going so far down.

I have, for the last two months, been trying fresh samples of collodion and silver—in fact, everything—but I cannot get rid of the stains in any other way. There is the evil; it can be seen, though so near the top of the negative as to do no harm.

I should be glad to drive the enemy out altogether, and shall still look into the Journal with the hope of finding how to accomplish it some day, but I have failed to do so yet, having tried all the means as yet prescribed without a cure.

If you think it worth while to publish my remedy, and it should help one poor photographic brother bothered as I have been, I shall be glad at having thus made it public. Has anyone before observed that the stain is always about the same distance from the bottom of the bath?—I am, yours, &c., Photo.

Post Office, Cam, Dursley, August 2, 1869.

IMPURITIES IN WATER.

To the Editors.

Gentlemen,—Your correspondent "Another Professional" misunderstands me. It is not the mere turning on or off a water-tap to which I object on a Sunday morning, but the hanging up of four or five hundred prints to dry.

The particular kind of water that I use is that supplied by the West Kent Water Company. It is admitted to be impure, but what the impurity consists of I cannot say. As the nature of the impurity varies so often in this water—changing so much that it is not two weeks alike—an analysis would have to be made almost every day.

I question much the propriety of purifying water by a pinch of oxide of manganese when it is to be employed for washing photographs; still, I should like to be informed what its probable action would be. Respecting the trace of sulphuric acid suggested and its effects I am in no doubt whatever. This acid will decompose the hyposulphite which remains in the prints, and, sulphur being liberated, the prints will be sulphur-toned—a thing not to be desired.

In my washing trough the plan I adopt is this:—I have a piece of brass gas tube, bent in a circular form, and pierced with holes all round. This remains at the bottom of the trough. A piece of India-rubber tube serves to connect it with the supply pipe. By this arrangement the prints are kept in a continual state of agitation when the water is turned on. Although the slime to which I alluded may, in some instances, be found in the prints themselves, its presence is very perceptible when the fingers are pushed down the side (inside) of the trough. Immediately when that part is reached which is usually covered by the water, the peculiar slipperiness is very apparent.

Your correspondent has not, after all, I beg to remind him, given me the information I asked for, viz., *what* the slime is?—I am, yours, &c.,

August 4, 1869. A Professional.

PAPYROXYLINE.

To the EDITORS.

GENTLEMEN,—As you remark in your *Answers to Correspondents*, I am "not the inventor of pyroxyline composed of paper." You could have found many other persons who are not the inventors of this substance.

Although I am a manufacturer of papyroxyline, you will kindly remember that in a paper *On Papyroxyline*, which was read before the Marseilles Photographic Society, and afterwards published in THE BRITISH JOURNAL OF PHOTOGRAPHY, I distinctly stated that paper collodion was an old thing in photography. It would be curious if a man who has been for ten years the editor of a photographic journal did not know this.—I am, yours, &c., DR. LIESEGANG.

32, *Boulevart des Italiens, August* 1, 1869.

[Our friend, Dr. Liesegang, slightly misunderstands the nature of the paragraph among our "answers" to which he refers. The information there given was in reply to a correspondent who adopted "Papyroxyline" as his *nom de plume*, as was evident from the inverted commas attached. The various jottings given under the heading *Answers to Correspondents* are simply replies to questions or letters received from correspondents, to each of which we prefix the name, initials, or *nom de plume* of the writer; hence the answer referred to merely conveyed the information sought for by the querist—nothing more.—EDS.]

PHOTOGRAPHERS *IN TRANSITU.*

To the EDITORS.

GENTLEMEN,—Seeing Mr. Cole's letter in the Journal for this week, I write to state my experience as regards the custom-houses abroad. I have passed the frontiers of France, Baden, Switzerland, Italy, Wurtemburg, Holland, and also the custom-house at Leith, and on declaring the dry plates I had (two boxes of fifty each) to be such, and stating that light would destroy them, I invariably succeeded in passing them quite easily. In Italy, indeed, where the authorities are very strict, they were a little doubtful, but on my taking up a box and shaking it they were quite satisfied.

I would suggest that plate-boxes with *locks* would be most protective against emergencies, such as passing a frontier by diligence. For my part I should certainly never feel it safe to carry dry plates in unlocked boxes. Rather than have yellow windows in the boxes, why not offer to show the contents in a darkened room by candle-light.—I am, yours, &c.,

July 30, 1869. E. B.

THE REPORTING OF MEETINGS AND CONDUCTING OF THE PHOTOGRAPHIC JOURNALS.

To the EDITORS.

GENTLEMEN,—Much has been lately written respecting the manner in which the proceedings of the photographic societies should be reported in the journals, and a *verbatim* report has been advocated. Now, it is well known that when there is no special paper read before a society the meeting is a purely conversational one, and methinks a *verbatim* conversational report would be supremely ridiculous; however, it is not my intention to say anything upon this branch of the subject.

The reports of what has taken place at the various home and foreign photographic societies are, I believe, considered to be an interesting feature of the English journals by the generality of their readers.

I think every one who takes any interest in the various branches of photography will agree with me when I say that whenever anything of an interesting, novel, or startling nature is brought before a meeting of any photographic society, it should be reported in the accredited journal of that society; and, moreover, that whenever a report is ordered to be made upon any subject at a future meeting, that report should also be published; and if this interesting, novel, or startling statement be but a mere idea, and is published in a foreign journal, it should be re-published in the English ones.

I am sorry to say that, from my inability to read any other language than my own, I am, like many other persons, entirely dependent upon the English journals for my knowledge of what transpires at the meetings of the foreign societies. Through this medium I have been made aware of any interesting, novel, or startling subject having been brought before a foreign society; and, also, that a report upon the subject has been ordered to be prepared for a future meeting.

It has sometimes happened that this said subject has been one in which I take a keen interest; but, from being unable to read any foreign language, I know not whether such ordered report has been published or not, for I have often been disappointed to find that the English journals have afforded no further information on the subject, as they have omitted—for months together—all notice of the proceedings of this foreign society.

I would fain ask, *ought* this to be the case? and I think I may venture, without fear of contradiction, to answer, most assuredly it should *not* be the case.

I could adduce several instances in which interesting subjects, well worthy of investigation, and startling statements—startling from their evident fallacy—have been thus treated; but I only wish to draw attention to the subject.

If, then, the worthy Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY will not deem me impertinent in offering a suggestion, I would advise that they keep their readers conversant with the proceedings of the various foreign societies; and that, whenever they publish anything of an interesting, novel, or startling nature which has been introduced in any such society that they take a note of it, and see that whatever else is published on the subject is also re-published in THE BRITISH JOURNAL OF PHOTOGRAPHY.—I am, yours, &c., GEORGE PRICE.

[A single word in reply to the concluding remark. We invariably publish every item of continental photographic information, so far as such is to be ascertained from continental journals, omitting nothing that we deem to be of value or interest to our readers.—EDS.]

SOCIAL MEETING OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.—In accordance with what is now becoming almost a time-honoured custom, the members of the South London Photographic Society met, by invitation, on Saturday last, at the residence of their president, the Rev. F. F. Statham, M.A., F.G.S., to partake of his hospitality and to spend the evening. The meeting was of the usual pleasant and genial character that we have, year after year for some time past, described it to be. Among the toasts given, none were more hearty or heartfelt than that in which the members expressed their kindly sentiments towards their respected president. Agreeable conversation and music caused the time to pass swiftly, the meeting breaking up at a late hour.

PHOTOGRAPHY AHEAD.—One of our Yankee subscribers was in the habit of keeping his place open on the Sabbath, upon the plea that it was necessary to accommodate those who were unable to have their pictures made any other day. The municipal authorities interfered, however, and made him close up. Not to be beaten, he secured one of Mr. Proctor's night photographic inventions, and then branched out in the following advertisement, which we clip from a local paper:—"The invention of this instrument is calculated to effect a wonderful change in the business of photography, and is the grandest achievement in aid of *morals* and *religion* of the present age, as it is hoped that photographers will now no longer be importuned to break the Sabbath by those whose business confines them during the week, but come to —— street during the evening. The inventor could hardly have *foreseen* the bearing his invention would have upon the morals of the community; but, like many other valuable inventions, its greatest service is in a direction least calculated upon. Remember, 24 —— street, from 7 o'clock A.M. to 10 o'clock P.M."—*Phil. Phot.*

BEHAVIOUR OF CHLORINE, IODINE, AND BROMINE TOWARDS A SOLUTION OF PERMANGANATE OF POTASSA.—M. W. Lindner says when to any solution containing a compound of iodine a drop of a dilute solution of permanganate of potassa is added, the peculiarly characteristic colour of the latter substance is changed into brown—that is to say, that iodine is set free and the permanganate reduced. It does not matter whether the original solution of the iodide has an acid or an alkaline reaction; for, in the former case, the fluid will be clear and transparent, in the latter turbid. A neutral solution of a bromide is not effected by the permanganate, neither is an alkaline solution; but if the solution of the bromide is acidified with nitric acid, the reaction, on addition of the permanganate, takes place in the same manner as for the iodide solution. A solution of a chloride is never, under any conditions, acted upon by the permanganate. The author states that, even when solutions of iodides or bromides are so dilute as hardly to be detected by nitrate of silver, the permanganate never fails to detect the presence of them, but does not, at the same time, distinguish between iodine and bromine, for which purpose the specially-distinguishing reagents for these two halogens have to be applied.—*Chemical News.*

THE GLASS USED FOR LIGHTHOUSES.—The special composition of the crown glass used for the light apparatus for lighthouses was, until quite recently, kept a secret by the manufacturers of Saint Gobain, in France, and some firms in Birmingham, which had the monopoly of this branch of trade. From the researches of David M. Henderson, C.E., published in *Dingler's Journal*, we are able to furnish the recipes for both of these. The French glass is composed of—

Silicic acid	72·1	parts.
Soda	12·2	,,
Lime	15·7	,,

Alumina and oxide of iron, traces. In Birmingham it is made from the following mixture:—

	cwts.	qrs.	lbs.
French sand	5	—	—
Carbonate of soda	1	3	7
Lime	0	2	7
Nitrate of soda	0	1	0
Arsenious acid	0	0	3

The best qualities of this glass are at present produced in the Siemens furnace.—*Scientific American.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

An excellent cabinet lens is offered for a binocular stereoscopic camera, and $6\frac{1}{2}$ by $4\frac{1}{4}$ double achromatic lenses.—Address, J. B., 8, Old Bond-street, Bath.

I wish to exchange a quick-acting *carte* lens, by Voigtlander, for a Kinnear camera; difference in value can be arranged.—Address, H. V., 8, Stockwell-street, Greenwich.

I will exchange a forty-eight-keyed English concertina, double action, in rose-wood case, for a bellows camera for plates $3\frac{1}{4} \times 4\frac{1}{4}$ to 8×5.—Address, M. C., Cheap-street, Sherborne, Dorset.

I will exchange a quarter-plate lens with rack and pinion, and Shepherd's 5×5 square camera with focussing screen, and one dark slide and three carriers, for a half-plate portrait lens with rack and pinion.—Address, H. L. B. JACKSON, High-street, Skipton-in-Craven, Yorkshire.

The subscriber has several excellent photographic lenses, namely, *carte-de-visite*, by Ross, ditto quarter-plate, Jamin's patent, with extra lens, and a *carte* or half small size, by C. Burr, London; also, four volumes, handsomely bound, of the *Journal of the Photographic Society*, and two volumes of Sutton's *Photographic Notes*. These, or either, will be exchanged for some other useful photographic articles.—Address E. LOCKYER, Photographer, &c., Ringwood, Hants.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

A. E. Lesage (Dublin).—*Six Portraits of the Most Rev. N. M'Cabe, Bishop of Ardagh;* and *one Portrait of His Grace the Most Rev. Michael Kieran.*

A. E. L. (Dublin).—It arose from an oversight, which was immediately rectified.

R. C. M.—The series of articles hinted at is already in course of preparation, and will be commenced in an early number.

A. B. (Liverpool).—As is usual in such cases, the negative you sent to us was completely smashed when delivered to us by the postman.

T. N. (Birmingham).—Instead of three grains of chloride per ounce of the solvent you must increase the strength to eight grains.

SCOTUS.—Received. Thanks. In respect to your query the subject is not of sufficient importance to warrant our devoting an article to it.

R. OWEN.—A solution of starch will make a "rough and ready" substitute for ground glass if properly applied, but of course it is not equal to ground glass.

NEOPHYTE (London).—Mr. Hardwich was at one time the teacher of, or "lecturer on," photography at King's College. He is now a minister of the Church of England.

CHEMICUS.—It will be much better to use plain pyrogallic acid solution. You will find it more manageable than protosulphate of iron. The latter will develope collodio-albumen plates, but not in a manner to equal the former.

PUZZLED (Belfast).—It might be well for you to try another sample of collodion before deciding that the bath is wrong. As you observe, *something* must be wrong; but, in our opinion, it is neither the developer nor the silver bath, as you suppose, but the collodion that is at fault.

MARY B——.—If the specimen enclosed be a fair sample of your ordinary work, you are worthy of taking a very high rank among the best of our manipulators. We are gratified at the results you have obtained by the lens we advised you to get. In all our experience we have never seen a sharper portrait.

G. B. (Darlington).—Why waste your time in trying to doctor an apparently irrecoverable silver bath instead of at once throwing down the silver and selling it to the refiner? If you were a mere experimentalist we should advise you to work away until you get it into proper condition again; but, as you appear to depend upon the performance of the bath, we unhesitatingly advise you to procure a new one.

MANCHESTER MAN.—We regret that we cannot inform you the cost of the degree "Ph.D." In *some* places it is said to cost five pounds, while in others it may be secured by the aspirant "standing" a champagne supper. Few respectable universities, however, now bestow the degree upon such easy terms. When conferred in this country the recipient is usually some one who has distinguished himself by research in physical science.

PONS ASINORUM.—The substance inquired about—protoxide of nitrogen—is the well-known nitrous oxide or "laughing gas." It is not used by photographers, but it may be employed by them after business hours with much amusement. It is prepared by heating nitrate of ammonia in a suitable retort, the gas then being liberated. When inhaled it causes a brilliant flow of ideas and an irresistible tendency to laughter. It is also used as an anæsthetic.

D. MARKS.—It will afford us pleasure to receive an account of your experiments in polarisation. If you call at our office when you are next in town we will give you the demonstration sought for. Those Nicol's prisms to which we have access include too narrow an angle of view to permit the experiment you speak of being effectively tried, and a tourmaline is quite out of the question, on account of its colour. We are busily engaged in trying to solve the problem hinted at in as easy and effective a manner as possible, and trust that we shall succeed very soon in doing so.

GEORGE WHYTE.—Use a sixty-grain bath, and the faults of which you complain will be remedied. For some kinds of paper a weak bath will answer, but most of the papers now in the market require a sensitising bath much stronger than you have been in the habit of employing. This is a matter which is regulated by the quantity of salt in the albumen.

BRISTOL AMATEUR.—Exactness in the proportion of your developer is not of consequence. When twenty grains is stated you may depart from this quantity a few grains either over or under without producing any ill effect; but it is different in the development of collodio-bromide plates. In this case you must adhere rigidly to the proportions given and the conditions imposed.

X. Y. Z.—Racks can be obtained from any dealer. One of these will serve your purpose better than the means you propose of laying a slip of paper on a shelf and rearing up the plates against the wall. We invariably place our plates in a small folding rack after coating them with the preservative, and then, if wanted immediately, we place them on a drying bath made of tin and filled with hot water. If not required at once we allow them to dry spontaneously.

WILLIAM SMITH.—Of course you may take two pictures and place them side by side, and equally, of course, these, if representing the continuous portions of a landscape, will form a panorama. The subjects, however, would not be delineated in panoramic perspective, but in a kind of mongrel projection—that is, neither plane nor panoramic. In plane perspective the eye examines the picture from a given point at a distance from the centre nearly equal to that of the focus of the lens. In examining a picture in panoramic perspective the axis of the eye should form a right angle with the plane of the picture.

TO TEST WATER.—G. DANIELS, with a view to aid in the queries of "Professional," at page 357, being answered, communicates the following tests for the purity, or rather the impurity, of water. *Chlorides* are discovered when, on nitrate of silver being added, a white precipitate is formed, which darkens by exposure to light. If *sulphuric acid* be present, chloride of barium occasions a white precipitate. *Carbonic acid* is present if milkiness follow the addition of lime water before, and not after, the water has been boiled. If oxalate of ammonia produce a white precipitate, it indicates the presence of *carbonate or sulphate of lime*. Sulphuretted hydrogen gives a black or brown precipitate when the water contains *lead, iron*, or *copper*, and a yellow precipitate if the water contains *arsenic*. If pure protosulphate of iron be added to water placed in a stoppered bottle, and a reddish precipitate occur after a few days, it indicates the presence of *oxygen*.

RECEIVED.—W. M'C. In our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.

LONDON GAZETTE, *July* 30.

NOTICE OF SITTING FOR LAST EXAMINATION.

J. W. MIELL, Salisbury, photographer.—Oct. 11.

Aug. 3.

BANKRUPT.

J. F. SHEW, Newman-street, Oxford-street, photographic dealer.—Aug. 13, at the Bankruptcy Court, London, at 1.

APPLICATIONS FOR NEW PATENTS.

July 5, 1869.—"Transferring Photographs to Wood, Metal, or other Surfaces. No. 2,002."—F. WILHELM GRÜNE.

July 20, 1869.—"New and Improved Apparatus for Photographic Pictures. No. 2,193."—DAVID TREVOR.

METEOROLOGICAL REPORT,

For the Week ending August 4th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
29	30·00	76	52	62	68	SW	—	Cloudy
30	30·03	76	58	66	72	SW	—	Overcast
31	30 06	—	63	65	69	SSW	—	Overcast
Aug.								
2	29·79	70	52	57	65	WNW	—	Bright
3	29·98	70	53	57	58	—	0·33	Raining
4	29·97	—	57	64	70	—	—	Cloudy

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 484. Vol. XVI.—AUGUST 13, 1869.

AN EASY MODE OF PREPARING SUBOXIDE OF SILVER.

Suboxide of silver is a substance which has long attracted the attention of photographers, since it has been supposed to be a product of the action of light on many silver compounds employed in photographic operations. Of late years it has also acquired increased importance, in consequence of the fact that it has been a most valuable agent in some of the processes which have from time to time been published for the production of photographs in their natural colours. If we were disposed to generalise upon a subject which is so little known as what is called "heliochromy," we might fairly say that *sub*oxide of silver bears about the same relation to the variously-coloured rays of the solar spectrum as oxide of silver and its corresponding compounds do to the purely chemical rays.

Last year, in the course of a general review of the subject of heliochromy, we gave an account of Wöhler's processes for the preparation of subsalts of silver, such as the sub-citrate; but the trouble attending the preparation of these compounds is sufficiently great to deter any who are not experienced chemists from investigating the photographic properties of suboxide of silver, and as we have been asked to give an easier process we shall do so now very briefly.

Some years ago Professor Rose, of Berlin, discovered that when a solution of oxide of antimony in common caustic potash is treated with excess of nitrate of silver a blackish precipitate is produced, which, when treated with ammonia to remove some oxide of silver, is found to consist wholly of the suboxide of the metal. This is an exceedingly interesting process, and one which, though known to analytical chemists, we believe has not been brought before the notice of photographers. We will now state the process in detail, as all the manipulations are extremely easy.

The first point is the preparation of the teroxide of antimony, a substance which, though little known to photographers, is well known in commerce and may be purchased in a sufficiently pure state; but should this not be possible the teroxide may be prepared from the "butter of antimony" of the shops. This butter of antimony is an acid solution of terchloride of antimony contaminated with more or less iron. When caustic ammonia is added to this solution until it smells strongly of the ammonia a more or less reddish precipitate is produced, which must be caught on a calico filter and washed with pure water until the liquid which passes through the filter ceases to give more than a slight turbidity, when a solution of nitrate of silver is added to it. This precipitate is kept in a moist state, and when required dissolved in caustic potash in the following way:—About two fluid ounces of the caustic potash solution of the shops is placed in a porcelain dish and gently warmed. Some of the moist precipitate of the mixed oxides of antimony and iron is now stirred in; the antimony dissolves while the iron remains behind, being insoluble or nearly so in the potash. The precipitate is added until no more is seen to dissolve; the whole is then diluted with three or four ounces of water, and allowed to settle in order that the iron may deposit. The clear liquid is then poured off from the precipitate and preserved for use. This is our solution of teroxide of antimony in potash, and with it we can now prepare as much suboxide of silver as we wish.

A tolerably strong solution of nitrate of silver is now made, and to this is added gradually and with constant stirring the solution of teroxide of antimony in potash, prepared as just described. The latter solution is to be added to the nitrate of silver, not *vice versâ*. A blackish-brown precipitate is produced, which settles rather quickly to the bottom of the vessel. When as much of this precipitate has been obtained as the liquids will yield, the mixture is allowed to stand for a short time, in order to allow the precipitate to subside as completely as possible. The supernatant liquor is then poured off; the precipitate is next stirred up with pure water, again allowed to settle, and the liquid poured away. This process is repeated three or four times, and the precipitate is then obtained in a sufficiently pure state for further treatment.

We now have a precipitate which consists of a mixture of oxide of silver and suboxide of the metal. Ammonia has the power of dissolving the former, but not altering the latter if too great an excess of the alkali be avoided. Strong caustic ammonia is, therefore, added to the liquid containing the precipitate until the colour of the latter changes gradually to a full black hue. When this point is reached the addition of ammonia is stopped, the mixture thrown on a filter, and the precipitate then washed with several changes of water. When this has been done the suboxide of silver is obtained quite pure.

We may add, for the information of those who wish to know the *rationale* of this process, that the following equation expresses the decomposition which takes place:—

$$KO, SbO_3 + 4\,AgO = KO, SbO_5 + 2\,Ag_2\,O.$$

A NEW RAPID WET AND DRY PROCESS.

We designate this a *rapid* dry process because its introducer says that it *is* so—quite as rapid, at anyrate, as the wet collodion process as it is now practised. The details of this process were foreshadowed in our last number by the "Peripatetic Photographer" in his *Notes on Passing Events*. Since then a descriptive pamphlet (price two shillings and sixpence) has been published (the author being Mr. Thomas Sutton), and we are thus in a position to give our readers some details of the process. Whether it be one of those processes which occasionally appear and are "destined to effect a complete revolution in photography" we shall not say, for the best of all reasons—we have not tried it; enough that in the present article we confine ourselves to a descriptive account of it.

In the preface to the half-crown pamphlet now before us the author states that its main point—its leading feature, its novelty—consists in the fact that no free acid is present in any of the operations, and from this arises a remarkable increase of sensitiveness, and the consequent power of reducing the exposure in the camera. He recals to the recollection of his readers that in the common wet process "the collodion is acid—the nitrate bath, the sensitive film, and the developer being also acid;" whereas in *his* process the collodion and nitrate bath are neutral, and the sensitive film and developer alkaline. In Major Russell's bromised collodion process, of which the new process is a modification, the preservative is an acid, while

in the new process it is an alkali. The plates also, unlike any other previously known, may be used wet as soon as they are prepared as well as when kept till they are dry. So much for prefatory remarks. We now proceed to the process itself, and first of all glance at the principle upon which it is based.

This process consists, as was indicated in the prefatory observations, in banishing altogether free acids from the process. "Free acid finds no place at all; hence the exalted sensitiveness that is obtained." Every photographer, the author says, knows that the more he acidifies his bath the less sensitive the plate becomes; and the more he acidifies his developer the more difficult it becomes to bring out the details.

In the gum dry process, brought forward by the same gentleman before the British Association at Aberdeen (1863), there was a glimpse obtained of rapidity in dry plates, the cause being that gum was a neutral preservative. But what, we inquire, of the other neutral substances brought forward by Dr. Hill Norris and others? At that time there were before the public many suggested preservatives, of which the most rigid analyst could not say they were acid.

Besides, says our author, the importance of banishing free acid from the process, the development should consist of two independent operations, viz., development proper and intensification. Seeing that in nearly all the articles on development that we have published both in this Journal and in our Almanac these operations are separated, we are not, of course, in a position to accept this as much of a new revelation. In dry-plate work we have always, of late years, separated the development from the intensification of the image, and so, we think, have the great majority of operators.

In the common wet process, says Mr. Sutton, there is no such thing as development proper. The whole negative from first to last is built up by the precipitation of silver from the developer, and you may see the blacks of the negative standing up in full relief. In alkaline development you have "real development proper." The latent image itself is reduced from the scarcely visible state of organic oxide of silver to the strongly visible state of black metallic silver.

But by this time our readers will be anxious to learn the details of the new process. We are coming to them as fast as we can.

The "outlines" of the process, as given in the pamphlet, are, when summarised, as follow:—

A special kind of collodion is poured over a clean glass plate, which is then excited in a neutral nitrate of silver bath. Being washed free from the nitrate of silver the plate is coated with an alkaline solution of organic matter.

After exposure the film is washed with water, and an alkaline developer is poured over it and left to do its work. When developed the image is "intensified by any of the known methods," and, after fixing, is varnished in the usual way.

Concerning the collodion no information is given, save that it contains no soluble iodide, and "is made specially for this process" by a certain firm whose address is explicitly stated, as well as the terms on which they undertake to supply the collodion. We are told that the "ether and alcohol are manufactured on the premises," and we are further informed that the collodion will be tested by Mr. Sutton before being sent out—a somewhat difficult operation, in consequence of his residing on the continent, while the manufactory is in this country. This is all that is really vouchsafed concerning the collodion, if we except the commonplaces that it flows over the plate precisely in the same manner as ordinary collodion, and is to be treated in the same manner.

The nitrate bath must consist of eighty grains to the ounce; the water must be distilled, and the silver is manufactured expressly by the same firm who supply the collodion.

After the plate is excited it is coated with what Mr. Sutton calls the "organifier," which is composed of—

Distilled water	1 ounce.
Neutral gelatine	3 grains.
Subcarbonate of soda	3 „

It is of importance that *Nelson's* gelatine be used. He considers it also of importance that the gelatine, when dissolved and previous to adding the soda, should not redden litmus paper. The solution should be used when freshly prepared, and not kept from day to day.

In developing the solutions are of a threefold character, as is so well known in the development of collodio-bromide and other plates of that kind. They are severally—

No. 1.

Pyrogallic acid	3 grains.
Distilled water	1 ounce.

No. 2.

Bromide of potassium	20 grains.
Distilled water	1 pint.

No. 3.

Liquor ammoniæ fortis	1 ounce.
Distilled water	1 pint.

To one ounce of No. 1 add twenty minims of No. 2 and a like quantity of No. 3, the addition being made in the above order. Solution No. 1 should be made on the day in which it is wanted and not before.

With respect to manipulatory details we are at a loss to know how long the plate should remain in the bath. It should not, however, be less than five minutes, and it should be removed "as soon as the film is sufficiently creamy, and before a sort of opacity comes over it." After being transferred to a bath of distilled water for five minutes the plate is then placed in a large pan of clean rain water, where it may remain some hours if necessary, or it may be used after being there for ten minutes. "Rain or distilled water is an absolute *sine quâ non*."

When the plate is required for use it should be rinsed, drained well, and then have some of the organifier poured over it. When well soaked in the excess is drained off for further use, and the plate is put into the dark slide.

The exposure should be "much less than that required for a common wet collodion plate." Experience alone can be the teacher on this point.

In developing, the plate, being rinsed with water from a jug, is placed upon a developing stand, and is covered over with the developing solution. In a minute the details appear, and in from five to ten minutes the development will be completed. When the developer has done its work any further duration on the plate will do no harm. If the details are not sufficiently brought out, Mr. Sutton recommends that, instead of adding ammonia to the developer, the old solution be poured off and some fresh applied to the plate. When all the details are out, but the density is insufficient, intensification may be effected by any of the known methods.

When the image has been developed and intensified—the latter operation being effected in the usual way; that is, by a two-grain solution of pyrogallic acid, with the addition of acetic acid and silver—it is fixed, and, if requisite, intensified by what the author calls "the mercurial intensifier," the only information concerning which we find in the book being that it may be purchased at three shillings per bottle. He recommends hyposulphite of soda for fixing, cyanide of potassium being poisonous. Previous to varnishing a light wash of gum arabic solution, applied after draining from the last washing water, is said to be a wise precaution, because it prevents the film from cracking either when drying or after the varnish has been applied.

Hitherto the process as we have described it must be classed as a wet one. By allowing the gelatine to dry on the plates they will keep for a considerable time *before* exposure and a few hours *after* it. To develope the dry plates they must first of all be damped with water and then treated by the alkaline developer in the manner already described.

Having thus given a digest of the "new process" of Mr. Sutton, we now proceed to make a few observations upon it. In the first place, we regret to see in this pamphlet such a tendency to what is now known as "shoppiness." It is imperative, for example, that a certain kind of collodion be employed. Now, in a half-crown pamphlet not containing one-fourth the quantity of matter to be found in a number of The British Journal of Photography, one might have expected that the formulæ for the preparation of the materials would have been given; instead of which, in every case where it is possible or commercially advantageous to conceal anything, special care is taken to do so. Is Mr. Sutton now so completely enfolded in the fetters of mammon that he dare not say that his collodion is composed of such and such material, but only that it may be obtained from a certain firm who prepare it under his direction, each bottle bearing his name as a guarantee? So with the nitrate of silver "manufactured expressly" for the purpose, and also bearing his name; so also with the "mercurial intensifier." Had the pamphlet purported to be a description of the method of using certain trade preparations, no room would have been left for finding fault on this score; but, whatever the merits of the process, and whether it turn out valuable or worthless, the public will, in such a case as this, not be slow in drawing their own conclusions, and these will certainly be more flattering to the author as a man of business than as a photographic discoverer. Should the *brochure* reach another edition, we would, for the sake of the photographic reputation of the writer, advise him to *delete* from the text

every reference to the advertisements at the end, and to substitute, instead, a simple and straightforward statement by which his process may be presented to the public on a level with others. We suggest for his emulation the conduct in this respect of such men as Fothergill, Russell, Gordon, Taupenôt, and the numerous army of investigators in dry-plate photography, in not one of the writings of whom can we find a syllable which conveys an idea that the photographer must use a secret preparation which can only be obtained from a certain dealer.

The process is in some particulars very closely allied to the rapid tannin process of Major Russell. Russell uses an eight-grain (or thereabouts) bromised collodion and an eighty-grain bath of pure nitrate of silver. Sutton uses a bromised collodion which must be bought ready prepared, and an eighty-grain bath, also made of pure silver. In both processes the plates, when excited, are thoroughly washed, after which they are coated with the preservative. In Major Russell's case this is tannin, while others have used coffee infusion; but Mr. Sutton uses alkaline gelatine.

The development, again, does not contain any special feature of novelty but is similar to that employed by Major Russell and others, who use the alkaline process. The essential difference between this and the cognate processes, which from time to time we have described in detail to our readers, consists in this one point—an alkaline gelatine preservative.

We have not tried the process described; but knowing well that apparently trivial differences in the mode of manipulating sometimes produce considerable diversity in results, we may readily enough believe Mr. Sutton's statement as to the increased sensitiveness obtained by the modification he adopts. As will be readily anticipated from the description of the process given, the least want of care in adjusting the proportions of the developer will cause fog. On this subject the author says:—

"The great enemy of the process is fog; but the very slight veil which sometimes occurs, even when all the right conditions are apparently observed, does no harm whatever—it merely retards the printing by a very small percentage of the whole time allowed. For my own part I do not object to this very slight veil over the negative; and my negatives thus veiled are always those which give the best and most artistic prints, the veil being a sort of guarantee of sufficient exposure in the camera. The *print* is the test of the quality of a negative; those which give the best prints *are* the best. People often judge of negatives by a false criterion of their own, and without any reference to the print. Clean, sharp, bright negatives are often the worst, and yield hard prints."

We conclude by giving an extract from that portion of the pamphlet in which Mr. Sutton describes the developing process, upon which, as every photographer is well aware, so much depends; and we take this opportunity of adding that we shall have something more to say about the practical working of the process on an early day, when we shall probably supply the *hiatus* referred to in the first part of this article, viz., the constitution of the collodion:—

"It may sometimes happen that in exposing for the darkest details of a shadow you may so over-expose the general picture as to lose, to some extent, any fine qualities of *chiaroscuro* which the subject may possess. This would always be a mistake. Let artistic effect be always your *first* care, and the mere rendering of minor details secondary. Shadow is an essential element of a fine composition; do not sacrifice it to the mistaken notion of bringing out very legibly subordinate details. Over-exposure is quite as great a mistake as under-exposure. Do not make it a rule to over-expose, but aim at the *right* exposure.

"Any amount of intensity may be got by the intensifying process. Do not, therefore, attempt to get more density by a longer exposure.

"Now we come to the development proper. That is an exceedingly simple matter, and might almost be performed blindfold.

"Rinse the plate well with water from a jug; then put it upon a levelling stand, and pour upon it as much of the developer as it will carry. Leave this on to do its work.

"In about a minute the details will begin to appear, and in from five to ten minutes the development will in general be completed. The time, however, will depend upon the temperature, and will be less in summer than in winter. It is quite immaterial how long the developer is left upon the plate, for when it has done its work it cannot possibly do any harm. The process does not require to be watched. If the developer has been properly mixed it cannot go wrong.

"If you fancy that the details are not sufficiently brought out, do not add ammonia to the developer—for that is an exceedingly risky thing to do—but pour off the old solution, which has become discoloured and inert, and apply some fresh to the plate. If the back of the film looks nearly as black as the face, in the darkest parts, it is a proof that the image has been fully developed, and that no further detail can be obtained. If, however, the action of light should not have extended through the whole thickness of the film, there will still remain a white veil over the back of the image, although that may have been fully developed.

"If all the details come out together, and very rapidly at first, it is a sign of over-exposure, and the negative will yield a flat print deficient in shadow.

"If, on the other hand, the high lights only come out readily, and the details of the shadows hang back, it is a sign of under-exposure, and the print will be hard, and too strong in its contrasts.

"There is no remedy for either of these troubles; but under-exposure is generally the worse evil of the two. A first-class negative cannot possibly be obtained unless the exposure has been well timed. Nevertheless, some latitude of exposure is allowable without actually ruining the picture. For instance, supposing the right exposure to be six seconds, you might give from four to eight, and still get a presentable picture; but strive always to hit the happy mean between the two extremes.

"When the image has been developed, wash it well, but carefully, with water from a jug, so as to remove all trace of alkalinity, and then intensify it by any of the known methods.

"If the negative were fixed without being intensified, it would have a greenish-brown tint, very much resembling that of a collodio-albumen negative. Intensification with acid pyrogallo-nitrate of silver changes this to black. The image is remarkably even, level, and delicate in its details and gradations before it is intensified; and in general it will then be dense enough for enlarged printing in a solar or copying camera. The process gives great immunity from stains, streaks, and pinholes.

"The intensification with pyro. and silver must proceed slowly, and be very carefully watched. The common formula will do, but silver must be added sparingly. Filter it into the pyrogallic solution through a little funnel of blotting-paper.

"I generally use an intensifying solution composed of two grains of pyrogallic acid, and thirty minims of acetic acid to an ounce of water, and add to this drops of a special thirty-grain silver solution."

ALKALINE DEVELOPMENT.

A STATEMENT recently appeared in your Journal [see page 351] to the effect that the inodorous carbonates cannot be used with good effect in the alkaline development of impressed bromide films. If Mr. Carey Lea will re-examine more carefully the subject on which he has expressed so decided an opinion, I feel assured he will be able, after a few experiments, to convince himself of having made a mistake somewhere.

Some years ago I was in the habit of developing my dry bromised plates by means of bicarbonate of soda and pyrogallic acid, and only abandoned the former in favour of the sesquicarbonate of ammonia, because I fancied—perhaps it was only a fancy—that the latter salt was more manageable. Be this as it may, I was somewhat surprised at the statement alluded to, and since reading it I have gone over the ground again very carefully, proceeding by comparative experiment, under conditions precisely alike in everything except the change of the alkaline salt added to the pyrogallic acid for development. The results will be seen from my experiments.

Having cut through the middle with a diamond, but not separated, twelve 8 × 5 bromised dry plates, all of which had been prepared at the same time and precisely alike, I exposed them one after the other as fast as could be done in the same camera, on the same object, in as nearly as possible an uniform light, and for exactly the same time.

I prepared sixty-grain solutions of each of the following alkaline salts:—

No. 1. Sesquicarbonate of ammonia.
No. 2. Bicarbonate of soda.
No. 3. Bicarbonate of potash.
No. 4. Carbonate of soda (common washing soda).
No. 5. Carbonate of potash.
No. 6. Caustic potash.

The pyrogallic acid was of the strength of three grains to the ounce of water, and, of course, I had ready at hand a ten-grain solution of bromide of potassium in a dropping bottle.

The plates after exposure were broken in two in the dark room, one half of each being developed with sesquicarbonate of ammonia and pyrogallic acid (No. 1), and the rest with the other carbonates. The quantity of alkaline salt required for each ounce of pyrogallic solution varied very much, so I had to proceed carefully and tentatively by adding to the pyrogallic not more than one drop at a time at first, till I saw how the development was likely to go on. For instance, a 5 × 4 plate needed altogether about ten drops of No. 1, twelve of No. 2, one hundred or more of No. 3, and but a very small proportion of Nos. 4 and 5, and of No. 6 not more than from two to five drops to complete the development. The caustic potash solution was particularly energetic.

Having plenty of plates I repeated these developing experiments; and, unless I had numbered the plates, I could scarcely have told

from the negatives which of the alkaline salts were used with the pyrogallic acid—so nearly alike were they in general character. The tone or colour varied considerably; but that, we all know, is greatly modified by slow or rapid development, and probably does not depend on the nature of the alkali or the alkaline salt.

It appears to me, therefore, that we may use with good effect any of the alkaline carbonates or alkalies when once we have determined the best proportions in which to use them. Those that act very slowly should be made in very concentrated form, so as not to dilute the pyrogallic solution too greatly. Others, again, should be made very weak, else a single drop might, in some instances, be too much and cause fogging. But it will require a great many trials to settle these points.

From all that I have observed, I am of opinion that the energy of this kind of developer depends altogether on the *alkalinity* of the salt added to the pyrogallic, and on nothing else, and that it matters little what salt is used, provided sufficient be added to give the pyrogallic the requisite alkaline reaction. From a single series of experiments, with only one set of plates, it would be hazardous to pronounce decidedly whether such an opinion of mine is well or ill-founded. Other conditions in the preparation and treatment of the films *might* interfere to alter the results, although I hardly think they can do so—at least to any great extent.

George Dawson, M.A., Ph.D.

P.S.—I omitted to mention that all the plates were prepared by Russell's rapid dry process, and that the collodion contained a trace of iodide.—G. D.

REMOVAL OF NITRATE OF SILVER STAINS FROM COTTON, LINEN, &c.

We learn from our contemporary, the *Chemical News*, that a German chemist, Herr Grimm, recommends a solution of chloride of copper for the removal of stains from coloured woven cotton tissues. Herr Grimm's mode of operating is to moisten the spot or stain to be removed with the solution of chloride of copper (prepared by dissolving oxide of copper in hydrochloric acid). The stain is thereby converted into a chloride of silver, and when the spot is subsequently treated with hyposulphite of soda the whole dissolves, leaving the tissue unaffected. When the tissue is uncoloured, and either cotton or linen, the stains may be better removed by first moistening the spot with a dilute solution of permanganate of potash to which some hydrochloric acid has been added, and when this has remained in contact for some little time the tissue is washed and treated with hyposulphite of soda. According to Herr Grimm, the employment of either of these modes of treating stains produced by nitrate of silver does away completely with the necessity of using cyanide of potassium for either of these purposes.

We may remind our junior readers that quite as good a plan as either of the above, and one nearly as generally applicable to the removal of these troublesome stains, is to treat the marks with a solution of iodine in iodide of potassium; the silver stain is thereby converted into iodide of silver, and this is now readily removed from the tissue by soaking in hyposulphite of soda solution. The hyposulphite does not remove the stain as rapidly as the cyanide does; but when given a little time, and with the previous iodine treatment, it is quite as effectual as the more dangerous though more energetic cyanide.

PAINT, AND HOW IT IS AFFECTED BY LIGHT.

A few weeks ago, a well-known photographer, while making an unimportant change in what we may call the topographic department of his business, had occasion to clean a window which had for some years rendered effective service as a signboard—that is to say, his name had been painted on the face of the window in black letters, and, in order to form an effective background for these letters, the inside or back of the panes had been painted of an uniform white, the colour used being ordinary white paint, largely dosed with the usual driers, which, as every painter knows, is prepared from lead.

The black lettering in front of the glass had, to a great extent, prevented the light from acting upon the white paint forming the groundwork on the other side, and the several relations had thus been maintained between the white and black pigments for several years.

In due course the black letters were removed, and shortly afterwards the white painted background followed suit. Cyanide of potassium was the detergent to which recourse was had on this occasion, and most effectively it did (as it always does) its work. But a curious thing was noticed: the cyanide, when applied to the white paint, at once swept off those portions on which the light had been allowed unintermitted action, while the parts which had been partially protected by the opaque black lettering in front proved to be very much more insoluble. Light, then, renders white paint more insoluble in cyanide of potassium than it would otherwise prove to be.

Now comes the question—What is white paint? It is, we presume, a mixture of carbonate of lead (white lead) and linseed oil, added to which, when used, are driers, of which there are several—litharge (oxide of lead) and acetate of lead assuming the most important functions in their composition. In the case before us, the pigment or colouring substance is evidently a matter of little or no consequence. We shall not at present stop to reason on the change that took place in the oil, but contenting ourselves, in the meantime, with placing it on record, shall pass to kindred matters in which we have long felt an interest.

When drying oil of the description alluded to is exposed to the atmospheric action, it oxidises or hardens like collodion, and in this leathery condition it can no more be softened by oil, as it would have been before it dried. Linseed oil, however, is not the only kind which rapidly oxidises when properly prepared. Walnut, poppy, and rape oils may all, as well as the cheaper linseed oil, be rendered oxidisable by exposure to the atmosphere; and oil which has thus been oxidised may be dissolved in ether and other solvents, and made exceedingly useful in the arts and manufactures.

When oils of the kind mentioned are spread out like collodion upon any flat surface they undergo a change which is erroneously designated "drying," but which is really oxidising. It becomes, in "rough and ready" nomenclature, semi-resinified, and may be dissolved in certain volatile solvents, such as ether, on the evaporation of which it is left in a solid condition. This solid body bears a marked resemblance to India-rubber, and, like it, is capable of being vulcanised.

About five years since we saw some chemical apparatus which were made by means of this material, and which admirably fulfilled the conditions required. When mixed with pigments, and exposed to the requisite degree of heat, this material yields a substance almost identical with that known respectively as ebonite or vulcanite, and may be employed for the majority of purposes for which that substance is applicable. We are aware of a photographic dipping-bath for nitrate of silver which was made of oxidised oil, and which has remained in good working condition for six or seven years.

THE DARK ROOM—DEVELOPMENT.

In former times the room in which the pictures were developed, the plates sensitised, &c., was properly called a dark room—it was dark, gloomy, and disagreeable. It is no longer so now. From discoveries that have been made, this developing room may be the lightest room in the establishment, as long as the light is of the proper colour. Let the window of the room be glazed with orange-red coloured glass, and in addition fix up a curtain of thin red woollen cloth or flannel. The light that passes through this window exercises no action upon the sensitised plate; you may develope the plate in front of this window without any danger of fogging the impression. But be sure to shut up every avenue to *white* light; the smallest beam of this light is detrimental to your success. The light that comes through the keyhole is injurious.

This room ought to be called the *non-actinic* room, because the light with which it is suffused is non-actinic, which means that it has no action on prepared chemicals.

It is well to try the efficacy of your non-actinic room by experiment. Sensitise, therefore, a collodionised plate, and then expose it to the light which enters through the orange-red window for two or three minutes. Pour on the developer in the usual way. If the plate does not change colour in the least, it is an evidence that actinic light at least has not made any impression upon it, and you may then, with full confidence, afterwards perform all your developing operations with ease and certainty.

To facilitate the operation still further, we always prefer developing by the aid of a light which comes from below, and thus shows the progress of development by transmitted light. For this purpose let the developing corner or table be a projection beyond the wall of the building, and let a large square of non-actinic glass be glazed in an aperture on the top of this table; this pane can admit light only from below upward.

During development the plate, whether large or small, may be held, it is true, between the thumb and finger, but it is much easier to hold it supported on a pneumatic plate-holder. In this position you can cover the plate with the developing solution with the utmost facility. It requires some experience before you can flow the developer evenly without any stoppage or interruption; the operation must be quick, and yet it must not be violent, otherwise much of the developer wil

rush off at the opposite side, and carry with it much of the free nitrate of silver which was still on the plate, and which is so very beneficial in producing intensity. If the developer proceed slowly over the exposed film the development will be uneven, one part being already out before the other has commenced. If the developer stop and refuse to proceed in a given direction, there will assuredly be found in the finished negative a dark line or curve at that place, which will be very offensive in the print.

Furthermore, if the developer be poured from a great height (and we regard two or three inches high in this experiment), its momentum the moment it comes in contact with the collodion is sufficient to wash off the impressed silver from this part, and to produce, in consequence, a very weak patch at this spot. To avoid all these troubles, and especially with a large plate, we prefer laying it at the bottom of a dish of gutta-percha at one end. In this case, the dish being slightly tilted, the developer can be poured into the opposite end in sufficient quantity to cover the plate the moment it is again raised to a horizontal position or tilted in the opposite direction. This is a very effectual plan of development, and especially so if the dish has a transparent bottom, for then you can watch the development by transmitted light.

A transparent developing dish is constructed in the following manner:—Take a thin piece of hard and well-dried wood, four or five feet in length, one inch wide, and half-an-inch thick, and plane a groove along the middle, about three-sixteenths of an inch deep, sufficiently large to allow the edge of an ordinary pane of glass to slide along it. Four lengths are then cut so as to make a rectangular frame, the ends being cut in a mitre box at an angle of forty-five degrees. A pane of glass is then tightly framed in the groove, and the frame is firmly nailed together. After this is done, a cement consisting of five parts of resin, one part of beeswax, and one of red ochre are melted together, and when fluid a sufficient quantity is poured along each seam or groove all round on either side, and along all the corners. After the cement has set, the excess is pared off and polished down smooth with a red hot pointed piece of metal. The frame is then finally covered with a coat of varnish, made by dissolving sealing wax in alcohol, in a teacup, over the stove. Coach or any other varnish will answer the purpose. We have a set of such frames, of different sizes, for the different-sized plates in use. Each transparent plate is at least two inches longer than the plate to be developed; the excess of length is the part which is to receive the force of the developing fluid as it falls out of the vial which contains it. If the plates to be developed are very large, the dish that is to hold them may be constructed so as to have two projecting handles, either screwed on to the ends of two parallel sides, or formed out of these two sides themselves, which are left projecting some four or five inches beyond the ends. The dish and plate are then easily supported by the two hands, whilst an assistant pours on the developer.—*Towler's Photographer's Guide.*

PHOTOGRAPHIC SOCIETIES: BALLOTING AND WITHDRAWAL OF MEMBERS.

Although in his first article on *Photographic Societies* the writer advocated the abolition of the custom of creating new members through the instrumentality of the ballot, it does not follow, even in the event of that suggestion being adopted, that the ballot will, for other purposes in connection with societies, fall entirely into disuse; and, in the event of its being retained, it is desirable to maintain its efficiency as an instrument for ascertaining the opinions, wishes, or sentiments of the members. In such instances of voting by ballot as have come under the writer's notice, each member has been supplied with a marble which he was required to introduce through the aperture of the ballot-box into one of two compartments which were respectively used for the reception of the votes for and against the individual being balloted for. As a rule, those on whose behalf the ballot is brought into use are known only to a few, and the greater number, who do not know them, and have, consequently, nothing against them, vote in their favour. Where "blackballing" is effected by a certain percentage or proportion of negative votes it is obvious that, however desirable, its performance is impossible where only very few vote for or against from their knowledge, whilst an overwhelming majority vote uniformly on the content side without any knowledge of the individual to whose application they give assent.

To remedy this the writer is of opinion that there should be three compartments in the ballot-box, namely, "contents," "non-contents," and "neutrals." He has heard it asserted that when there is an objection to the introduction of any gentleman as a member it is always "noised about" before the election time. To be sure this process is likely enough to answer the desired end, but it is clumsy, troublesome, and inconvenient; and where the objection is of a slanderous nature, the process, in addition to its other objections, becomes a legal offence, which may involve those adopting it in unpleasant, if not in serious, consequences.

To turn to another subject—the one most opposite in its character to the admission of members—viz., their withdrawal. Amongst the rules of photographic societies it is customary to find one regulating, to some extent, the withdrawal of members. So far as the writer has seen, this rule generally confines itself to the terms upon which a member may, optionally, withdraw.

"Accidents," it is said, "will occur, even in the best-regulated families." So, upon the same principle, contingencies which render it desirable for the general good that some particular member should be removed, will, at times, in spite of all that can be done to prevent them, arise in photographic societies. Whether there are or not any societies having a rule by which they are enabled to expel undesirable members the writer does not know; but he is aware that there are several, the Manchester Photographic Society amongst them, in which there is no such rule, and in which societies a member can remain, if he be so disposed, so long as such societies exist, no matter how objectionable he may render himself. Amongst the members of the Manchester Society there are a few, and amongst them the writer of the present article, who would in all probablity have been ejected from the body had its members possessed any rule by which this could have been accomplished As, however, there is no such rule, they could not be, and therefore were not, ejected. In the writer's case, he withdrew without hesitation the same evening that he ascertained there was any extended feeling against him. This is a course, however, which others of less impetuosity might not always choose to adopt, and in these latter instances a society has no alternative but to "grin and abide," where time does not exercise a healing influence. This, certainly, should not be the case where any real or unpardonable offence has been committed, and a rule should, the writer is of opinion, exist in every society by which such of its members can be expelled as it is evidently undesirable for it to retain.

Whether a want of personal charms or of what in any particular locality is looked upon as a "genial disposition" should or should not be considered as a sufficient reason for ejecting a member is a question for consideration. The possession of what has been termed "an incompatible disposition" may be a serious misfortune without in any way being a fault; and, if the writer's idea of what is meant by the term is at all correct, it may exist in conjunction with every necessary attribute for becoming a useful member of a literary or scientific body, and should not, in his estimation, be considered a valid reason for the ejection of any member of a photographic society, although there are few, in all probability, having anything like a sensitive nature who would remain with a body who objected to them upon such extraordinary grounds.

The omission to pay subscriptions for "victuals consumed and journals received" during a number of years would, if largely persisted in, soon bring a society into the Bankruptcy Court; and the writer would imagine the marked and intentional interruption of a society's proceedings, except in very unusual instances, or the deliberate violation, from personal motives, of any of those rules drawn up for the good of the whole assembly, to be surely offences which should render those committing them *liable* to ejectment, if that be the wish of the general body; and, in his estimation, there should always exist a rule providing for such contingencies, which rule should, he thinks, be carried into effect through the instrumentality of the triple ballot box.

D. Winstanley.

Contemporary Press.

ALABASTRINE POSITIVES.

[Humphrey's Journal.]

The colouring of collodion positives may be effected on the whites of the pictures either before the varnish is flowed on or upon the varnish itself. When well performed it communicates life and roundness to a picture which before was flat and lifeless. The colours in use are in fine powder, and are laid on with a dry and very fine pencil of camel's hair. Naturally the operation must be very simple, and a very small quantity of colour must be used, otherwise the operation will become a work of art, and none but an artist could perform it. In all ordinary cases the colour lies on the surface and does not penetrate into the material of the film. In the alabastrine process, however, the film is so treated as to become *permeable* to varnish, and thus to exhibit the colour, as it were, in the collodion; besides this, the whites are still retained white, notwithstanding the impregnation of the film with the penetrating varnish. Positives treated in this manner are regarded through the glass and collodion film; the pictures, therefore, are direct, as they ought to be. The mode by which the tones are preserved soft and white, and rendered at the same time permeable, is the following:—

Alabastrine Solution.

Formula.

Sulphate of the protoxide of iron	20 grains.
Bichloride of mercury	40 ,,
Chloride of sodium	15 ,,
Rain water	2 ounces.

Select for this operation a vigorous good positive; a faint and thin film does not answer well. One that has been rather under-exposed is most suitable. Then, whilst the collodion film is still moist from fixing, pour upon it a quantity of the above solution, and keep it in motion. At first the picture assumes a dead and grey appearance, but this soon changes and becomes continually more and more brilliant. It is sometimes necessary

to add a little more of the fresh solution, and to retain this solution on the surface until the whites are perfectly clear. The time required for this operation varies according to the temperature and the thickness of the film. Heat promotes the effect; the plate is, therefore, frequently supported on the ring of a retort-stand, with the fluid on its surface, whilst a small flame is kept in motion beneath it. Unless this precaution be observed there will be a liability to break the plate. It happens sometimes that a few minutes are sufficient, but generally more time is required. If no heat is applied the operation may require, in some cases, as much as an hour. As soon as the whites have attained their utmost purity the operation is complete. It is better to be quite certain that the whites have attained the purity required than to shorten the time and have the effect underdone. There is no danger in giving too much time; but it is a disadvantage to remove the fluid from the plate too soon, because, in drying, the whites in such a case are apt to grow darker again, and the picture assumes then the cold blue tone which arises from treatment with corrosive sublimate alone.

As soon as the effect has been reached the plate is thoroughly washed in several waters and then dried over the spirit-lamp. The plate is now ready for the first coating of varnish, which communicates transparency to the shadows without at all impairing the whites.

The next operation is to lay on the colours carefully and artistically on those parts that require them. It is unnecessary to apply any to the shades. Where much colour is desired on a given surface it is better to apply it by repetition, and not in one thick blotch. Colours thus tastefully laid on produce a very brilliant effect by reason of the purity of the whites, and this effect is again increased by the softness communicated to the whole picture by the application of the *penetrative* varnish, which causes the colour to permeate into the pores of the film, or to be seen, at least, in full beauty from the opposite side. This varnish is nothing more than a very pure, strong-bodied, protective varnish. The picture, so far finished, is backed up with a piece of black velvet, but never with black Japan, which would injure the film.

J. Towler, M.D.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Aug. 18th	Edinburgh	Hall, 5, St. Andrew-square.

PHOTOGRAPHIC SOCIETY OF FRANCE.*

We resume Dr. Ozanam's description of his apparatus for reproducing by photography the beatings of the heart and pulse:—

The lower extremity of the tube, expanded into a small pyramidal reservoir, is applied directly upon the artery or upon the heart. A membrane of very thin vulcanised India-rubber fixed round the reservoir holds the mercury, and permits it to oscillate freely at each arterial impulsion. These oscillations are so sensible that they reproduce the least variations of sanguine undulation. It is conceived besides that this membrane might also be made of other materials; but the India-rubber being perfectly supple, and not very sensitive to the variations of temperature, fulfils all the most favourable conditions. This tube is, therefore, a kind of barometer measuring all the variations, all the shades, of the sanguine tide, just as the ordinary barometer indicates the variations of the atmospheric tide. It may be placed in various ways—sometimes upright, and with a length of only ten centimetres; sometimes bent at an angle, in order that the reservoir may be easily fixed on the heart or pulse; and sometimes the reservoir and the tube may be separated the one from the other, and united again by an intermediate tube of India-rubber permitting all the evolutions and positions that are desirable. Only one condition is necessary, which is, that the pressure of the artery against the reservoir of mercury should cause the latter to rise at the marking of the vertical slit in the dark chamber. We should notice besides that the cylindrical form of the tube is eminently favourable to the concentration of light, and facilitates the instantaneity of the proof.

Dr. Ozanam said:—The apparatus which I have employed is one of great accuracy; it is so regulated as only to give the middle of its course always with the same rapidity, avoiding the first trigger, which is too quick, and the last, which is too slow. Its construction can be varied by forming it with two cylinders, one of which rolls and the other unrolls the photographic band, whilst the mercurial column oscillates between the two cylinders. This latter apparatus is much smaller and more portable, but it will only act upon paper, which is less sensitive, and not upon glass like the former; but the recent photographic discovery of supple plates of mica will greatly facilitate this process. The photographic plate travels about 0·01 (millimetre) per second; and the image produced, after having been fixed in the usual way, can, without difficulty, be enlarged two, four, or ten diameters. A single pulsation occupies, in consequence, a space of 0·10 (millimetre), like those I have now the honour of exhibiting. Thus the time is multiplied by the space, and the eye can perceive with ease the modifications undergone in one-hundredth part of oscillation during one-hundredth part of a second, as each will occupy on the image a space of 0·001. Thus there is in this process that which will answer all the requirements of exact science. But I may add, in order to show the progress of science, that in submitting the enlarged image to ten diameters of the microscopic focus, which enables us to see with ease $\frac{1}{1000}$ of a millemetre, we might examine, if it were necessary, the variations of $\frac{1}{100000}$ of pulsation during $\frac{1}{100000}$ of a second. Then, taking this image and submitting it to an apparatus lighted by the Drummond, the electric, or, better still, the magnesium light, we might obtain on a prepared plate the image enlarged to one metre in diameter, while the observer who should examine it on the other face with a microscope would be at the extreme limits of the visible; that is to say, he would see the millionth part of a pulsation of the heart during the millionth part of a second. But already it is easy to detect in these images one of the peculiar characters of the pulse *dicrotism*, to which I desire more particularly to draw your attention at the present time. *Dicrotism*, or double beating, has been described by Dr. Marey as a normal condition of the pulse; before the invention of the sphymograph this could not be observed, except in some pathological cases, and it had been regarded as a precursory sign of hemorrhage. Our photographic figure has corroborated the assertion of Dr. Marey; but, at the same time, it has resolved the question in a manner much more complete. It shows, in fact, that the natural pulse is not only *dicrote*, but *triple*, and even *quadruple* sometimes, in its evolution; after mounting by a single bound to the top of the ladder, it descends by three or four successive falls to the lower level. In the second place, this natural dicrotism varies infinitely in force and in degree, so that *the fall is sometimes by successive horizontal lines*, and *sometimes by ascending lines* where the *pulse remounts twice or thrice before it drops entirely*. It will, therefore, be necessary henceforth to distinguish the *horizontal* dicrotism from *ascending* dicrotism, *simple* dicrotism from that which is *multiple*. The plates annexed to this treatise represent the pulse physiologically, commencing at the age of five years and mounting to 12, 18, 25, 28, 30, 42, 43, 48, 65 years. These images enable us already to observe a crowd of interesting details. We see in effect that the power of contraction of the heart increases with age, at least up to fifty years, to descend afterwards. Dicrotisms are perfectly evident in the greater number of the images, and we perceive that their characteristics are more and more discernible with the increasing age of the subject. On examining the eighth pulsation of the first image a notable diminution is observable in its height. This is owing to the influence of the respiratory movement. At the moment that we inspire the atmospheric air, the heart, clogged in its contraction, disperses the blood with more difficulty, and the ascension of the sanguine column is less marked. When this oppression is increased the pulse becomes intermittent—a phenomenon which I have often observed in children half-deprived of motion by croup; at each inspiratory movement there was a complete absence of pulsation. At the present time, by the photography of the pulse, this pathological fact is explained, and proves to be only a great exaggeration of a physiological fact. It is by an analysis equally delicate that we are enabled to characterise each affection of the heart and veins—not only the large veins but the small arteries; for the delicacy of the instrument is such that the beating of the capillary vessels of the pulp of warmed fingers, or of an inflammation in course of formation, may equally be detected. Thus, for the future, it will belong to the light to inscribe the beatings of the heart of man, and to diagnose his maladies; the whole of these signs, united in the form of a dictionary, will constitute a kind of language which the physician will have to learn. It will give him, in a few pages, a key to the organism he is called to take care of, instead of leaving it to the opinion of each practitioner, one varying from another and too often deceptive, like the imperfection of the senses we receive from nature. The same apparatus will also give images which are easier to obtain, though rather less perfectly. It is sufficient to plunge a slight stem into the tube, swimming upon the mercury and having a sharp point, in order to inscribe by its undulations the form of the pulse upon a plate of lampblack. Already the dicrotisms of the pulse teach us to better analyse the functions of the heart; we see, in fact, on comparing the images with the sounds of the heart perceived by auscultation, that we must admit no longer two, but four sounds and four silences, corresponding with the four sounds of the four cavities and the spaces which separate them. The two principal undulations correspond with the two beatings of the heart, left and right, so that dicrotism is only the resounding of the veiny heart upon the general circulation. Two other undulations there are which cannot be perceived except under certain circumstances, and they are due no doubt to the resounding, not so strong, but almost simultaneous, of the two small auricles; hence it is that they often appear like one, and can only be distinguished when their simultaneity is incomplete.

The Society, having followed Dr. Ozanam with much interest throughout his demonstrations, returned him its thanks.

Photography in Colours.

M. Davanne communicated to the Society the contents of a letter he had received from M. Cros, which showed the situation in which he was placed with regard to M. Ducos du Hauron, and the discussion which

* Concluded from page 379 in our last number.

had naturally arisen between him and that gentleman relative to priority in the reproduction by photography of the natural colours. The letter was as follows:—

"You have given an account to the Photographic Society of France of the works of M. Ducos du Hauron, and you have mentioned that a question of priority would no doubt arise between him and myself on this subject. Permit me then, Sir, to explain to you in what state the question is (in every respect honourable and pacific), and how I have a right to be in perfectly good and sympathetic relations with my rival. I wrote to M. Ducos du Hauron and I sent him a reprint of my treatise extracted from *Les Mondes*, with the date of the journal containing the theories which formed the subject of this treatise. This communication was received by the Academie des Sciences on the 2nd of December, 1867.

"As M. Ducos du Hauron's patent only dates from the 23rd of November, 1868, I was anxious to assure myself as to any other titles he might have besides this patent. The following letter satisfied me on this point, and that I had a priority of almost a year without taking into account the priority of publication:—

"'You are quite right in saying that ours is a curious rencontre. Without knowing each other, and at a distance of six hundred miles the one from the other, the same inspiration seems to have come to us both almost at the same time. Far from complaining of the confraternity that it has created for us, I feel highly flattered, and rejoice to meet with a man of your merit and acknowledged science claiming part of the honour which belongs to me of our common discovery. My patent should date back as far as 23rd of November, 1868, in effect, as that was the date of my application and the deposit of my specification; but it was only delivered to me on the 23rd February, 1869, therefore it was since that date that the journal *Les Mondes* published your fine theoretic work, namely, on the 25th of this same month of February.

"'The dates being so near the one to the other proves sufficiently, without opening your sealed packet, that the theory laid down in your treatise belongs to you—in this sense at least, that this treatise, evident fruit of your personal meditations, numerous and prolonged, could print nothing respecting my labours, which had not till then been divulged. I am, therefore, the first to proclaim your title to the scientific property of the theories published by you; but I believe that I have pretty nearly the same in regard to theories published on my part, without taking into account the property resulting to me commercially from my patent.

"'This patent assures to me, in addition, the property of the practical means and material processes for realising the theories it embraces. They have cost me much arduous labour and most multiplied experiments, and it needed great patience and imagination to overcome the obstacles revealed by practice. However important the theoretic conception of *obtaining and fixing the colours*, you confined yourself to consigning them to a sealed cover; you recoiled, as you confess, before the great cost of time and action which the realisation of your idea entailed, reserving yourself until you should see it *take form and life* in the hands of others, thereby saving yourself the laborious work.

"'*This cost of time and action*, this *laborious work*, is the rough trial that I, for my part, undertook. Without flattering myself that I have, by my sole personal experiments, brought our common system of heliochromy to all the material perfection that it will attain in special studios, or by the aid of the most appropriate instruments, I have been enabled to show, at the present time, results which clearly confirm your anticipations and my own. A theory of itself (in the abstract), and without any indication of the practical means of realising it, would not have been patentable.'

"'If it be true that in matters of science the first idea on a subject should take away much from the research and discovery of the means of execution which do not appertain to it, then, Sir, the first idea belongs equally to the one as to the other of us. Such is my sentiment and such is the formula by the aid of which we may close the honourable debate which you have had occasion to raise.

"'I authorise you, Sir, to make use of my letter, as you will understand I consider it quite natural that you should give it publicity. In this case an insertion of the whole is necessary, and I expect as much from your loyalty.'

"Together with his letter, M. Ducos du Hauron sent me his treatise, in which his works are exhibited. The following is what I perceived on comparing his work with mine:—

"M. Ducos du Hauron knows but one means of analysis, viz., that which consists in interposing successively three coloured glasses before the picture to be reproduced. I have described this means under the head of *analysis by transparency* as a particular case of the general process, which comprehends also *analysis by refraction* (successive or simultaneous) and *analysis by monochrome lighting*. This latter process appeared to me, however, as easier for experimenting, just at first, than the others. The processes of synthesis of M. Ducos are all described in my treatise under the names of *synthesis by reflection* and *synthesis by transparency* by means of *antichromatic* positives; but, besides these, I give a process where the solution is independent of all artificially-coloured products—that which I have named *synthesis by refraction*. Thus I consider that that which belongs to M. Ducos du Hauron is his *practical processes* as described; and that all researches are permitted to experimenters not only on the processes which M. Ducos has not described, but on the general means which he has realised, provided that the practical processes be different.

"Hence there is one way open by which anyone may enter with every advantage. The problem exacts particular conditions which will belong to those who shall be first to discover them."

The Society thanked M. Davanne for his communication, and decided to insert in its *Bulletin* the pamphlet presented by M. Ch. Cros.

M. Ducos du Hauron exhibited two heliochromatic proofs—one a copy of a chromo-lithograph, the other being from nature. They were accompanied by the following explanations:—

"I have the honour to present to the Society two new attempts in heliochromy—that is, first, a reproduction of a lithograph; second, a very small landscape taken according to nature. Like the first, these two new specimens were obtained not only by the incorporation but by the superposition of three monochrome images which constitute my system, and they are due, the one and the other, to the manner in which I qualified by a method of placing them one upon another, and in which the uniting of the three monochrome images produces not only the local colours simple or composite, but also the gradation of lights and shades, from the brightest white to the most intense black.

"It is by transparency that the least effect of these two heliochromes is produced. Always seen by reflection, except when examined from certain unfavourable angles, they seem to me always to have a certain charm. This result leads me to think that even without having recourse to the incorporation of the monochromes (an incorporation that requires either a combination of my system with photolithography or heliography, or a vitrifying of the colours), we ought very well, by placing the three monochromes one upon the other, to arrive at excellent effects by reflection. But everything has a beginning; to desire at the commencement of a game to attain to a great perfection in results would make us liable to compromise them. I have, therefore, endeavoured neither to suppress, by dissolving them, the pellicles which have served as a support for the coloured gelatine, nor have I had recourse to other means which experience indicated.

"The reproduction of the lithograph appeared to me worthy of attention, from its vivacity and variety of colouring. It is difficult to conceive that this scale, so rich in colours, should have been produced by three colours only submitted to simple contact with three black negatives. The Society can examine these three negatives, between which curious differences are manifested, resulting from the employment of three coloured glasses. This reproduction is superior to the original as regards harmony and artistic effect, which seems to indicate that the system is based upon a very simple law of nature. The slight variations which separate this heliochromy from the model, as regards colouring, proceed from the fact that the two blue monochromes, both feeble and poor in half-tints, had to be placed one upon the other from the want of a single blue proof insolated for a sufficient length of time. The operation has been compromised on this point. The result is somewhat spoilt.

"With regard to the landscape from nature this is but a timid attempt, for which the author asks some indulgence, from the circumstance that injurious influences of temperature prevailed detrimental to the production of the negatives of the landscape, flat and uniform of itself. These negatives have not contrasts sufficient in them. I made use of ordinary objectives, whilst for this special kind of photography the most rapid objectives should be employed; for it is of importance to hasten as much as possible by optical means, independently of chemical processes, the formation of the image given by the orange-red glass. However it may be, this modest landscape appears to me to offer some interest, if not by its fine execution, at least by the harmony of the effects.

"P.S.—Like all paintings in general, the heliochromes lose much by being seen at night by the light of lamps. If the Society do not examine them till then a false idea may be formed of them. The yellows become light, the blues sombre, and only the red preserves its brightness."

The Carbon Process.

The Society, after examining the proofs sent by M. Ducos du Hauron, thanked him for his presentation.

M. Andra presented to the Society some carbon proofs transferred upon glass, and which were adhesive by simple pressure. They were accompanied by the following note:—

"It is now some weeks since that, occupying myself particularly with the printing of carbon positives, the idea occurred to me of substituting glass for albumenised paper in the transfer, through a negative, of the bichromated gelatine pellicle rendered insoluble by light, with the view of obtaining images visible by transparency. I tried in succession to spread different adhesive substances upon the glass, particularly gelatine prepared with alum or albumen. The results obtained were tolerable only. The adhesion was never complete, and there were creases which, gaining one upon another as they came in contact with the boiling water, destroyed or partially destroyed the image. Discouraged, I was on the point of abandoning my idea, when I made a last proof on glass itself which had not received any preparation, and I remarked, not without surprise, that the wrinkles were rare. I continued this means, and at last succeeded in being able to develope easily any carbon or colour proof on glass. Those which I have the honour of presenting to the Society were all obtained by this process.

"The following is the manner in which I operated:—I employed paper covered with coloured gelatine prepared exactly according to the system exhibited to us by M. Jeanrenaud. I chose in preference as a support some sized paper thin and without grain, and even occasionally satined paper bichromated, which I then exposed under the negative precisely in the same way as the ordinary carbon proofs

during a lapse of time varying according to the degree of colouring that I wished to obtain. This paper was applied upon a perfectly plain glass after immersion in a basin of cold water at the same time as the glass. Then, raising it out of the water, the gelatine-sized side interposed by the liquid against the glass, I passed the roller two or three times upon the prepared paper, covered previously with blotting-paper. The pressure dispersed the water without any air-bubbles being produced, and the sensitive layer has been sufficiently adhesive from the sole fact of their being no air between the two surfaces. With regard to proofs of small size particularly, the development may be immediately proceeded with. If, on the contrary, the proofs are large, and printed on a foundation, it is preferable to leave them to dry under the moderate pressure of a positive frame. The employment of a press would, no doubt, have been preferable, but I did not want to use it. Development takes place afterwards exactly as with albumenised paper; the plates are put at the bottom of a basin, the paper above, and the boiling water is poured upon the latter. It is indispensable to wait until it detaches itself spontaneously by abandoning upon the glass the particles of undissolved gelatine, which the first water often produces, and the second or third always. Then leave the glass to purge itself, shaking it gently in rather warm water at about fifty or sixty degrees; wash with cold water, and leave it to dry spontaneously. This method of developing is most simple, and need not be hastened. It occupies about ten minutes. It has never been half-an-hour, and with a sufficient number of baths it is possible to develope at the same time as many plates as may be desired.

"It appears to me that the proofs obtained in this manner present more perfect modelling than those on paper. If they are energetic—that is to say, if the exposure has been long—they give by transparency very vivid effects. Printed more moderately they should be seen by reflection, fixed exactly upon white or tinted paper.

"For portraits particularly, which should be put under glass, the support itself is sufficient, and it is only necessary to frame them. They are consequently seen in a sense contrary to that which is produced with albumenised paper. This latter result may, however, be obtained by making a second transfer from the glass upon paper; but the adhesion of the layer is such that, up to the present time, I have never been able to obtain a satisfactory result.

"I have likewise the honour to present to the Society two proofs developed upon enamelled glass, the softness and modelling of which have appeared to me of a nature to attract attention. I have also made the transfer upon panels intended for oil paintings. The image in this process being obtained upon glass—that is to say, on a perfectly plane and hard surface—the reliefs and the cavities of the gelatine may be moulded and produce an engraved plate of the most exquisite fineness, of which I hope shortly to present specimens.

"I think it right to terminate this communication by adding that I do not pretend to have made any discovery. I confine myself to pointing out the result of personal experiments, hoping that, in consequence of the publicity which will be given to them, they will not be found without interest for others more skilful than myself, who perhaps may be unacquainted with these manipulations, the simplicity of which is not to be surpassed."

At the end of this presentation,

M. Despaquis observed that in the process which he used for obtaining carbon proofs by enlargement, the exposed layer of chromatised gelatine presented also, after washing, reliefs, from which it would be easy to make mouldings.

M. Braun presented to the Society a series of proofs with two tints, obtained with chromatised gelatine by means of one single impression. The two colourings used by M. Braun were black for strong shades, and sepia for the other tints.

The Society thanked M. Braun and the other contributors, after which the meeting terminated.

SOCIETY FOR THE ADVANCEMENT OF PHOTOGRAPHY, BERLIN.

A meeting of this Society was held on the 25th June last,—Dr. H. Vogel in the chair.

The Chairman stated that Herr Christmann had sent the first part of an artistic publication, with photographs of the principal churches and monuments in Germany, together with views of certain convents. Some of the details in the interiors of the latter could only be taken by the magnesium light or by solar light reflected from mirrors. He (the Chairman) likewise exhibited the two pictures, by Herr Hammerschmidt, of the Sepulchre at Jerusalem, also taken in this manner, and which were spoken of at the previous meeting of the Society. He (the Chairman) particularly recommended the method of lighting by means of mirrors in preference to the magnesium light, as being materially cheaper and causing no smoke. He said that by the employment of several mirrors it was possible to bring light to rooms apparently inaccessible; but, of course, the further the mirrors extended the feebler was the reflection, and a corresponding increase in the length of exposure was indispensable.

A letter was read from the New York District Society of great interest to the members of this Society, but it related only to private affairs, after which some other communications were read, and amongst them one from Herr Hinrichsen, of Kiel, accompanied by a number of proofs finished with his retouching essence for negatives.

Herren Prümm, Marrowsky, Lindner, Grasshoff, and Jacobsen undertook to examine these proofs. Herr Prümm said he took the "essence" to be gum benzine. According to the instructions for using it, the essence was poured over the negative plates, which were thereby roughened for retouching with a lead pencil.

Herr Petsch was reminded on this occasion that the rubbing of the plates with oil of turpentine had formerly been recommended, but he said it had the disadvantage of making the plates greasy and difficult to dry.

Herr Wilde recommended that the fresh plates should be covered with a very thin lac, the roughening of which would make the layer receive the pencil easily, and that, after successfuly retouching, they should have a supplementary varnishing with the usual lac.

Herren Bruck and Grasshoff though that by this operation the retouching would be injured. The latter believed, however, that, provided the first lac was sufficiently thinned, the retouching would permit the application of a second coating.

Herr Marrowsky remarked that, on a rough surface, every pencil touch looked like a stripe, which did not suit the character of photography.

Herr Petsch spoke in favour of the white lac as the ground for retouching, and urged the use of Siberian lead pencils, which answered all the requirements.

Herr Prümm confirmed what had been stated by Herr Petsch.

Herr Grasshoff referred to what he had, on a former occasion, stated as to the manner of roughening the lac, the effect of which was very good; also to gum mustic, which, he said, was better and cheaper than sandarac. The latter, when rendered rough, received a lustre in the shadows which showed the freckles very distinctly.

Herr Lindner spoke in favour of the lac recommended by Herr Grasshoff, but thought a layer of camphor would be an improvement.

Dr. Jacobsen thought the effect of the camphor was attributable to the evaporation of the camphor from the lac covering, which made it porous and granular, and hence it received the pencilling better.

Herr Petsch, for the transparent places, recommended black-lead and gum-water stirred together with water-colours. Such colours could be bought everywhere.

In reference to a communication from Herr Hinrichson respecting the prevention of intense fogging from the iodide of silver,

Herr Marrowsky mentioned that similar advantages had accrued therefrom in the Daguerreotype process.

The Chairman remarked that the simplest way of preventing the fogging was by adding free acid to the strengthening bath; and that the effect upon the iodide was very similar, because it freed the silver salt from nitric acid. He (the Chairman) then read a letter from Herr Kiewening, in which the question of stripes upon a plate under examination was cleared up. The stripes proceeded apparently from the bottom of the gutta-percha dipper, and spread in a horizontal direction upon the plate.

Herr Prümm said that when working with glass or porcelain he had met with similar faults.

After some general conversation on this subject the meeting separated.

Apparatus for Washing Photographs.—The following is the provisional specification of the invention of Mr. Marsden for this purpose:—My invention consists of improved machinery or apparatus for toning, fixing, and washing photographic prints, and in part is also useful for other purposes where similar rocking motion arrangments to those hereafter described are required. The apparatus consists of one or more receptacles or for vessels containing the toning or fixing solutions, or water, or other liquid in which the photographic prints or other articles to be prepared are immersed, and so arranged that by means of said machinery or apparatus a mechanical rocking motion can be produced and applied to the washing of photographic prints and other fragile articles, as also in the operation of toning and of fixing photographic prints, and for other purposes for which it is desirable to use a rocking motion with or without change of water or other liquid in the manner described. In the said machinery or apparatus the receptacles before mentioned are so placed as to be rocked by turning on its axis a rod or bar, with or without joints, fitted with one or more bends, pins, or other projections, or with crank or cranks, and connecting rod or rods, fixed or movable, which may be turned or put in motion either by the hand and foot or any other mechanical power. Other arrangements of rocking mechanism may, however, be adopted in lieu of the above, although those above described I have hitherto considered preferable. The receptacles may be filled with water or any other liquid to the required height, and emptied either by means of jointed tubes of India-rubber connected with an aperture or apertures in each receptacle, or by tubes of other suitable material with or without joints, or in any other convenient manner. In the operation of toning and of fixing photographic prints the same motion is produced by the same means, with the intention of thoroughly separating the prints and keeping them in motion while immersed in the toning and fixing solution.

Correspondence.

Foreign.

Paris, August 9, 1869.

ONCE more in this fine city again, having, by my absence, escaped some weather of intolerable heat, and met with some of general rain in that land of "heavy wet"—old Ireland! One result of being away is that I have to fall back upon the "foreign journals" in which our friend and correspondent, Mr. G. Price, believes there is so much hidden wisdom, and the most recent information. I have just gone over a pile of about thirty, which have been accumulating, and very little is there of interest to a photographer. The English journals are laid under heavy contributions, especially in the matter of our art, but, generally speaking, this borrowed knowledge is several months old. I never go to foreign journals, except as a *dernier ressort*, for I prefer, whenever I can, to cull direct information. The short time which has elapsed since returning to Paris, and the occupations of that time, have prevented me from seeking much original; still I have noticed something about which I intend to seek information for your readers, and I find a letter respecting the way of making magnesia cylinders which may be of interest to some of them.

The magnesia must be of great purity, and, to mould it, it should be moistened with weak gum water, placed in a tube of metal of the required size, and allowed to dry there. The moulded magnesia is then put into a crucible, which should be subjected to a moderate heat at first, and then allowed to attain a white heat. The cylinder must always be allowed to cool in the crucible. It is whispered that something better than either zirconia or magnesia is upon the point of being found out, and that the light emitted by the magnesia cylinders is not so intense as it might be, although the cylinders are very lasting. All this is extremely tantalising, but I think you have whispers on your side of the channel which are more so, and respecting which I, for one, would be very glad to learn "the truth, the whole truth, and nothing but the truth." I allude to the cheap way of manufacturing magnesium. It has been long whispered that this was on the point of being put in operation. I have had it formally denied that there was any truth in the whisper or rumour, and, as I read in your pages that it is nearer a *fait accompli* than ever, what is the truth about this?

A *mémoire* has been presented to the Academy of Sciences, in which the unequal rendering of various colours by photographic processes is explained by the fact, that the slowness of the vibrations of red, orange, and yellow light is the cause of these rays being scarcely reproduced at all; and the rapidity of the vibrations of the blue rays is the reason of their being more rapidly impressed. The more refrangible rays accomplish their work in less time than the rays of lesser refrangibility. It has been found, also, that of sunset the spectrum of light from the zenith is very short—does not contain any red, orange, or yellow, but is invariably composed of green, blue, and violet; and this is accounted for by supposing that the atmospheric prism only refracts to the earth the rays of the greatest refrangibility, and whose vibrations are the most rapid. Therefore, the absence of the red rays in the zenithical twilight spectrum is due to the insufficient vibratory rapidity of these rays.

It appears from an article of Mr. M. Carey Lea that pure bromide of potassium is rarely met with in commerce. Pharmaceutists have long known this, and, now that the demand for this chemical is so enormous, it is well to be assured of the purity of each specimen bought, if the quality of the article be a *sine quâ non.* The bromide which is made in the manufactories of iodine is much more liable to contain this metalloid than that made from saline matter free from it; hence, for the preparation of bromides where purity is required, it is better to employ the bromine which is so largely manufactured at Stassfurth, and which I spoke of in your pages some months ago. But, supposing the bromide to be purchased, the following reactions are recommended by Dr. Constant Barillot for detecting and estimating the usual impurities. These consist chiefly of iodides and chlorides of potassium—the former arising from want of care in the preparation of the bromide, and the latter from falsification by means of the cheaper salt. The process generally used for the detection of iodine is to mix a little starch paste with the solution of bromide to be tested, and then to add to this mixture some concentrated nitric acid. The iodine, if present, is set at liberty, and imparts a blue colour to the starch.

M. Lepage, of Gisors, recommends dissolving one gramme of bromide in five of distilled water, and adding to the solution five or six centigrammes of iodine in a finely-divided state. If the bromide contain the slightest trace of iodide, the solution takes *instantaneously* a yellow colour more or less intense. If it be free from iodide, it is only after a certain time that the yellow tint becomes manifest, for bromide of potassium will dissolve iodine *in course of time.* A third process for the detection of iodine consists in dissolving in a test tube one gramme of bromide in five or six of water, adding thereto four or five of pure benzine, a few centigrammes of iodic acid, and shaking the whole well. If there be any traces of iodine the benzine is tinted of a rose colour, which is more intense according to the quantity of iodine in the mixture. The detection of chloride is a more delicate operation, and the following process of M. Salières, of Libourne, is recommended as easy and good:—A test solution of nitrate of silver is poured into the solution of bromide to be tested; a mixture of bromide and chloride of silver is precipitated together, if the chloride of potassium be present. The solution of silver is added carefully till no more precipitate is produced. The quantity of chloride, if there be any present, is then found from the following data:—One gramme of absolutely pure bromide of potassium requires 1·427 of nitrate of silver for its complete transformation into bromide of silver; one gramme of chloride of potassium, equally pure, requires for its transformation into chloride of silver 2·279 of nitrate of silver. Hence, if we imagine a mixture of 0·9 of bromide of potassium and of 0·1 of chloride, the quantity of nitrate of silver to be absorbed for the complete transformation into bromide and chloride of silver will be—$1·427 \times 0·9 + 2·279 \times 0·1 = 1·5122$. I see an objection to this process in the source of error that would arise if iodides were present in the bromide as well as chlorides.

One little expected that spiritualism, whatever that means, should ever be alluded to in the pages of a photographic journal, or that photography should be drawn in to aid in the deceptions of the craft; but so it is, and in my opinion it is one of the most absurd and painful notions of the present age that spiritual beings should come at the will of photograpic operators, and should "stand for their portraits." I am lead to these reflections, and to make these remarks by the indignation I felt at reading the ridiculous nonsense which the editor of the *Art Journal* is said to have communicated to Judge Edmonds, of Mumler trial celebrity. If people will perpetrate such absurdities in print they must take the consequences, and, although I would not willingly hurt the feelings of anyone, nor touch upon such matters at all, I cannot avoid making my protest against the illogical and impious matter attributed to Mr. S. C. Hall, and to ask all photographers to scout this so-called "spiritualism," and wipe their hands of such things. I have longed as much as anyone for the visits of glorified beings, but I would not wish to see one in a "mutch" cap, with "hair plaited back," and blind. I should be shocked to think that such was the garb of "this mortal when it shall have put on immortality," and my common sense would teach me that "mutch" caps and "plaited hair" were at any rate mortal accessories, and could never survive eight months in the grave. My ideas of a glorified state would not let me believe that the "getting up" and starching that "mutch caps" would require were celestial occupations, nor could I imagine they could be obtained ready made in the habitations of the just. The vision of Mr. Hall will not hold together; it is full of absurdity, and is most illogical. If Mr. Hall believes that what he saw was the spirit of his risen sister, he must also believe in the resurrection of "mutch caps" and "plaited hair."

R. J. FOWLER.

Redon, August 7, 1869.

PERMIT me to say that you are quite wrong in the history you give of the deep meniscus lens in your last number, page 372.

Mr. Ross's doublet was described in your Journal in September, 1864; and Mr. Dallmeyer's deep meniscus was patented in the autumn of that same year; whilst my deep meniscus was published in *Photographic Notes* in March, 1864—that is to say, six months before Mr. Ross's doublet or Mr. Dallmeyer's deep meniscus were heard of.

It is true that I did not publish the full analytical demonstration until February, 1865; but the formula for making the lens was published in my *Notes* in March, 1864, and also its peculiar properties, which were not known before.

In Mr. Airy's paper on eyepieces, to which you refer, no demonstration is given of the peculiar property of the deep meniscus of flattening the field, when used as a photographic lens with a stop in front.

I trust that in fairness to me you will consult published authorities, and put yourself right with your readers on this matter of history.

Mr. Ross has returned me a letter which I wrote to him, bearing date February 15, 1864, of which the following is a copy:—

"*Jersey, February* 15, 1864.

"DEAR ROSS,—I send you a sketch of a doublet made with a pair of those lenses with plano-contact surfaces (deep meniscus achromatic).

"This doublet ought to give a flat field, and no distortion; and it ought to be better than the globe lens in every respect.

"You say you are making a single lens on this principle of plano-contact surface. If you were to make two while you are about it, this doublet could easily be tried. It might turn out very jolly. Now is the time to try it, before other fellows get hold of the idea. This doublet looks to me very promising. If we can get rid of the concave lens in the triplet it will be a fine thing.

"SUTTON'S DOUBLET, FEB. 15, 1864.

"Radii of meniscus lenses	1·77 and 2·9 inches.
Focal lenth	10 inches.
Distance apart	1 inch.

"The field will be tolerably flat. The obliquity of incidence at the outer surface of the lenses is much less than in the globe lens, which seems to be an advantage as regards marginal definition. Flare is not so great as in the globe lens.—Yours faithfully, "THOMAS SUTTON."

The above letter was addressed to Mr. Ross six months before he published the particulars of his own doublet; and twelve months before the particulars were published of Mr. Dallmeyer's patent meniscus.

Mr. Ross's actinic doublet is not made with deep meniscus lenses

having plano-contact surfaces, nor are these lenses pairs as in the doublet which I suggested to him to make. I have always given him credit for being the inventor of his own doublet, because it is different from mine.

I have never, until lately, published the fact of my having suggested to Mr. Ross to make a doublet with deep meniscus lenses, because I was unwilling to say anything which might appear to detract from the credit due to him; but he has requested me to publish the foregoing letter.

I am quite aware that deep meniscus lenses have been known ever since the art of lens-making was known; but the superiority of this form of single lens over the old form of single lens for photographic purposes was first pointed out by me in the spring of 1864, and that publication was the means of setting to work the two leading opticians to apply this principle in the way they subsequently did.

There was a great want felt at that time of a single landscape lens which would include a very wide angle. If the properties of the deep meniscus of flattening the field were generally known before I published the fact, why was that lens not introduced before? Why did not Goddard introduce it if he knew of its properties?

THOMAS SUTTON.

[In replying briefly to the above communication we commence at the end. Mr. Goddard's pecuniary circumstances did not permit him to introduce any lenses but those which afforded the chance of a quick return pecuniarily, and the single deep meniscus was not one of that kind. Moreover, some lenses of this class made by Goddard are as deep as those made by London makers at the present time. Curiously enough, neither of the two leading opticians appear to have profited by Mr. Sutton's counsels, for the wide-angle lens of Dallmeyer is not a deep meniscus in the sense in which Mr. Sutton evidently uses the word, and Ross's doublet is not so deep in the external curvatures of its parts as the old globe lens. The special features in the respective lenses of these opticians reside, as we said before, in the *in*ternal not the *ex*ternal configuration; and both of them will, doubtless, readily aver that the properties possessed by the deep meniscus form were well known to them for many years previous to Mr. Sutton's writing on the subject. Single meniscus lenses quite as deep, if not *deeper*, than the curves preferred by Mr. Dallmeyer for his wide-angle landscape lens, have been in the market for at least ten or twelve years; and doublets (*e.g.* the globe) with components *deeper* than those of Mr. Ross's doublet have, too, been long known. And does Mr. Sutton really imagine that clear-headed lens makers would thus use a special form of lens without having a good reason for it? Concerning the demonstration given by Mr. Airy in his paper in the Cambridge transactions to which we referred in our last number, had we room to embody it with its illustration in the present append to the foregoing letter, Mr. Sutton and the rest of our readers would see how much we really owe to the learned professor named. It appears from the above that Mr. Ross has requested Mr. Sutton to publish the letter embodied in his communication. Well, what does it illustrate? Mr. Ross's doublet is *quite* different from that suggested by Mr. Sutton. In due time it will be found that we have given Mr. Sutton credit for all that he has done in connection with the optical department of photography; but as yet the evidence adduced prevents us from giving him the credit of having any share in the introduction of the meniscus lens.—EDS.]

Home.

SURFACE MARKINGS.

To the EDITORS.

GENTLEMEN,—A letter from "Photo.," in your issue of yesterday, again compels me to take up my pen to aid and assist my photographic brother in his trouble.

Constantly working day after day out of doors makes one pretty conversant with markings of every kind, such as "oyster shells," "scum marks," and also what are termed "dipper marks," similar to those mentioned by "Photo." as occurring on the plate about an inch from the bottom, and taking the shape of the dipper. These latter I am never troubled with now, although in 1866 I was bothered with them the whole summer long.

The two first kinds of markings I constantly meet with now, and have not yet found a perfect remedy. The bath may be perfectly clean (I filter mine every night), and yet every plate from the first to the last may be covered with oyster-shell markings and surface stains. I always use a silver dipper wiped clean after being used.

The evil does not lie in the bath and the plate-holder—certainly not in the latter, which is a mere mechanical support, and does not touch the sensitive surface at all.

I find sometimes that a bath after working for two hours satisfactorily gives surface stains all over the plate; that after an hour or so has elapsed they all disappear, and that the original condition has returned. Very early in the morning—that is, between five and nine—these marks are rarely met with.

To temperature must be ascribed the cause of such. During the early morn the air is cold, still, and moist, and the bath is then extremely sensitive. Given a dry, hot day, with wind adding to the dryness, and these markings will appear on every plate. A shower occurs, and they disappear. The hotter and drier the air—the longer the exposure—so sure will be the quantity and intensity of the markings. In damp, cold weather they rarely occur, even in cases of exposure of one or two hours' duration.

The old method—proposed, I think, by Mr. Lake Price—of adding a little alcohol to the bath, will in some measure obviate the trouble. So will a plan I proposed in the spring in a series of articles published in THE BRITISH JOURNAL OF PHOTOGRAPHY—*The Wet-Plate Worker in the Field: Chemicals, and How to Use Them*—and which I constantly make use of myself, viz., "adding a little white powdered sugar to the bath." This will not only tend to keep the film moist, but make it more sensitive.

The markings, when they do occur, may be removed, if not very intense, with a fine feather drawn just over them. This is better than a pencil.

And now a word in conclusion as to "dipper" marks. These may be got rid of by diluting the collodion with a little plain collodion—say one ounce to five—when they will all disappear. Or add a little pure ether and alcohol; or, if very thick, half-a-grain per ounce of bromide of ammonium, and let it stand for a week or so before you decant.

If your correspondent will try either of these remedies, closely observing the weather, I think he and others will have no difficulty in future.—I am, yours, &c., WM. HARDING WARNER.

Ross, August 7, 1869.

P.S.—The markings which always take the shape of the dipper or the markings on the surface of the dipper arise from absorbed light acting on the plate whilst in the bath. Thus, you may recollect, M. Niepce enclosed a roll of paper in the dark, after subjecting it to heat, along with a negative, and a faint image was found on it. The iodide of silver being doubly sensitive is more readily acted on. If you take a plate in these hot days and sensitise it in a glass dish you have none of these markings. I sometimes think that the air of one's tent, from the vapour of the collodion, gets very sensitive to a very little light; just as I have seen on a hot, dry day—after a shower especially—the mullions from windows in Tintern Abbey reflected or refracted, and standing as it were in the air, perfectly invisible to the eye, yet perfectly plain on the negative. I have one or two negatives with such markings on them, although the sun was not shining at the time. I think these dipper marks are caused in the same way; the collodion being thick, the atoms of iodide are closer together and more sensitive to such feeble reactions, the heat of the air acting in the place of light. This subject is very interesting and needs investigation; it might account for much of the so-called "spiritualism."—W. H. W.

DEEP MENISCUS LENSES.

To the EDITORS.

GENTLEMEN,—I am surprised that Mr. Sutton should think for a moment of laying claim to any invention in connection with the meniscus lens, whether it be of deep or shallow curvature, for both the one and the other have been in use long prior to the time when Mr. Sutton's name was first heard of in the photographic world. The meniscus lens was among the forms employed by Daguerre, and, indeed, it is scarcely possible to take up any old illustrated catalogue of photographic apparatus, or any illustrated manual of the art, without this fact being impressed upon us. In addition to what you have adduced about Airy, in the Cambridge transactions, the majority of writers on optical subjects have directed attention to the meniscus lens as possessing features which made it specially useful. A meniscus lens the radii of whose curvature was as five is to eight was recommended for cameras by Sir David Brewster in one of his very first works on optics.

I have always been taught that in proportion to the width of angle of view so must be the depth of the curvature in the lens; and I am sure that if Mr. Sutton had applied for information relative to this to any person conversant with the practical details of lens construction, he would at once have been set right. The narrower the angle of view the flatter the curvature of the lens, and *vice versâ*.

I am in the habit of seeing daily some of the best and most modern single landscape lenses of our best makers, and, from the fact that none of them are what I at least would call a deep meniscus, I infer that, despite what Mr. Sutton says he has taught to the contrary, the deep meniscus, whatever it may in theory be, has not turned out sufficiently good in practice to warrant its being made by any optician who is jealous of his reputation. Meniscus lenses may not have been made or sold by any of the opticians in Jersey, in which place this gentleman is said to reside; but these are somewhat narrow premisses from which to conclude that, because such was the case and he never heard of them, *therefore* they are unknown elsewhere.—I am, yours, &c.,

August 9, 1869. SANTA CLAUS.

PYROXYLINE AND COLLODIO-BROMIDE.

To the EDITORS.

GENTLEMEN,—Mr. M. Carey Lea seems determined to persist in drawing from me unpleasant rejoinders. In his last letter, published at page 380, he gives up the pyroxyline controversy. Mr. Lea is quite entitled to hold his own opinions on the preparation of pyroxyline, be they derived, as he himself avers, from hearsay, or from any other source, but he is not entitled to decry the preparations of others without good cause; and unless he appeal to direct and careful experiment in corroboration of his views, he will find few believers in them within the pale of crucial experimentalists.

In another part of his letter Mr. Lea says:—"I do not doubt that when Mr. Dawson shall have worked at collodio-bromide as long as I have done, he will acquire greater facility in the manipulations," &c. This is merely what our American cousins themselves designate "tall talk," which deserves no other notice at my hands than a gentle hint that, in this country, reasonable and modest men are not in the habit of publicly praising themselves to the depreciation of others, or of calling their own "the best dry process known." We leave these things to be found out by a discerning public.—I am, yours, &c.,

King's College, August 9, 1869. GEORGE DAWSON.

WASHING PHOTOGRAPHS.

To the EDITORS.

GENTLEMEN,—A friend has suggested to me the following method of making a little water go a great way in washing prints, and also of doing its work in the briefest possible time:—After removing the prints from the hyhosulphite of soda, pin them upon a board, and forcibly project over them a spray of water by means of one of the ordinary hydropults or double-action garden syringes now so commonly met with.

I have tried this, and am much pleased with the rapidity with which a 15 × 12 print on albumenised paper was washed. Although I did not measure the time by my watch, I would hazard a belief that the effective washing of the print did not occupy a thirtieth part of the time usually required for this necessary operation. The nozzle which I employed with the hydropult projected the water as a fine spray, but with great force. The hyposulphite was removed with great rapidity, and the picture was not damaged in the least degree.—I am, yours, &c.,

August 11, 1869. CHARLES HOGG.

OCULAR PARALLAX.

To the EDITORS.

GENTLEMEN,—Is there any kind of lens (which could be used as a spectacle lens or single eyeglass) which will enable a person possessing good eyesight to bring into focus at the same time, more easily than the eye alone can do, several points or objects situated upon different planes?

I refer to the difficulty in rifle shooting of getting a clear view of the fore and back sights of the rifle and target at the same time whilst aiming, especially when the back sight is placed rather near to the eye of the shooter, as in the case of the Enfield rifle.

This can be done by substituting for a spectacle glass a piece of metal having an aperture drilled in it of one-tenth of an inch, but this would be objected to in practice. No objection can be made to any person shooting in spectacles or using an eyeglass to assist his natural vision, and my wish is to ascertain what form of single lens could be so used with advantage if mounted as an eyeglass. It should not diminish the size of objects more than is absolutely unavoidable. Please also state where it can be obtained.

A reply to the above queries in your next number will oblige a regular subscriber.—I am, yours, &c., RIFLEMAN.

August 10, 1869.

[The principle involved in a satisfactory solution of the above problem is precisely that by which depth of focus is obtained with a lens, viz., reduction of the aperture. Equal sharpness is required with the near sight on the rifle and the distant object. By reducing the effective aperture of the eye this will be readily obtained. Closing the eyelids very considerably will enable a sharp outline of an object to be obtained which otherwise would from its nearness be imperfectly defined. This reduction of the visual aperture imparts depth of definition. How to apply this principle in the case of rifle shooting *according to law* we know not. The best way would probably be to have a pair of spectacles with a plain glass at the right-hand side, a central patch of black being neatly made, with a small hole scraped in its centre. This would amount, practically, to the same thing as a plate of brass with a small hole drilled through it, and even if observed could not, we think, be objected to by those having the superintendeuce of the shooting match. The next best thing would be to try a concave spectacle glass.—EDS.]

Miscellanea.

PRESERVATION OF PROTOSULPHATE OF IRON.—M. Welborn states that protosulphate of iron is absolutely preserved and kept from even the very least trace of oxidation, by placing with it a piece of camphor wrapped in a piece of clean and dry paper.—*Deutsche Ind. Zeitung.*

DESTRUCTIVE FIRE IN SHREWSBURY.—On Saturday morning last, at one o'clock, a destructive fire broke out in Castle-street, Shrewsbury. As far as can be ascertained, the fire originated in the warehouse of Mr. Laing, photographic artist, and the first indication was the livid light which shot up above the surrounding buildings, all of which, with St. Mary's Church, were illuminated by the flames. Hundreds of people were speedily on the spot at the alarm of St. Mary's bells; the cottagers by the Yorkshire House Inn were got up, and the furniture carried into the street and St. Mary's Church. The shops of Messrs. Alltree and Lee, Mr. Laing, photographer, and Mr. Powell, provision dealer, were broken open, and many of their valuable contents removed. The water from the plugs was put on after some delay, and the firemen got to work. The horses from the Crown Hotel stables were taken out. Sergeant Bowman, of the Shropshire artillery, courageously got a canister of powder out of Alltree's cellar. The fire raged for a considerable time, and much of the property in the shops named was seriously damaged.

MOVING MACHINERY REPRESENTED BY PHOTOGRAPHIC PROJECTION.—All persons who have recently attended the higher classes in our public schools know how much teaching has been facilitated by the frequent use of photographic projections with the electric, or Drummond, light. Thanks to this process, says *Appleton's Journal*, the most delicate objects, whether microscopic or telescopic, can be faithfully represented to an entire audience; and it was supposed, in arriving at these results, that perfection was certainly attained. M. Bourbouze, however, in explaining the gas machine of M. Hugon, experienced many difficulties not before anticipated, while demonstrating the relative movements of the slide and pistons; and was obliged to repeat several times the same design, with the organs in different positions, with only a partial degree of success. In studying to remedy this defect, we are glad to say he has entirely succeeded, having invented a process that will completely revolutionise the art of projection. He constructs his photographs in movable parts, but turning a small winch the whole design is correctly demonstrated; the pistons and slides repeat successively the different relative positions taken by the real machine, and consequently all difficulties in explaining disappear. This elegant result has been obtained by the ingenious inventor by means of a very simple arrangement; each movable organ is photographed on a special glass, and these different glasses are arranged in a frame which contains on a fixed glass the photography of the fixed parts of the apparatus represented. The movable glasses are each fixed to a connecting rod moved by a single winch, the length of each connecting rod being calculated in such a way as to produce accurately the movement required.—*Scientific American.*

ELECTRO-CHEMICAL DEPOSITION OF IRON.—Much attention is now being paid in France to the electro-chemical deposition of iron, and all the difficulties in the way of obtaining electrotype copies of engraved plates in this metal seem to have been surmounted by M. Feuquieres. This gentleman, however, keeps his process secret, but M. Klein is more communicative. Every salt of iron has been tried in turn for the purpose, but hitherto without success. We mentioned, three or four years ago, that Bottger had obtained the best results with iron alum, as it is called, which is really a double sulphate of iron and ammonia. It is a solution of a similar kind that Klein employs. He has tried it in various forms—first, a simple solution of iron alum; then a mixed solution of the sulphates of iron and ammonia; and, lastly, he made a solution, which he finds to answer better than either the preceding, by first precipitating sulphate of iron with carbonate of ammonia, and then dissolving the precipitate in sulphuric acid, taking care to have a perfectly neutral solution. For the positive electrode, a sheet of iron eight times the size of the copper negative is used—that is, supposing the object is to obtain a copy in iron of a copperplate engraving. It was found that a good deposit of iron was not to be obtained directly upon plumbagoed gutta-percha or other moulds. It was necessary to get first upon these a very thin layer of copper, upon which the iron was deposited freely without any cracks or flaws. The copper can be removed from the iron copy by scrubbing it with a brush and rotten stone. Electro-deposited iron is, of necessity, quite pure. It is of a dull grey colour, and has rather a higher density than the best soft iron. It is malleable, but after hammering for a time it becomes brittle. It cements in charcoal, and after cementation will take a temper. It may be magnetised, of course, and it retains its magnetism in a most remarkable manner when common iron loses it. This suggests the use of needles made of electro-deposited iron for magnetic observation. The uses to which the art is applied are very numerous. Besides the reproduction of copper plates in iron, dies and stamps of all kinds are reproduced in the harder metal with manifest advantages.—*Mechanics' Magazine.*

PRODUCTION OF OXYGEN FOR INDUSTRIAL USES.—The works, in running order, although not yet quite finished, are located at the foot of Forty-first Street, in this (New York) city, a malodorous neighbourhood, where

some means, artificial or otherwise, would not be out of place, in substituting oxygen for the foul emanations of butchers' shops and dirty gutters. The essential or characteristic portions of the process are carried on by the aid of brick furnaces, of which only one was in operation at the time of our visit, several others being, however, rapidly put up and fitted for use. Each furnace has its fire-box so arranged as not only to heat the retort which holds the manganate of soda (the vehicle through which the process is carried on), but also one or more chambers through which an air-blast passes to the retort. The retort, furthermore, communicates, by a pipe furnished with stopcocks, with a suitable steam-boiler. The process is carried on as follows:—About 600 pounds of manganate of soda are placed in the retort, heated to the requisite degree in the furnace; superheated steam from the boiler is then admitted for about ten minutes. Two equivalents of the manganate of soda and two of water react upon each other, as indicted by the formula—

$$2(MnO_3, NaO) + {}_2(HO) = 2(NaO, HO) + Mn_2, O_3 + O_3.$$

In other words, the water combines with the soda of the manganate to form a hydrate of soda. The manganic acid is changed to sesquioxide of manganese, containing only half the proportion of oxygen, and the other half of the latter passes off in a free condition. At the conclusion of this part of the process the steam is shut off, and the superheated air is admitted for about fifteen minutes, whereupon the sesquioxide combines with more oxygen from the air, and is converted back into its original form of manganic acid, which, of course, resumes its former relation to the soda, reconstituting manganate of soda, ready for a repetition of the process. In forcing the air to the apparatus, a steam-pumping engine is used, noticeable for the manner in which friction gearing is applied to transmit power from the engine to the air-forcing pumps, without the jar incident to the use of cogged wheels. The air-blast passes first through cylindrical vessels containing caustic soda, by which its carbonic acid is removed, and thence through the superheating chamber previously mentioned to the retort. The retort is never opened, as the material shows no signs of deterioration by use. That in the retort at the time of our visit was tested continuously for six months before being brought to this country, and has been in constant use for six weeks past, the period during which the works have been in constant operation. As the oxygen leaves the retort it passes through a suitable meter, which registers the quantity, and thence to the gasometer, which, at the present time, contains 25,000 feet of oxygen gas, much purer than is required for most of the purposes for which it is to be employed.—*American Artisan.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A Derogy's patent objective, for three sizes of portraits up to whole plate, also for views (an excellent lens), will be exchanged for an orthographic lens (10 × 8) by Ross, or a Grubb's aplanatic landscape lens (10 × 8).—Address, R. Mason, 19, Fishergate, Preston.

A good bicyle is offered for a small portrait lens by any good maker, or useful photo. apparatus. Also a model steam engine for a musical box or scientific articles. Difference adjusted.—Address, W. K. Menns, Photographer, West End, Chipping Norton, Oxon.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photographs Registered During the Past Week.—

P. P. Skeolan, Harrogate.—*Three Portraits of Dr. Bedley.*

Fred. Evers, Liverpool.—*Photograph of the Bible Stand in Seville.*

☞ *Correspondents should never write on both sides of the paper.*

Payne Jennings.—In our next.

*** Some reviews and answers are unavoidably left over till next week.

G. P. Powell.—The portrait ought to be somewhat more of a profile than it is. To your second question—yes.

Alfred Taylor.—The same solution of pyrogallic acid may be used for developing several negatives. We allude, of course, to a plain solution of the acid.

A Friend.—Thank you; not at present. In reply to your second query, let the plate of the rolling-press be heated.—3. Whipple's process was patented, but the patent has long ago expired.

G. Fergusson.—Now that you are residing so near the sea we advise you to secure some of those admirable effects to be met with in maritime districts. In addition to these, you may easily enough obtain many charming inland views in the Isle of Wight. You may spend a month very pleasantly in that island.

Nicholas Nickleby.—Mr. Berry, many years ago, suggested something of the same kind, and not only so, but he carried it out in practice; it is, however, unsound in principle. The nitrate bath ought to be kept free from all kinds of contamination.

Experimentalist.—We are quite unable to inform you whether the exhibition of carbon prints by Mr. Pouncy is still open in the Strand. It is nearly two months since we visited it. By applying at Mr. Tweedie's you will doubtless obtain all the information you desire.

George Simmons.—Place the lens in lukewarm water, and, after it has become warm throughout, transfer it to a vessel of water much hotter. This will effect a softening of the balsam, by which the parts of the lens may be separated from each other and cleaned by means of old collodion or benzole.

James B—— (Great Portland-Street).—By the original plain paper negative process of Mr. Fox Talbot results may be obtained, which, in sharpness are not much inferior to collodion. We have some prints from paper negatives by Mr. Talbot which we might have mistaken for collodion had we not known that they were taken long before collodion was introduced in connection with photography.

W. A.—We have never altered our opinion concerning the value of the collodio-bromide process. Although we have not employed it during the last few months, we still consider it to be a process of very great value, and intend soon to prepare a number of plates for exposure when on our annual tour. The special phase of the process which we intend to employ will be that of Mr. M. Carey Lea. Whether rightly or wrongly, we *believe* his to be most convenient, and from a specimen which Mr. Lea sent us, many months ago, we know that it is capable of producing good work.

Sartor Resartus.—We once got from Mr. Swan, of Newcastle, some specimens of his photo-mezzotint process, which quite disprove what you say concerning the impossibility of obtaining pictures by such means. The thing was *done*, therefore your theories are wrong. We have enjoyed your letter very much, and many of our readers would also have enjoyed it; but we make a special point of not publishing anything which might be construed into a question of religious principles, and, so far as we remember, we have never given our views on either religious or political questions.

F. R. S.—1. The two lenses are quite different from each other. We have in our possession the most perfect specimen of Archer's fluid lens that we have ever seen. It is said to have been the lens by which he took many of his finest pictures; but for the truth of this we are not, of course, able to aver. It is an excellently-made instrument and great ingenuity is displayed in its construction.—2. You ought to leave London on Tuesday, or at latest Wednesday morning next, so as to secure lodgings and get "settled down" before the evening of Wednesday, when the President delivers the opening address. The proceedings last one week. You will have an opportunity of meeting with many foreign as well as British scientific "lions" at Exeter. There is always a considerable number of scientific foreigners who attend the meetings of the British Association.

Received.—T. Bradshaw; H. Errington; John Bowman; "Strike a Light." To the last correspondent the author of the process will reply in our next.

LONDON GAZETTE, *Friday, Aug.* 6.

Partnership Dissolved.

Lloyd & Jefferson, Southport, Photographers.

Tuesday, Aug. 10.

Bankrupt.

Horatio Nelson Harrop, Longsight, near Manchester, photographic artist.—September 8, at Manchester.

Notice of Sitting for Last Examination.

G. Aldridge, Ashley Cottage, Warwick Road, Kensington, photographer.

METEOROLOGICAL REPORT,

For the Week ending August 10th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 A.M.

Aug. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
5	30·28	70	54	59	67	E	—	Bright
6	30·29	68	52	58	65	NE	0·04	Bright
7	30 28	66	52	58	65	SSW	—	Bright
9	29·63	75	56	63	65	WNW	0·02	Overcast
10	29·77	65	50	53	60	NNW	—	Cloudy
11	29·88	—	51	55	60	WNW	—	Bright

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.**

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 485. Vol. XVI.—AUGUST 20, 1869.

ON THE RIPENING OF COLLODION.

We have long been familiar with the fact that certain kinds of pyroxyline will not work properly until the collodions manufactured with them have been allowed to "age." The time required for this ripening of collodion varies with different samples of pyroxyline, and has long been a source of some difficulty to the photographer, as there cannot be said to be any safe guide known by the aid of which the approach to ripeness can be ascertained. In a recent communication published in *Les Mondes*, however, Professor Lallemand has described a peculiarity of new collodion which appears to us to afford a clue to the determination of the change which collodion undergoes in the process of ripening, and would even seem to place in our hands a practical mode of determining with some accuracy when the collodion has reached the proper working condition or become ripe, without leaving the determination of this point to the judgment of the operator, or solely depending upon the evidence of a few plates coated with the sample, sensitised, exposed, and developed.

Before more particularly referring to the very interesting and important investigation of M. Lallemand, we must say that the observations we are about to describe occur in the course of a *mémoire* on a subject apparently quite foreign to photography, but yet connected with our art-science by a curious link; but we shall not touch upon any of the matters referred to by M. Lallemand, except in so far as they may bear upon the point we wish to lay before our readers.

M. Lallemand arranged a glass tube about eighteen inches long and of moderate internal diameter. One end of this tube was closed by a glass plate cemented on to the end, and the tube then filled with perfectly new and bright collodion; the second end was then closed with a similar plate of glass, and the tube fixed with its axis horizontal. Through this column of perfectly clear new collodion a beam of light polarised in a horizontal plane was transmitted. The observer, now stationing himself on either side of the horizontal column of collodion contained in the glass tube, and looking down upon it from the height of a foot or so, sees no light whatever; but the moment he brings his eye nearly upon a level with the tube the column of collodion appears self-luminous, while, on depressing the eye below this particular point, or raising it above the tube, the latter appears perfectly dark.

The peculiar phenomena described are only observed when the collodion experimented with has been freshly prepared and perfectly free from all insoluble particles. If the collodion be old, the tube full of the liquid appears to be self luminous, whatever may be the angle under which the operator views it. If, then, two samples of collodion were given, each perfectly bright and clear, but the one old and the other new, this test of M. Lallemand's would enable us at once to distinguish between them. It would appear, then, if we may venture to interpret some of the results of these experiments, that collodion, in the first instance, is a true solution of pyroxyline in the mixture of alcohol and ether, but that, as it ages, the pyroxyline gradually separates from the solution, and the collodion is then simply a mixture of pyroxyline in a peculiar gelatinous condition with alcohol and ether. We hope that M. Lallemand will take into consideration the practical bearing of his remarkable experiments which we have touched upon above.

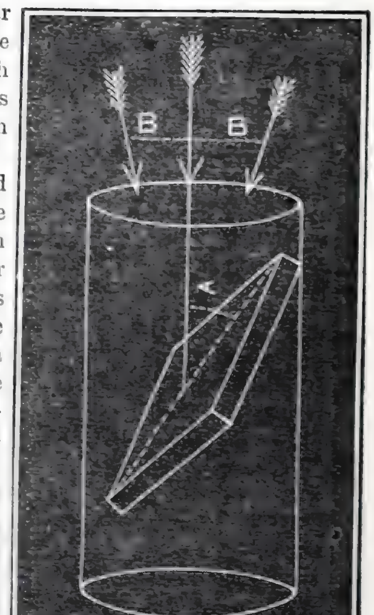
JAMIN'S POLARISING PRISM.

A few weeks ago we gave a short account of a very remarkable polarising prism recently devised by M. Jamin, the distinguished physicist. It will be remembered that the prism consists of a glass box filled with bisulphide of carbon and a thin plate of Iceland spar, so placed in the liquid that it shall be fixed diagonally in the box, as shown in the annexed diagram. As the angle that the plate of Iceland spar should make with the bottom of the glass box has not been stated by M. Jamin, and is subject to some variations, a friend of ours—Mr. G. Johnstone Stoney, F.R.S., Secretary to the Queen's University in Ireland—has investigated the matter, and we are now indebted to him for the following general statement of the mode of finding the angle at which the plate of calc spar should be placed.

"Let μ_o and μ_ϵ be the refractive indices of the ordinary and extraordinary rays in Iceland spar, and let μ be the refractive index of bisulphide of carbon; then μ_o is the greatest, μ the intermediate, and μ_ϵ the least of these three quantities.

"It is to be observed that extraordinary rays have indices varying (according to their direction through the crystal) from μ_o, their maximum value, down to μ_ϵ, their minimum value:—

"The slice of Iceland spar should be so placed as to give those extraordinary rays with which we are concerned indices bordering upon the minimum value.



"This will occur if the dotted line of the figure (which line is the projection of the incident ray upon a slice of crystal) be perpendicular to the axis of the crystal. This condition is fulfilled by any one of a system of lines lying in a plane. Three of these lines are the longer diagonals of the cleavage face of the crystal. Accordingly, the condition may be fulfilled with the slice which it is most convenient to make, viz., with a slice bordered by cleavage planes, provided the longer diagonal of the slice be brought into the position represented in the figure.

"The other condition to be fulfilled is that the angle $(\alpha + \beta)$ (where 2β is the angle between the extreme rays required to pass

through the apparatus) be somewhat smaller than the angle determined by the following equation:—

$$\text{co}\ (\alpha + \beta) = \frac{\mu_\epsilon}{\mu}$$

This is the condition for the total reflection of that light which, if it could gain admittance into the crystal, would furnish extraordinary rays.

"The best values of μ_ϵ and μ to use are those corresponding to red light.

"If these values of μ_ϵ and μ be used, $(\alpha + \beta)$ may be as large as the angle determined by the foregoing equation; and it is of importance to keep this angle as large as practicable, since upon it depends the intensity of the transmitted beam."

With the aid of the foregoing valuable statement, the optician has no difficulty in adjusting the angle at which the section of crystal should be placed, once he has determined whether he will employ the values for the red, yellow, green, blue, or violet rays.

NOTES ON THE COFFEE PROCESS.

This process has now been before the public for a considerable time, and has on the whole maintained its position against the numerous rivals it has had to encounter. In our own hands it has acquitted itself in a highly satisfactory manner, the plates proving to keep much better than at one time we had expected.

By employing a highly-bromised collodion and a very strong bath, with alkaline pyrogallic development, we have obtained pictures with a degree of rapidity similar to wet colldoion; but in our usual way of working with it we generally employ the ordinary bromo-iodised collodion of commerce with a slight addition of bromide, and a bath which varies between thirty-five and forty grains to the ounce, developing with plain pyrogallic acid solution.

We have just finished the perusal of some notes on dry-plate processes communicated to *Photographisches Archiv* by M. de Constant, in which he reviews the various additions to the coffee infusion proposed from time to time by experimentalists.

In his own experience he finds that the addition of a little gum water to the coffee tends very much to improve its good qualities as a preservative agent. His gum solution consists of gum arabic four parts and sugar candy one part, dissolved in one hundred parts of water. He prepares the solution as required. Although he finds that plates prepared with coffee alone will keep for a period of twelve months, he considers that the addition of the gum lowers their keeping qualities. The proportions of gum and coffee that he employs are one part of the former to two of the latter, this proportion of gum being sufficient to impart to the negative softness and atmospheric effect. When he tried a similar mixture of gum and tannin he obtained good negatives, but the plates were less sensitive. For this and other reasons M. de Constant did not persevere in its use.

When using an iron developer with the gum and coffee preservative the exposure need be but little longer than is required for wet plates. After repeated trials he gives the preference to the following:—

Water	100 parts.
Protosulphate of iron	3 ,,
Acetic acid	3 ,,
Alcohol	5 ,,

In developing by the alkaline pyrogallic method he does not adopt the process recommended by Major Russell and others, as he finds it better to pour over the surface of the plate a very weak solution of ammonia by itself, followed by a minute addition of pyrogallic acid.

We have not given any details of operating, as these have already been published in previous numbers of this Journal, and also in our last Almanac.

PHOTOMICROGRAPHY.*

The progress made in photography has extended not only to all the exigencies of art, but also to the requirements of science. It is possible to draw with accuracy the objects on which the microscope is brought to bear, either directly or by the *camera lucida*, but the most skilful and conscientious draughtsman will only be able to give you an interpretation of it. Light alone can give the exactness which is unquestionable.

* *Le Moniteur.*

Photomicrography is derived from micrography and photography: it proceeds both from the one and the other, but preserves a special character through its operating processes. It is already old, because it is contemporary with these two sciences; but, being only an experimental science, its extension has been hitherto restrained.

Photomicrography only differs from common photography by the substitution, for landscape and portrait objectives, of a microscopic lens with a short focus, placed opposite the preparation, which is lighted by reflection; this is the principle of the solar microscope. The numerous ways there are of placing the apparatus resolve themselves into two principal ones, viz., the camera fixed at the extremity of an inclining microscope, and resting upon a horizontal table; or the application of the instrument against an exposed window at noon, and throwing into the camera the image produced by the luminous rays.

The photographic processes employed in connection with this branch do not differ from those generally adopted. In the microscope, considered as an instrument of observation, the lighting by means of light reflected from a mirror is satisfactory; but, considered as a photographic instrument, there are complex luminous phenomena produced which give a defective print on the sensitive layer, and an alteration of the image. As success partly depends upon the light we make use of it is necessary to correct it, and for this purpose a glass cell is employed, constructed of parallel glass plates, filled with a solution of sulphate of copper at five per cent., which is so arranged as to interpose the passage of the luminous rays; but as this is sometimes difficult to manage, a very pure cobalt blue glass may be employed with advantage in its stead.

The most simple reflecting apparatus is a plane or concave mirror, according to the lenses employed. The prism has the property of dispersing the luminous bundle, and enables us to dispense with the necessary monochromatic adjustment, the heliostat always preserving the solar rays in coincidence with the optical axis. The diffused light is very feeble in intensity under most circumstances, as the diameter of the lenses is sometimes not more than a millimetre, or even less. The sun alone possesses the desired qualities, artificial lights being only used for exceptional cases and experiments.

It is a delicate matter to prepare objects relating to natural sciences for ordinary observations, and it is of still greater importance to have perfect preparations for photographing them, the smallest defect assuming enormous proportions, which are infallibly reproduced beyond remedy. Though all kinds of objects may be taken more or less indistinctly in the camera, special preparations are necessary for photomicrography, and the enlargement best suited to objects must be chosen.

Without pushing it too far, it is desirable to take the greatest degree of enlargement that can be attained without compromising in any degree the clearness of the image. It is possible to go beyond the limit assigned by obtaining successive enlargements; but, as it is imperatively necessary to produce, in the first instance, a perfectly complete negative developed with an intensity in harmony with the effect required, it is rarely that we are satisfied with these two conditions; even a most skilful operator is subject to numerous failures from the multiplication of the smallest error.

Photomicrography fixes the fugitive image which is observed with the microscope; instead of being the privilege of a single person it may become visible to a vast assembly, and be of great assistance for public demonstration. A large dark chamber adapted for this purpose has been organised at many exhibitions; enlarged views are there exhibited to spectators, and photomicrographic proofs printed upon glass.

It is interesting to see subjects as they exist naturally. Chemistry and natural philosophy have operated directly; they give the image precisely and mathematically. Thus a parasite, imperceptible to the naked eye, presents upon the screen a length of two or three feet, animal and vegetable organs being shown in their true form.

J. Girard.

SARONY'S PHOTO-CRAYON PROCESS.

The six months of provisional protection having been completed, the details of Mr. Sarony's process are now open to the public. In his specification he says:—

I give effect to my invention in the following way:—I take a small negative portrait, and enlarge the same to any suitable extent or variation upon glass, either by sun or artificial light, which portrait I back up with, by preference, rough drawing-paper or other suitable equivalent material on which has been lithographed hatched shading or free hand lines or tint, such lining or tinting being so arranged on the paper backing as to properly surround the transparent picture on the glass when placed before it.

This improved process or treatment of photographic pictures, which I purpose entitling "photo-crayon vignette," imparts to the picture the artistic effect of a highly-finished sepia drawing.

But, with a view of being well understood, I will further detail the character of my invention. For example: I take a small negative portrait or picture, and enlarge the same on glass by sun or suitable artificial light, as before referred to; but, as it is important to the result that the shadows should be clear, I, by preference, use old collodion containing bromine and iodine, and sensitise the plate in a bath about thirty-five to forty grains strong, rendered slightly acid, the time of immersion being short, as will be well understood by an experienced practical photographic operator.

To develope I prefer to use pyrogallic acid one grain, citric acid one and a-half grain (to the ounce of water), with sufficient spirits of wine to cause it to run freely over the plate, fixing the portrait with hyposulphite of soda.

I will here observe that, should the negative appear hard, extra exposure and a plentiful use of developer will tone and soften the picture.

In enlarging my pictures from small negatives, I have found Solomon's magnesium apparatus to answer well, the time of exposure being about thirty seconds with an ordinary negative; but the time may be regulated by the experience of the operator. The transparent mixture or portrait thus produced I place on, by preference, a rough-surfaced paper, well known to artists, on which I print, by means of lithography, hatched lines, tinted shading, or softening background, the transparent picture being so arranged on the glass as to fall in a suitable position for the lithograph hatching or shading to blend into and with the softened outline of the photographic picture; and the transparent picture, with the lithographed paper back being united and mounted in the usual way with a suitable glass or frame for protection, completes my improved process, and renders the same ready for suspension, or other modes or means for protecting and exhibiting the pictures so produced.

Having thus described and set forth the nature of my improvements, I wish it to be understood that the same may be diversified without departing from the spirit and object of my invention; as, for instance, the hatching or toning, instead of being lithographed on paper, may be reprinted on the same glass containing the transparent picture, and, in that case, the portrait or picture may be backed up with plain paper or otherwise, which will produce the same effect as before described. Nor do I purpose confining myself to the colour of the lithographic ink or chalk producing the hatching, as the same may be a grey or other colour or colours as desired; and what I claim as my invention and wish protected by these letters patent is —giving additional artistic effect to transparent photographic pictures enlarged from small negatives in the manner herein described and set forth. OLIVER SARONY.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER VI.—NON-DISTORTING LENSES.—GODDARD'S RESEARCHES.

THE name of Mr. James T. Goddard occupies an honourable position among the few practical opticians who have directed their efforts to the introduction of lenses different from those which previously existed, in order to eliminate, with more or less success, their inherent faults.

We have already stated that, notwithstanding the many admirable qualities which were to be found in the orthoscopic lens, the slight curvature of marginal lines, which ought to have been straight, precluded the possibility of its being considered as an efficient architectural lens. The various schemes, some successful and others abortive, to which recourse was had in order to obviate this evil we shall consider in their turn; meanwhile we direct attention to some of the efforts, in this direction, of a man whose ability and modesty one would have thought should have secured him from the depreciatory sneers of unsuccessful and non-practical pretended inventors of the present time—one whom our practical opticians hold in affectionate remembrance, and the deathbed of whose widow was soothed by their pecuniary assistance. We refer to the late Mr. Goddard, optician.

Having, through the kindness of a friend in whose possession they were, obtained access to the manuscript books, memoranda, and other documents belonging to Mr. Goddard, we are enabled to give, in his own language, the following notes of experiments made by him, which culminated in his issuing, in January, 1859, lenses which he designated, respectively, his "compound landscape lens," and his "double periscopic lens":—

"My own experiments in the direction of compound landscape lenses were commenced immediately after the announcement of the introduction of a new lens by Professor Petzval and Voigtlander. That lens, it has been said, has never been done justice to. It has to be seen to be appreciated. The good time may be coming. I believe opticians have not been backward in paying a just tribute to the sterling qualities of that lens. One of the most distinguished so lately among us bore unequivocal testimony to certain perfections it possessed. It would be a very small addition if I were to do the same; yet I cannot withhold the fact that, where considerable aperture joined with the great clearness of focus and flatness is a desideratum, I have never seen it surpassed.

"I might illustrate my own experiments in the following manner:—Suppose a gas window lamp to be at some distance off, and I hold an achromatic meniscus, say of fourteen or fifteen inches focus, in front of a white screen, with the convex side towards the radiant, the objects that coincide with the axis of the lens will be represented on the screen nearly clear, or with only a small amount of halo proceeding from the aberration of the lens; but all the objects at some distance from the axis will be most confused. Under these circumstances, can we not devise a back lens that, without altering the mean focus, shall yet be able to rectify all this confusion out of the axis? For this purpose I worked a plano-convex plate lens on the six-inch tool, and a plano-concave lens of plate glass on the six-inch concave—so that their effect, when the curved pieces of glass were together, was exactly similar to a plain glass; but when the convex side was placed towards the screen and the concave side of the plano-concave was towards its flat side, and the pair of lenses, thus enclosing a space between them, held a little behind the achromatic meniscus, the effect was to remedy, to a considerable extent, the confusion of the oblique image without altering the mean focus, merely leaving, however, a good deal of uncorrected aberration. Further: it was shown that separating the back pair from the front cemented achromatic brings the otherwise concave field considerably flatter.

"Then I varied the plano-convex to a meniscus without much altering the focus. I considered the result improved. Afterwards the plano-convex was altered to a slightly crossed form, still retaining nearly the same focus. I then found that positions of these lenses could be found where architectural lines would be straight; or, in other words, distortion would be cured. The above corrections would not be quite as good as we usually aim at, nor the aberration so nearly corrected; but to have done this would have been to make it into a Petzval combination altogether, wherein those aberrations are perfectly corrected, but, unfortunately, accompanied with distortion from the axis when a certain size of picture is exceeded. It did not appear possible to combine all the elements of perfection in the degree the public taste might desire; and as there was much outcry about distortion, my endeavour lay particularly to produce a combination having the widest field with the least distortion. The lenses were made up in two or three different sizes, and a few sold. One of them went to Edinburgh and was tried by the committee. My not having, I suppose, sufficiently described by name what the lens was, it was called a triplet—this description exactly applying to the symmetrical triplet as much as it did to my compound. It seemed unnecessary to me at the time to enter into further explanation. My impression was this—that in making the lenses unsymmetrical I could include a greater angle of picture at this time.

"Reverting, again, to the experiments. Suppose a gas lamp at some distance, and I hold a meniscus lens in my hand with the flattest side towards the radius. On the white screen behind is the image, enveloped in a slight appendage of aberration, and its position being, of course, in the centre of the shadow of the lens that is also on the screen. Then the lens is gradually turned round on a vertical axis, the image is seen to slowly curve out of the centre of the shadow, and towards the eyes of which the brush of light springs out on the opposite of the image away from the axis. Continue to move the lens, and the nucleus gently diminishes all the while, moving with increased speed like a comet approaching its parhelion, and finally goes quite out of the shadow and disappears. This is one way of showing the distortion of a lens. Now, having a series of uncemented lenses in a box used for experimental purposes, each lens was tried in turn. When an aplanatic lens such as a Herschellian was tried, there could hardly be said to be any nucleus, as the oval spectra of the obliquely incident light was nearly uniform.

"When the convex side of the crown was presented to the radius, and the lens slowly turned round a vertical axis as before, the nucleus moved out of the shadow but moved from the axis. Here was a distinction then. Combinations were then examined, and at length it was found that a deep non-achromatic meniscus, with a compound of an equally double concave flint (worked to radii equal to the concave radius of the meniscus), and cemented to a crown of nearly equal focus to the flint—these three lenses, with the hollow sides together, formed a compound that might be turned 60° or 70° without the image departing from the centre of the shadow. Here was an achromatic compound, therefore, without distortion. But aberration could not compensate, nor was it quite flat in field, and there was found to be reflections from the surfaces, causing some dismay. These were disadvantages. But my impression was so favourable to it being able to compass more subject, and with one glass less than the former compound —it being the best result of many months' examinations—that I decided on advertising them as "double periscopic landscape lenses." A few have been sold, and some returned. I tried several times to make

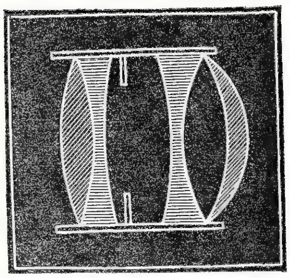
the back lens achromatic with the front one, like a very thick watch glass, but I could not balance the distortion nor make it include as much subject; but in the double periscopes the colour was corrected by the cemented combination. It is observable that this compound may be used either side towards the radiant, only the stop must be on the side nearest the cemented."

Within the last few days we have examined somewhat particularly a lens of the double combination form which was made by Goddard, at the time indicated above, for a gentleman well known in metropolitan circles—Mr. J. J. Cole. In this gentleman's hands (as we had heard before examining it) the lens has proved singularly effective.

Mr. Cole has, we find, a variety of front lenses of various foci, each of which he may use in combination with the one back lens, which, when looked through near its centre, is, practically, plain glass, in the sense that it neither magnifies nor diminishes. Its sole object is to correct the aberrations of the front lens, which it does without affecting the focus.

Fig. 1 conveys a good idea of Goddard's combination landscape lens, to which class Mr. Cole's belongs. The front lens is a flat achromatic meniscus mounted with its convex side towards the view. The anterior of the two back lenses is an unequally double concave crown; and the posterior element is a *deep* meniscus, also of crown—the curvature of these two being, as we have said, such as to prove that they possess no magnifying power when looked through centrally. The distance apart of the front and back lenses is not an arbitrary one, but may be altered to suit the circumstances of each case. When they are separated somewhat the marginal definition becomes much improved, with a flatter field than when they are brought close together. Mr. Cole speaks in high terms of this lens, but not in stronger language than he is entitled to do if we estimate it by some specimens of that gentleman's work produced by the lens.

FIG. 1.

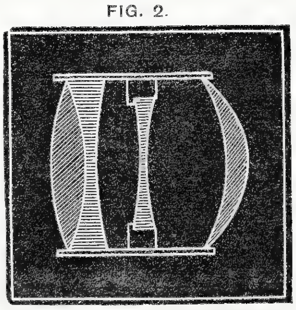


Goddard made and sold other lenses of the same general type as that shown in the diagram, although differing somewhat from them in details. The double concave crown, for example, was in one or two instances made plano-concave.

A modification of a more important nature was made by his separating the back elements to a considerable extent, carrying this separation so far, indeed, that in one lens, for some time in our own possession, the concave was placed nearer to the front achromatic than it was to its *quondam* partner, the back deep meniscus. Goddard knew from experiment as well as theory the properties of the deep meniscus, and he availed himself of that knowledge when fitting occasion demanded; and if the spirit of the departed optician still take any interest in the construction of lenses, it must afford him no little amusement and perhaps unrest to see aspiring, but unscrupulous *pseudo*-inventors, eager to appropriate every optical discovery and invention, and among them the properties of the deep meniscus, so well known to and utilised by himself.

We here give an engraving *(fig.* 2) of the lens just referred to. It is the instrument which, when tried among others by a committee of the Photographic Society of Scotland several years ago, was found to be the only one which gave freedom from the defect known as curvature of the marginal lines. The angle of view embraced by this lens was very great; it defined well and worked rapidly, but unfortunately it reflected much false light, or flare, into the camera. The front achromatic and the back deep meniscus (of crown glass) were of similar foci, the power of the intermediate concave being such as to neutralise the magnifying power of either of them.

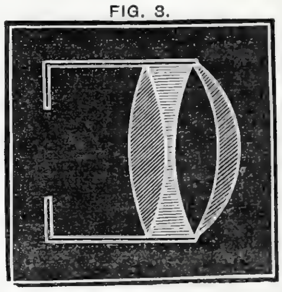
FIG. 2.



The "double periscopic" lens of Goddard, described in the paper which we have extracted above from the manuscripts now in our possession, is a singular-looking lens at first sight. When we first got ours we were rather surprised at its external shape, which was that of a double convex lens of exceeding thickness. A glance obliquely through it showed us at once that it was a lens possessing peculiar properties as well as a singular appearance; for, not being aware at the time of its *internal* configuration, we at first could only notice the fact that an oblique pencil was defined when a certain side was next to the stop, but not so when reversed, for Mr. Goddard had ground flat the margins of the two hollow surfaces and had neatly cemented them by the extreme edges. On softening the cement and taking them asunder, we then ascertained the construction of this objective. The lenses are two and a-quarter inches in diameter.

The following engraving *(fig.* 3*)* represents the instrument. The anterior portion of the lens is a double convex crown lens cemented to a double concave flint, the two neutralising each other in respect of magnifying power. The back element is a meniscus of deeper curvature than is employed at the present time by our best opticians, except, perhaps, in the construction of lenses of exceedingly wide angles of view.

FIG. 3.



Although we have never met with any *single* deep meniscus or periscope lenses advertised by Goddard, we observe, from his "work book," that he made a number of them in 1859. In one page we find no fewer than eleven different lenses of this kind figured, nine of which are composed each of plano-convex and plano-concave, cemented together at the flat surfaces. *Fig.* 4 represents one of them, and, we may state, that attached to each diagram are the radii of all the curved surfaces. So far as we know, this form of lens was first introduced by the late Mr. Andrew Ross, who made one for the Rev. J. B. Reade, F.R.S. Some of those figured in Goddard's "work book" are deeper, however, than that lens appears to have been. We have in our possession a doublet made by Archer, in which both front and back lenses have plano-convex crowns.

FIG. 4.

The Steinheil "periskop" or wide-angle lens is probably well known to many of our readers. It was introduced into this country three and a-half years ago, and was a good deal spoken of at the time of its introduction, on account of the wideness of the angle which it included. Goddard appeared to have occupied this field a considerable time before Steinheil, and this we know from at least two facts—first, we find one of them figured in his work book in 1858; and secondly, we have in our possession a lens of this kind made by Goddard many years ago. This lens may be described as a pair of deep single meniscus lenses mounted with their hollow sides together, a stop being placed between them. Mr. Towson, of Liverpool, was the first to introduce this form of lens, but the elements of his objective were much flatter than either Goddard's or Steinheil's.

From the foregoing it will be seen that Goddard was an intelligent optician, and wrought assiduously to render our photographic objectives as perfect as possible. In addition to those forms of lenses described above, he made, in the usual routine of his business, portrait and landscape lenses of the ordinary kind, and which bear an excellent reputation, but need not be alluded to here, inasmuch as they possess no new or distinctive features.

SURFACE MARKINGS.

As this subject is claiming attention during the hot weather we add our experience, having special reference to interiors requiring long exposure.

The bath and the corner frame are the two points requiring special attention. We find that different samples of distilled water are more or less liable to produce these stains, and that the only plan to secure success is to draw the water yourself from a still that is used *only for water*.

We have also proved that the silver wire corners so often used are a cause of these stains. If the exposure be prolonged, and thus starting out with new slides, we could do no good till these were removed. This is an experience that has been repeated several times, and we find that ebonite corners, or wood well varnished, will work much cleaner than silver wire corners.

PUMPHREY BROTHERS.

JOHNSON'S NEW CARBON PROCESS.

BELOW we give the specification of Mr. Johnson's process, of which we gave a full account of the manipulatory details in our number for April 2:—

My invention consists of certain improvements in the operation by which photographic pictures in carbon or pigments are obtained. These operations are usually as follows:—

1. The mixing of the pigment with gelatine or its analogue and with sugar or its analogue, and with a bichromate to render the

compound sensitive to light, by the action of which it becomes insoluble in warm water.

2. The spreading of the gelatine upon paper or other support to form a tissue.

3. The mounting of the tissue, after it has been exposed to light, upon paper or other support for the purpose of development—that is, for the removal by washing of the gelatine which remains unacted upon by light, leaving that which has been acted upon and rendered insoluble to constitute the picture. If the picture be retained upon the paper or other support upon which it has been developed, it is called a permanent support, and the images of the picture are then reversed. In this case it has been usual to employ albumen coagulated by alcohol or by heat, and gelatine rendered partially insoluble by the alums as the cementing material.

4. To avoid the objection of obtaining reversed pictures, it has been usual to mount the picture upon a temporary support, in which case paper is prepared with an adhesive coating of India-rubber or other substance soluble in benzole; and the face of the gelatinous tissue, after exposure to light, is also coated with a solution of the same substances, and when dry they are brought together under heavy pressure to effect adhesion.

The mounted tissue is then developed, the resulting reversed picture being supported upon the India-rubber paper. The picture thus obtained is then mounted upon or cemented to paper by means of gelatine, or gelatine rendered partially insoluble by the alums. When dry, the India-rubber paper is moistened at the back with benzole, and may be then torn from the face of the print, which is left upon the permanent gelatine support, the images of the picture being thus brought into their correct or non-reversed position.

1. Now my first improvement consists of a new mode of treating the pigment to be used in the production of these pictures, which is required for this purpose to be in the finest possible state of division, and has hitherto only been successfully used in a moist condition fresh from the mill or grinder. If kept for some time after grinding, aggregation takes place among the particles of the pigment, and the results are then no longer of the same degree of perfection. A moist pigment, unless specially treated, is also of unequal density, and cannot be used conveniently to obtain definite shades of colour, equal portions of such pigment giving unequal depth of colour.

I obviate the inconvenience by mixing thoroughly, by mechanical means, the finely-ground pigments, black, red, or other colours, with gelatine and sugar, these being in much smaller proportion than that which is required for the production of the sensitive compound—say four parts of the gelatine and two of sugar to one part of the dry colour, but these proportions may be greatly varied; and I pour the mixture upon a slab or surface, where it is allowed to set and dry. The sheet of prepared pigments is then cut up into leaves or cakes.

I prepare in the same manner transparent or colourless sheets or cakes of the gelatine, or similar substance, mixed with its proper quantity of sugar or like material, and I form the tissue of variable tint by dissolving variable quantities of these—that is, of the prepared gelatinised pigment and of the transparent or colourless compound; and, spreading the tissue compound so prepared upon paper, as is well understood, the result being definite, and the pigment being in its most perfect state of division. By "pigment," I mean not only those pigments used in oil or water-colour painting, but those used for painting upon glass, enamel, and ceramic surfaces.

In addition to the pigments just referred to, I also use dyes and other colouring matters, soluble and insoluble. I mix these also with gelatine and sugar, or their analogues, and dry them, for the purpose of giving colour to the tissue compound.

2. My second improvement consists in a new method of making tissue in continuous lengths, and of modes of using the gelatine compound without the necessity of forming the ordinary tissue.

I manufacture tissue in long or short lengths by rolling the paper as it leaves the mill upon a roller in a continuous sheet, and bringing it from such roller in contact with the surface of the pigmented gelatine solution by means of an endless band of canvas or other fabric, stretched upon rollers, which band may conveniently rest upon the roller carrying the paper. When the endless band is set in motion, it draws off the paper from the rollers without any tension upon the paper itself, and thus admits of indefinite lengths being made continuously, instead of operating intermittently, with a single sheet or sheets of definite length made into endless bands, as has heretofore been done, the length of which sheets is greatly limited by the small amount of tension which the paper, when wet, will bear.

Instead of the endless band of canvas stretched upon rollers, a simple roller of wood or other material may be used. This is driven by hand or power, while the long roll of paper rests upon it, the paper being thus unwound by the friction of the driven roller instead of by the endless cloth, as in the former case, the principle being the same—that is, the paper is delivered to, or brought into contact with, the surface of the tissue compound in solution, without any tension or strain upon the paper itself.

Or, I avoid the necessity of forming the ordinary gelatinous tissue with its support of porous paper, by proceeding as follows:—

I spread the gelatine compound upon a layer or film of wax, paraffine, or similar substance, supported upon a plate of metal, japanned panel, oiled cloth, varnished paper, or other impermeable substance, and I expose this under a negative, and attach the exposed face to another surface. I then warm the metal, panel, or other impermeable substance to soften the wax or its analogue. The metal panel or other impermeable substance may then be removed, leaving the gelatine layer attached to the support to which it has been cemented, and it is then subjected to the ordinary treatment.

If the fatty matter employed to form the film be fusible at the temperature required for developing the picture, the support upon which the gelatine layer has been formed separates without any further application of heat, leaving that layer fully exposed to the action of the water; or, I spread the gelatine compound upon a layer or film of wax or similar material (which in this case must be infusible at the temperature at which the picture is developed) spread upon a transparent support of glass, and, when dry, I print through the glass by means of the camera or by parallel rays, or by rays proceeding from a luminous point, and I develope the picture upon the glass as a temporary support.

Or, I place the layer or film of wax or similar substance upon the negative itself; and after exposure I develope it upon the negative, and transfer to a permanent support in the usual way.

And here I would have it understood that I do not claim this mode of operating with the sensitive compound upon the negative or glass support, except so far as regards the intervening film of wax, which enables me to transfer the developed picture from the negative, or other temporary glass support, to its final support of paper or other material.

3. My third improvement consists of the substitution of resinous and other substances, which may be rendered soluble in water but which become insoluble when dry, for cementing the pigment picture to its permanent support in place of the substance hitherto used for this purpose, such as albumen or gelatine rendered only partially insoluble.

The substances I prefer are colophony or pine resin, shellac, or their analogues dissolved in water, to which caustic ammonia or other substance having the like solvent property has been added. The new cements may be used either spread upon paper and brought in contact with the wetted tissue, or the paper and tissue may be moistened with the water and then brought together in a solution of the cement, so as to expel air-bubbles and bring the two surfaces into contact, with a thin layer of the cement between them, as described by Swan in the *Year-Book of Photography*, 1868, in respect to a compound of gelatine and chrome-alum. When dry the adhesion is complete, and the mounted tissue may be developed as usual.

I have assumed paper to be the permanent support, but other surfaces may be so employed, as glass, porcelain, or prepared canvas; and when glass is used as the permanent support, it is obvious that the pictures are not reversed when seen through the glass, either as transparencies or with a white backing behind them.

4. My fourth improvement consists of a new mode of obtaining photographic images in pigmented gelatine or its analogue upon plates of metal, glass, or other substances impermeable to water, which plates may be used either as permanent or temporary supports, dispensing in the latter case with the India-rubber paper heretofore used for this purpose. This improvement is based upon the observation that if the support be impermeable to water, and the tissue be well exposed, no cementing material is necessary to effect the adhesion necessary for mounting the tissue upon its support, all that is necessary being the perfect exclusion of air between the moistened surface of the tissue impressed by light and the impermeable surface to receive the picture as its support.

I effect this by wetting the tissue and laying it upon the metal or other surface, and sponging or rubbing the back of the printed tissue so as to drive out air with the superfluous moisture, as in mounting a print upon card. To effect perfect and permanent adhesion, the surface of the glass or metal forming the supports must be chemically clean, particularly when such surface is polished. To avoid the necessity of thus cleaning the surface, I occasionally cover the surface with a very thin layer of plain collodion, using for this purpose a collodion containing about one or two grains of cotton to the ounce of ether and alcohol forming the solvent. When the collodion is set,

but not dry, I plunge it into water to wash off the solvents, until the greasy appearance has ceased. I then lay upon the plate thus prepared the wetted tissue. When the picture is completed it adheres to the glass with great tenacity, by surface adhesion only, even if such glass had had a slightly greasy or otherwise impure surface.

Pictures thus mounted upon glass or metal as their permanent support, may not only be used as pleasing pictures, but can be employed in various processes, as a model or pattern to obtain casts or impressions, either by means of pressure, by the electrotype process, or by casting. The hardened gelatine picture, either negative or positive, on a plate of zinc, copper, or steel, may also be used as a *resist*, which enables us to etch the plate or to gild it for the purpose of etching it subsequently, with the object of producing a plate in intaglio or relief, for the purpose of printing therefrom.

When the plates of metal, glass, or other impermeable substance are used as temporary supports, such plates must have received some slight smear or coating of wax or other fatty body to prevent the absolute adhesion of the picture film. Instead of wax alone, I find equal parts of wax and yellow resin dissolved in turpentine to give the best smearing compound. This is rubbed over the plate, and immediately rubbed off again with a piece of clean flannel, leaving only a very thin coating.

When polished glass plates are used as the support, instead of the wax and resin, I prefer to use the coating of the thin collodion, already described to prevent the adhesion; but in this case the collodion coating must be allowed to dry before immersion in water. The film so formed then readily leaves the glass attached to the print, which retains the polish of the temporary support.

Plates thus prepared allow of pigment gelatine images being formed on their surface, not only by development in the way described, but indirectly by employing the image formed by development as a model or pattern for obtaining a mould from which other and similar gelatine images are obtained by casting; and images thus formed may equally be transferred to paper in the way described.

The nature of the surface of the support will determine the resulting surface of the gelatine images. A polished surface will give a polished surface to the print. If a mat or grained surface be required, the support must be grained or tooled to give that surface.

The gelatine image may be transferred to paper while in the wet state by bringing into contact with it a piece of paper coated with gelatine or other analogous substance; or, which is preferable, the image be allowed to dry upon its support, and the prepared paper soaked in water may be laid upon it, air being carefully excluded; or, the resinous cements already referred to in my third improvement may be used, giving to the dried image a coating of the shellac solution and to the paper a similar coating, and then bringing the two wet surfaces together.

I also transfer the print from its temporary support to a sheet of imitation ivory, as in the so-called eburneum process, or to a sheet of imitation porcelain or marble formed of plaster or other plastic substance. When the print is required to be mounted upon a fabric, I take fine muslin or other porous fabric, and, after wetting it, I lay it over the print upon its temporary support, and I spread over the muslin or fabric any of the before-mentioned cements mixed with whiting or other pigments. This compound penetrates to the surface of the print, thoroughly expelling air, and when dry perfect contact is effected. The muslin or fabric can then be lined with canvas, as is well understood. If the picture be very large, and be formed of several negatives, I mount the several parts upon paper or other flexible support, either coated with India-rubber, as already practised or as above described. I cut out the several parts, wet them, and lay them down well matched upon a drawing board, and I then proceed to mount them upon, or rather under, the muslin or fabric as already said.

I claim, as my invention, under this fourth head of my improvements—

First, the formation of the mounting of the gelatine image formed as described upon a sheet of glass, metal, or other impermeable surface serving as the permanent support, without the intervention of any cementing material to be used as pictures or as models, moulds for producing engraved plates, or otherwise.

Second, the mode of transferring images of gelatine mounted upon the surface of plates of glass or metal from such surface (serving as a temporary support) to the surface of paper or the like material, by means of an intervening film of wax or other substance having the like properties.

5. My fifth improvement consists in another mode of transferring the picture in one or many parts from its temporary to its permanent support for the purpose of being painted upon in oil or being varnished. I mount the picture, in this case, upon paper rendered transparent by wax, paraffine, or any fatty matters not fusible at the temperature used for developing the gelatine pigment prints. When the developed print is quite dry I varnish the surface of the permanent support which is to receive it—such as wood, panel, or oil canvas. I varnish, also, the face of the picture; and, if of several parts, I carefully match these. The two varnished surfaces, when nearly dry, are then rubbed down together, and, when in perfect contact, the back of the waxed paper is warmed, and then leaves the pigment film perfectly attached to the panel or canvas.

Before the picture is transferred it may be tinted or painted, and, if painted with opaque colours, it may be laid over another picture without the latter being seen. Thus I form composition pictures by laying down a landscape background, for example, upon the canvas; and upon it I place figures trimmed to their contours, and which have received a coating of white or coloured opaque varnish at the back. These then show as perfect forms without the landscape or other background interfering, and, as the gelatine film is extremely thin, the superposition is not visible. JOHN ROBERT JOHNSON.

THE LATE MR. ROGER FENTON.

ON Sunday evening, the 8th instant, after an illness of six days, Mr. Roger Fenton, at the comparatively early age of 50, ceased to exist.

Mr. Fenton was at one time a most active and enthusiastic amateur photographer. He was one of those who was mainly instrumental in founding the London Photographic Society, of which body he was appointed Honorary Secretary, an office he occupied until 1856. At the first meeting of this Society, Mr. Fenton made some excellent remarks on the advantages likely to arise from meetings of photographers, who, he said, were constantly meeting with accidental results, sometimes spoiling, sometimes improving, their pictures; in each case independently of any plan on the part of the operator. The person to whom these occurred might and would, in the majority of cases, be unable to trace out the causes of such apparent accidents, but he could always make a simple statement of the circumstance under which they occurred; and so, perhaps, lay the foundation of what, in the hands of another member of the Society, might become an important discovery. This observation is as true at the present time as it was on February 3rd, 1853, when Mr. Fenton uttered it. Narratives of special experiences, whether successful or otherwise, given to the public, are assuredly not thrown away, for they supply the requisite material to the man whose mental characteristics qualify him for deducing from such observations the law which may operate in each special case. Without the carefully-narrated astronomical observations of Tycho Brahe, the logical-minded Kepler would not have found material out of which to compute his laws, now so well known to every astronomer. Let each photographer, therefore, who discovers any speciality in course of his experience for which he may be unable to account, communicate it to his brethren, for there may be one or more among them able to recognise and grasp a principle in it which may eventually be utilised.

At the time above mentioned, 1853, landscape photographers employed either the plain or waxed-paper process, or the albumen process on glass, for at that time dry collodion plates had not been introduced. Mr. Fenton's negatives were then taken upon paper which was iodised by being immersed in the following:—

Rice water	1,000 parts.
Iodide of potassium	30 „
Bromide „	3 „
Cyanide „	2 „
Fluoride „	1½ „

These papers were sensitised in a solution of nitrate of silver containing a large proportion of acetic acid, and were developed with gallic acid. It was Mr. Fenton, we believe, who first directed public attention to the necessity for having the collodion negative bath in a state delicately bordering on acidity when developing with pyrogallic acid; and he was, in this way, the means of evoking many useful suggestions concerning freedom from fog, and other matters arising out of the condition of the bath.

The principal event in Mr. Fenton's public career was his expedition to the seat of war in the Crimea, in 1855, in which he was accompanied by the late Mr. Marcus Sparling as an assistant. Mr. Sparling, we may state, was known at that time as a shrewd, clever, and practical photographer, and it is questionable if Mr. Fenton could have found in the world a better *collaborateur*, Sparling having been previously conversant with the routine of military life as well as being an energetic and really good photographer. Mr. Sparling was the author (or, rather, editor, seeing it was a series of

"clippings") of the photographic portion of *Orr's Circle of the Sciences.*

In the Crimean campaign Mr. Fenton underwent many interesting adventures, and had to encounter the difficulties attendant upon a greater degree of heat than he had perhaps anticipated. Some idea of this heat may be ascertained from the fact that one day in June, when the door of his photographic van was left open, a gutta-percha funnel, which was exposed to the sun's rays, was in a short time blistered all over, as if it had been laid upon the heated bars of a fireplace. Mr. Fenton was present at the storming of the Redan; and, in his narrative of his Crimean experiences, he mentions several touching episodes in connection with that event. His photographs were received with great interest on his return from the Crimea.

For some time after this, when he had yielded up the Secretaryship of the London Photographic Society to a paid official (the Rev. J. R. Major), he continued to act as a member of the Council, and took part in the various discussions at the meetings.

Mr. Fenton was subsequently connected with the "Photogalvanographic" Company, which was formed to work an engraving process of Herr Paul Pretsch. In later years, however, he allowed photography to "lie on the shelf," and devoted himself to other pursuits. He practised as a barrister for some time, but was lately better known in connection with the Stock Exchange. He was a skilful artist, and possessed good taste. As he resided a few miles north of London we occasionally met him when coming to town by the Great Northern Railway. On the last occasion on which we saw him, *apropos* of some pictures we were looking over, he made some remarks to us on the importance of photographers paying more attention to the foregrounds of their landscapes than many of them were in the habit of doing.

Up till the night preceding the day on which he died he was not considered to be dangerously ill; and it will interest his personal friends to know that he was free from pain up to the last moment.

PHOTOGRAPHY IN WAR.

At a recent meeting of the United Service Institution, Mr. H. Baden Pritchard, of the General Photographic Establishment of the War Department, read a very interesting paper *On the Application of Photography to Military Purposes.* We copy the following condensed report of the paper from *The Times*:—

Mr. Pritchard stated that the first time photography was used in connection with military matters was during the Crimean war, when Lord Panmure, then Secretary of State for War, conceived the idea of securing some photographic records of the campaign. The series of pictures produced, or at least a great number of them, were, he believed, stored up at the War-office. There was reason to fear that they would be found on examination to have faded considerably. At the time they were produced the art was still in its infancy, and many of the manipulations exercised were of an experimental character. Since that time the art had progressed to a wonderful degree, and the necessity of diffusing a knowledge of the subject had been so fully appreciated by the authorities of the War Department that a school of instruction had been formed for the special purpose of instructing classes of young soldiers in its details. This school, which formed a portion of the Royal Engineer Establishment at Chatham, and was under the direction of Capt. Stotherd, R.E., had been of considerable benefit to the service.

During the recent Abyssinian campaign a staff of photographers, instructed and equipped from this establishment, had been attached to the Quartermaster-General's Department, and had done good service in copying maps and sketches of the route, and in taking pictures of objects and points of interest of which a record was considered desirable.

The author then addressed himself for a short time to the applications of the process made practical by the non-combatant portion of the service.

One of the most important uses to which the process was applied was the copying of maps, plans, designs, and rare MSS., as practised at the Ordnance Survey-office, Southampton. In this establishment, the process of photozincography, the invention of Colonel Sir H. James, R.E., had been carefully elaborated, and had been employed with such unequivocal success that the Governments of France, Prussia, Austria, Belgium, and America had adopted it with more or less modification. In addition to the multiplication of special maps for warlike purposes, valuable service had been done in the establishment at Southampton by the reproduction of rare and curious MS. *facsimiles* of the Great and Little Domesday Books, bound up in thirty-five imperial quarto volumes, and also of the national MS. of England and Scotland, without the necessity of tampering in any way with the originals.

At the general photographic establishment—a branch of the chemical department at Woolwich, under the direction of Professor Abel, F.R.S.—the camera was employed in many ways. All experimental structures, such as shields, guns, small arms, waggons, or rockets were photographed. The results of firing experimentally against iron plates of different thicknesses were reproduced, pictures for purposes of instruction, showing the method of working guns of different descriptions, and the positions taken up by individual gunners on the issue of various orders were taken, photographs exhibiting the regulation mode of wearing accoutrements, the precise manner in which the harness of horses should be adjusted, the method of packing waggons and fitting service saddles, and the mode in which military tents and equipages are set up, were also included in the collection of the institution. Prints from the negatives were issued to various departments of the army, both in England and India.

Photography could also be usefully and economically employed in the construction and preservation of patterns at Woolwich and other manufacturing stations. Returning to the subject of the employment of photography in the field, he said that the avowed purposes for which the art was used in that case had been for reproducing and copying maps and plans, and taking pictures of important localities and interesting objects. In discussing the importance of this part of the system, he said that during the Abyssinian campaign as many as thirty copies had been prepared and distributed to brigadiers and others within twenty-four hours after the original plan of certain places had been sketched.

He thought it advisable that copies of field maps intended to be of a lasting character should be printed on linen, cambric, or silk. He recommended that landscape views should be taken, not only on account of the particular interest they possessed as such, but also on account of their value to an army in the field. Sketches of an enemy's position might be obtained at a considerable distance without much risk of danger. He himself had obtained a picture of a building two miles distant from the camera.

The camera might also be used as a theodolite, and the distance between the reconnoitering party and the enemy's position accurately and rapidly determined, supposing the actual dimensions of the enemy's fort or intrenchment to be known. The camera might also be used in the production of landscape pictures to illustrate the ground plan or sketch of route. He then explained the manner in which these field pictures should be taken, and the advantages accruing from their existence.

The progress of works might also be ascertained by means of photographs, and this system of ascertaining the rate at which works were proceeding had been adopted by several firms of contractors. The remainder of the essay, which contained several novel and interesting suggestions, was occupied with a discussion on the respective values of different kinds of plates used in photography, and on the methods of preserving pictures taken by means of the camera.

At its conclusion a cordial vote of thanks was passed to Mr. Pritchard for his elaborate paper.

In connection with the above report we find the following note in *The Times* of Monday last:—

"In reference to the report of my lecture at the Royal United Service Institution on the above subject in your impression of the 13th inst., I shall feel much obliged if you will permit me to supply an omission which, although of an apparently trivial nature, is nevertheless of some considerable importance in connection with the subject in hand.

"Referring to the multiplication and printing of military maps and plans in the field by means of photography for distribution among Staff officers, the report states that, to be of a lasting character, such photographs are recommended to be printed upon linen, cambric, and silk, instead of upon paper. Now, although permanence is an essential quality in pictures of this description, still simplicity and rapidity of production are far more important, seeing that large numbers of copies are required in as short a time as possible.

"By printing upon a densely-woven linen, prepared in a manner I have described, the advantages secured are very great over those of paper; the fabric prints more quickly, is capable, owing to its open structure, of more rapid and perfect washing (the most important operation in photography), and, finally, needs no subsequent mounting upon a flexible material, as is the case with paper maps. Thus much economy of manipulation is effected, a matter of some consideration when performing hurried operations in the field.

"I have the honour to be, Sir, your obedient servant,

"H. Baden Pritchard.

"General Photographic Establishment of the War Department, Woolwich, Aug. 14."

Photographic Identification.—It is now near a month ago since a dead body of an unknown man was found on the beach at New Brighton. Before it was buried a photograph was taken, and circulated by the police. A few days ago, a person called at the Police-office, Hanley, Staffordshire, to give information that Elijah Sutton, of that town, had not been heard of since he went away a month ago for the benefit of his health. The sergeant in charge, remembering the *carte*, produced it, and the person depicted thereon was at once identified as the missing man.

British Association.

EXETER MEETING, 1869.

The proceedings of the British Association were formally commenced on Wednesday evening last by the President, Professor George Gabriel Stokes, M.A., Sec. R.S., delivering his opening address, from which we extract the following portions, which bear more particularly on light and its effects:—

The science of astronomy is indebted to that of optics for the principles which regulate the construction of those optical instruments which are so essential to the astronomer. It repaid its debt by furnishing to optics a result which it is important we should keep in view in considering the nature of light. It is to astronomy that we are indebted for the first proof we obtained of the finite velocity of light, and for the first numerical determination of that enormous velocity. Astronomy, again, led, forty-four years later, to a second determinatiou of that velocity in the remarkable phenomenon of aberration discovered by Bradley—a phenomenon presenting special points of interest in relation to the nature of light, and which has given rise to some discussion, extending even to the present day, so that the Astronomer Royal has not deemed it unworthy of investigation, laborious as he foresees the trial is likely to prove, to determine the constant of aberration by means of a telescope having its tube filled with water.

If in respect of these phenomena optics received much aid from astronomy, the latter science has been indebted to the former for information which could not otherwise have been obtained. The motions and the masses of the heavenly bodies are revealed to us more or less fully by astronomical observations; but we could not thus become acquainted with the chemical nature of these distinct objects. Yet, by the application of the spectroscope to the scrutiny of the heavenly bodies, evidence has been obtained of the existence therein of various elements known to us by the chemical examination of the materials of which our own earth is composed; and not only so, but light is thrown on the state in which matter is there existing, which, in the case of nebulæ especially, led to the formation of new ideas respecting their constitution, and the rectification of astronomical speculations previously entertained. I shall not, however, dwell further on this part of the subject, which is now of some years' standing, and has been mentioned by more than one of your former Presidents, but will pass on to newer researches in the same direction.

We are accustomed to apply to the stars the epithet *fixed.* Night after night they are seen to have the same relative arrangement; and when their places are determined by careful measurement, and certain small corrections due to known causes are applied to the immediate results of observation, they are found to have the same relative distances. But when instead of days the observations extend over months or years, it is found that the fixity is not quite absolute. Defining as fixity invariability of position as estimated with reference to the stars as a whole, and comparing the position of any individual star with those of the stars in its neighbourhood, we find that some of the stars exhibit "proper motions," show, that is, a progressive change of angular position as seen from the earth, or rather as they would be seen from the sun, which we may take for the mean annual place of the earth. This indicates linear motion in a direction transverse to the line joining the sun with the star. But since our sun is merely a star, a line drawn from the star exhibiting proper motion to our sun is, as regards the former, merely a line drawn to a star taken at random, and, therefore, there is no reason why the star's motion should be, except accidentally, in a direction perpendicular to the line joining the star with our sun. We must conclude that the stars, including our own sun, or some of them at least, are moving in various directions in space, and that it is merely the transversal component of the whole motion, or rather of the motion relatively to our sun, that is revealed to us by a change in the star's apparent place.

How, then, shall we determine whether any particular star is approaching to or receding from our sun? It is clear that astronomy alone is powerless to aid us here, since such a motion would be unaccompanied by change of angular position. Here the science of optics comes to our aid in a remarkable manner.

The pitch of a musical note depends, as we know, on the number of vibrations which reach the ear in a given time, such as a second. Suppose, now, that a body, such as a bell, which is vibrating a given number of times per second, is at the same time moving from the observer, the air being calm. Since the successive pulses of sound travel all with the velocity of sound, but diverge from different centres, namely, the successive points in the bell's path at which the bell was when those pulses were first excited, it is evident that the sound-waves will be somewhat more spread out on the side from which the bell is moving, and more crowded together on the side towards which it is moving, than if the bell had been at rest. Consequently, the number of vibrations per second which reach the ear of an observer situated in the former of these directions will be somewhat smaller, and the number which reach an observer situated in the opposite direction somewhat greater, than if the bell had been at rest. Hence to the former the pitch will be somewhat lower, and to the latter somewhat higher, than the natural pitch of the bell. And the same thing will happen if the observer be in motion instead of the bell, or if both be in motion; in fact, the effect depends only on the *relative* motion of the observer and the bell in the direction of a line joining the two—in other words, on the velocity of recession or approach of the observer and the bell. The effect may be perceived in standing by a railway when a train in which the steam-whistle is sounding passes by at full speed, or, better still, if the observer be seated in a train which is simultaneously moving in the opposite direction.

The present state of optical science is such as to furnish us with evidence, of a force which is perfectly overwhelming, that light consists of a tremor or vibratory movement propagated in an elastic medium filling the planetary and stellar spaces, a medium which thus fulfils for light an office similar to that of air for sound. In this theory, to difference of periodic time corresponds difference of refrangibility. Suppose that we were in possession of a source of light capable, like the bell in the analogous case of sound, of exciting in the ether supposed at rest vibrations of a definite period, corresponding, therefore, to light of a definite refrangibility. Then, just as in the case of sound, if the source of light and the observer were receding from or approaching to each other with a velocity which was not insensibly small compared with the velocity of light, an appreciable lowering or elevation of refrangibility would be produced, which would be capable of detection by means of a spectroscope of high dispersive power.

The velocity of light is so enormous, about 185,000 miles per second, that it can readily be imagined that any motion which we can experimentally produce in a source of light is as rest in comparison. But the earth in its orbit round the sun moves at the rate of about eighteen miles per second; and in the motions of stars approaching to or receding from our sun we might expect to meet with velocities comparable with this. The orbital velocity of the earth is, it is true, only about the one-ten-thousandth part of the velocity of light. Still the effect of such a volocity on the refrangibility of light, which admits of being easily calculated, proves not to be so insensibly small as to elude all chance of detection, provided only the observations are conducted with extreme delicacy.

But how shall we find in such distant objects as the stars an analogue of the bell which we have assumed in the illustration drawn from sound? What evidence can we ever obtain, even if an examination of their light should present us with rays of definite refrangibility, of the existence in those remote bodies of ponderable matter vibrating in known periods not identical with those corresponding to the refrangibilities of the definite rays which we observe? The answer to this question will involve a reference, which I will endeavour ao make as brief as I can, to the splendid researches of Professor Kirchhoff. The exact coincidence of certain dark lines in the solar spectrum with bright lines in certain artificial sources of light had previously been in one or two instances observed; but it is to Kirchhoff we owe the inference from an extension of Prevost's theory of exchanges, that a glowing medium which emits bright light of any particular refrangibility *necessarily* (at that temperature at least) acts as an absorbing medium, extinguishing light of the same refrangibility. In saying this it is but just to mention that in relation to radiant heat (from whence the transition to light is easy), Kirchhoff was preceded, though unconsciously, by our own countryman, Mr. Balfour Stewart. The inference which Kirchhoff drew from Prevost's theory thus extended led him to make a careful comparison of the places of the dark lines of the solar spectrum with those of bright lines produced by the incandescent gas or vapour of known elements; and the coincidences were in many cases so remarkable as to establish almost to a certainty the existence of several of the known elements in the solar atmosphere, producing by their absorbing action the dark lines coinciding with the bright lines observed. Among other elements may be mentioned in particular hydrogen, the spectrum of which, when traversed by an electric discharge, shows a bright line or band exactly coinciding with the dark line C, and another with the line F.

Now Mr. Huggins found that several of the stars show in their spectra dark lines coinciding in position with C and F; and what strengthens the belief that this coincidence, or apparent coincidence, is not merely fortuitous, but is due to a common cause, is that the two lines are found associated together, both present or both absent. And Kirchhoff's theory suggests that the common cause is the existence of hydrogen in the atmospheres of the sun and certain stars, and its exercise of an absorbing action on the light emitted from beneath.

Now by careful and repeated observations with a telescope furnished with a spectroscope of high dispersive power, Mr. Huggins found that the F line—the one selected for observation—in the spectrum of Sirius did not exactly coincide with the corresponding bright line of a hydrogen spark, which latter agrees in position with the solar F, but was a *little* less refrangible, while preserving the same general appearance. What conclusion, then, are we to draw from the result? Surely it would be most unreasonable to attribute the dark lines in the spectra of the sun and of Sirius to distinct causes, and to regard their almost exact coincidence as purely fortuitous, when we have in proper motion a *vera causa* to account for a minute difference. And if, as Kirchhoff's labours render almost certain, the dark solar line depends on the existence of hydrogen in the atmosphere of our sun, we are led to infer that that element, with which the chemist working in his laboratory is so

familiar, exists and is subject to the same physical laws in that distant star—so distant that, judging by the most probable value of its annual parallax, light which would go seven times round our earth in one second would take fourteen years to travel from the star. What a grand conception of the unity of plan pervading the universe do such conclusions present to our minds!

Assuming, then, that the small difference of refrangibility observed between the solar F and that of Sirius is due to proper motion, Mr. Huggins concludes from his measures of the minute difference of position that at the time of the observation Sirius was receding from the earth at the rate of 41·4 miles per second. A part of this was due to the motion of the earth in its orbit; and on deducting the orbital velocity of the earth, resolved in the direction of a line drawn from the star, there remained 29·4 miles per second as the velocity with which Sirius and our sun are mutually receding from each other. Considering the minuteness of the quantity on which the result depends, it is satisfactory to find that Mr. Huggins's results as to the motion of Sirius have been confirmed by the observations of Father Secchi, made at Rome with a different instrument.

The determination of radial proper motion in this way is still in its infancy. It is worthy of note that, unlike the detection of transversal proper motion by change of angular position, it is equally applicable to stars at all distances, provided they are bright enough to render the observations possible. It is conceivable that the results of these observations may one day lead to a determination of the motion of the solar system in space, which is more trustworthy than that which has been deduced from changas of position, as being founded on a broader induction, and not confined to conclusions derived from the stars in our neighbourhood. Should even the solar system and the nearer stars be drifting along, as Sir John Herschel suggests, with an approximately common motion, like motes in a sunbeam, it is conceivable that the circumstance might thus be capable of detection. To what wide speculations are we led as to the possible progress of our knowledge when we put together what has been accomplished in different branches of science!

I turn now to another recent application of spectral analysis. The phenomenon of a total solar eclipse is described by those who have seen it as one of the most imposing that can be witnessed. The rarity of its occurrence and the shortness of its duration afford, however, opportunity for only a hasty study of the phenomena which may then present themselves. Among these, one of the most remarkable, seen indeed before, but first brought prominently into notice by the observers who watched the eclipse of July 7, 1842, consists in a series of mountain-like or cloud-like luminous objects seen outside the dark disc of the moon. These have been seen in subsequent total eclipses, and more especially studied, by means of photography, by Mr. Warren De la Rue in the eclipse of June 18, 1860. The result of the various observations, and especially the study, which could be made at leisure, of the photographs obtained by Mr. De la Rne, proved conclusively that these appendages belong to the sun, not to the moon. The photographs proved further their light to be remarkable for actinic power. Since that time the method of spectral analysis has been elaborated; and it seemed likely that additional information bearing on the nature of these objects might be obtained by the application of the spectroscope. Accordingly various expeditions were equipped for the purpose of observing the total solar eclipse which was to happen on August 17, 1868. In our own country an equatorially mounted telescope provided with a spectroscope was procured for the purpose by the Royal Society, which was entrusted to Lieut. (now Captain) Herschel who was going out to India, one of the countries crossed by the line of the central shadow. Another expedition was organised by the Royal Astronomical Society, under the auspices of Major Tennant, who was foremost in pressing on the attention of scientific men the importance of availing themselves of the opportunity.

Shortly before the conclusion of the meeting of the Association at Norwich last year, the first results of the observations were made known to the meeting through the agency of the electric telegraph. In a telegram sent by M. Janssen to the President of the Royal Society, it was announced that the spectrum of the prominences was very remarkable, showing bright lines, while that of the corona showed none. Brief as the message necessarily was, one point was settled. The prominences could not be clouds in the strict sense of the term, shining either by virtue of their own heat, or by light reflected from below. They must consist of incandescent matter in the *gaseous* form. It appeared from the more detailed accounts received by post from the various observers, and put together at leisure, that except in the immediate neighbourhood of the sun the light of the prominences consisted mainly of three bright lines, of which two coincided with C and F, and the intermediate one nearly, but, as subsequent researches showed, not exactly, with D. The bright lines coinciding with C and F indicate the presence of glowing hydrogen. Several of the other lines were identified with those which would be produced by the incandescent vapour of certain other elements.

This is precious information to have gathered during the brief interval of the total phase, and required on the part of the observers self-denial in withdrawing the eye from the imposing spectacle of the surrounding scenery, and coolness in proceeding steadily with some definite part of the inquiry, when so many questions crowded for solution, and the fruits of months of preparation were to be reaped in three or four minutes or lost altogether; especially when, as too often happened, the observations were provokingly interrupted by flying clouds.

But valuable as these observations were, it is obvious that we should have had long to wait before we could have become acquainted with the usual behaviour of these objects, and their possible relation to changes which may be going on at the surface of the sun, if we had been dependent on the rare and brief phenomenon of a total solar eclipse for gathering information respecting them. But how, the question might be asked, shall we ever be able so to subdue the overpowering glare of our great luminary, and the dazzling illumination which it produces in our atmosphere when we look nearly in its direciion, as to perceive objects which are comparatively so faint? Here again the science of optics comes in aid of astronomy.

When a line of light, such as a narrow slit held in front of a luminous object, is viewed through a prism, the light is ordinarily spread out into a coloured band, the length of which may be increased at pleasure by substituting two or more prisms for the single prism. As the total quantity of light is not thereby increased, it is obvious that the intensity of the light of the coloured band will go on decreasing as the length increases. Such is the case with ordinary sources of light, like the flame of a candle or the sky, which give a continuous spectrum, or one generally continuous, though interrupted by dark bands. But if the light from the source be homogeneous, consisting, that is, of light of one degree of refrangibility only, the image of the slit will be merely deviated by the prisms, not widened out into a band, and not consequently reduced to the intensity by the dispersion. And if the source of light emit light of both kinds, it will be easily understood that the images of the slit corresponding to light of any definite refrangibilities which the mixture may contain will stand out, by their superior intensity, on the weaker ground of the continuous spectrum.

Preparations for observations of the kind had long been in progress in the hands of our countryman, Mr. Lockyer. His first attempts were unsuccessful; but undismayed by failure, he ordered the construction of a new spectroscope of superior power, in which he was aided by a grant from the sum placed annually by Parliament at the disposal of the Royal Society for scientific purposes. The execution of this instrument was delayed by what proved to be the last illness of the eminent optician to whom it was entrusted, the late Mr. Cooke; but when at last the instrument was placed in his hands, Mr. Lockyer was not long in discovering the object of his two years' search. On the 20th of October last year, in examining the space immediately surrounding the edge of the solar disc, he obtained evidence, by the occurrence of a bright line in the spectrum, that his slit was on the image of one of those prominences the nature of which had so long been an enigma. It further appeared from an observation made on November 5 (as indeed might be expected from the photographs of Mr. De la Rue, and the descriptions of those who had observed total solar eclipses) that the prominences were merely elevated portions of an extensive luminous stratum of the same general character, which, now that the necessity of the interposition of the moon was dispensed with, could be traced completely round the sun. Notices of this discovery were received from the author by the Royal Society on October 21 and November 3, and the former was almost immediately published in No. 105 of the Proceedings. These were shortly afterwards followed by a fuller paper on the same subject.

Meanwhile the same thing had been independently observed in another part of the world. After having observed the remarkable spectrum of the prominences during the total eclipse, it occurred to M. Janssen that the same method might allow the prominences to be detected at any time; and on trial he succeeded in detecting them the very day after the eclipse. The results of his observations were sent by post, and were received shortly after the account of Mr. Lockyer's discovery had been communicated by Mr. De la Rue to the French Academy.

In the way hitherto described a prominence is not seen as a whole, but the observer knows when its image is intercepted by the slit; and by varying a little the position of the slit a series of sections at the prominence are obtained, by putting which together the form of the prominence is deduced. Shortly after Mr. Lockyer's communication of his discovery, Mr. Huggins, who had been independently engaged in the attempt to render the prominences visible by the aid of the spectroscope, succeeded in seeing a prominence as a whole by somewhat widening the slit, and using a red glass to diminish the glare of the light admitted by the slit, the prominence being seen by means of the C line in the red. Mr. Lockyer had a design for seeing the prominences as a whole by giving the slit a rapid motion of small extent, but this proved to be superfluous, and they are now habitually seen with their actual forms. Nor is our power of observing them restricted to those which are so situated that they are seen by projection outside the sun's limb; such is the power of the spectroscopic method of observation that it has enabled Mr. Lockyer and others to observe them right on the disc of the sun, an important step for connecting them with other solar phenomena.

One of the most striking results of the habitual study of these prominences is the evidence they afford of the stupendous changes which are going on in the central body of our system. Prominences, the heights of which are to be measured by thousands and tens of thousands

of miles, appear and disappear in the course of some minutes. And a study of certain minute changes of position in the bright line F, which receive a simple and natural explanation by referring them to proper motion in the glowing gas by which that line is produced, and which we see no other way of accounting for, have led Mr. Lockyer to conclude that the gas in question is sometimes travelling with velocities comparable with that of the earth in its orbit. Moreover, these exhibitions of intense action are frequently found to be intimately connected with the spots, and can hardly fail to throw light on the disputed question of their formation. Nor are chemical composition and proper motion the only physical conditions of the gas which are accessible to spectral analysis. By comparing the breadth of the bright bands (for though narrow they are not mere lines) seen in the prominences with those observed in the spectrum of hydrogen rendered incandescent under different physical conditions, Dr. Frankland and Mr. Lockyer have deduced conclusions respecting the pressure to which the gas is subject in the neighbourhood of the sun. I am happy to say that Mr. Lockyer has consented to deliver a discourse during our meeting, in which the whole subject will doubtless be fully explained.

I have dwelt perhaps too long on this topic, and I cannot help fearing that I may have been tedious to the many scientific men to whom the subject is already perfectly familiar. Yet the contemplations which it opens out to us are so exalted, and the proof which it affords of what can be accomplished by the union of different branches of science is so striking, that I hope I may be pardoned for occupying your time. I cannot, however, leave the subject of astronomy without congratulating the Association on the accomplishment of an object which originated with it, and in the promotion of which it formerly took an active part. It was at the meeting of the Association at Birmingham in 1849, under the presidency of the Rev. Dr. Robinson, that a resolution was passed for making an application to Her Majesty's Government to establish a reflector of not less than three feet aperture at the Cape of Good Hope, and to make such additions to the staff of that observatory as might be necessary for its effectual working. This resolution met with the hearty concurrence of the President of the Council of the Royal Society, who suggested that the precise locality in the Southern hemisphere where the telescope should be erected had best be left an open question. This modification having been adopted by your Council, the application was presented to Earl Russell, then First Lord of the Treasury, by representatives of both bodies early in 1850. A reply was received from Government to the effect that though they agreed with the Association as to the interest which attached itself to the inquiry, yet there was so much difficulty attending the arrangements that they were not prepared to take any steps without much further inquiry. This reply was considered so far favourable as not to forbid the hope of success if the application were renewed on a suitable opportunity. The subject was again brought before the Association by Colonel (now General Sir Edward) Sabine, in his opening address as President at the Belfast meeting in 1852. The result was that the matter was again brought before Government by a commitee of the British Association, acting in conjunction with a committee of the Royal Society, by means of an application made to the Earl of Aberdeen. By this time the country was engaged in the Russian war, in consequence of which, it was replied, no funds could then be spared; but a promise was given that when the crisis then impending was past, the matter should be taken up, a promise which the retirement from office and subsequent death of Lord Aberdeen rendered of no avail.

But though failing in its immediate object, the action of the British Association in this matter has not remained fruitless. A few years later the subject was warmly taken up at Melbourne, and after preliminary correspondence between the Board of Visitors of the Melbourne Observatory and the President and Council of the Royal Society, and the appointment by the latter body of a Committee to consider and report on the subject, in April, 1864, a proposition was made to the Colonial Legislature for a grant of £5,000 for the construction of a telescope, and was acceded to. Not to weary you with details, I will merely say that the telescope has been constructed by Mr. Grubb, of Dublin, and is now erected at Melbourne, and in the hands of Mr. Le Sueur, who has been appointed to use it. It is a reflector of four feet aperture, of the Cassegrain construction, equatorially mounted, and provided with a clock-movement. Before its shipment, it was inspected in Dublin by the Committee appointed by the Royal Society to consider the best mode of carrying out the object for which the vote was made by the Melbourne Legislature; and the Committee speak in the highest terms of its contrivance and execution. We may expect before long to get a first instalment of the results obtained by a scrutiny of the southern heavens with an instrument far more powerful than any that has hitherto been applied to them—results which will at the same time add to our existing knowledge and redound to the honour of the Colony, by whose liberality this long-cherished object has at last been effected.

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When chemists ceased to be content with the mere ultimate analysis of organic substances, and set themselves to study their proximate constituents, a great number of definite chemical compounds were obtained which could not be formed artificially. I do not know what may have been the usual opinion at that time among chemists as to their mode of formation. Probably it may have been imagined that chemical affinities were indeed concerned in their formation, but controlled and modified by an assumed vital force. But as the science progressed many of these organic substances were formed artificially, in some cases from other and perfectly distinct organic substances, in other cases actually from their elements. This statement must indeed be accepted with one qualification. It was stated several years ago by M. Pasteur, and I believe the statement still remains true, that no substance the solution of which possesses the property of rotating the plane of polarisation of polarised light had been formed artificially from substances not possessing that property. Now several of the natural substances which are deemed to have been produced artificially are active, in the sense of rotating the plane of polarisation; and therefore in these cases the inactive artificial substances cannot be absolutely identical with the natural ones. But the inactivity of the artificial substance is readily explained on the supposition that the artificial substance bears to the natural the same relation as racemic acid bears to tartaric—that it is, so to speak, a mixture of the natural substance with its image in a mirror. And when we remember by what a peculiar and troublesome process M. Pasteur succeeded in separating racemic acid into the right-handed and left-handed tartaric acids, it will be at once understood how easily the fact, if it be a fact, of the existence in the natural substance of a mixture of two substances, one right-handed and the other left-handed, but otherwise identical, may have escaped detection. This is a curious point, to the clearing up of which it is desirable that chemists should direct their attention. Waiving, then, the difference of activity or inactivity, which, as we have seen, admits of a simple physical explanation, though the correctness of that explanation remains to be investigated, we may say that at the present time a considerable number of what used to be regarded as essentially natural organic substances have been formed in the laboratory. That being the case, it seems most reasonable to suppose that in the plant or animal from which those organic substances were obtained they were formed by the play of ordinary chemical affinity, not necessarily nor probably by the same series of reactions by which they were formed in the laboratory, where a high temperature is commonly employed, but still by chemical reactions of some kind, under the agency in many cases of light—an agency sometimes employed by the chemist in his laboratory. And since the boundary line between the natural substances which have, and those which have not, been formed artificially is one which, so far as we know, simply depends upon the amount of our knowledge, and is continually changing as new processes are discovered, we are led to extend the same reasoning to the various chemical substances of which organic structures are made up.

Correspondence.

Foreign.

Paris, August 17, 1869.

A SUBJECT of some interest to scientific photographers was brought forward at a recent meeting of the Academy of Sciences, by M. Morren. About a month ago, Mr. Abel presented to the same scientific body a *mémoire* upon the action of explosive substances, which, although long, was considered of such importance that it was ordered to be inserted in the *Compte Rendus* of the Academy, without any abbreviation. In this communication, our compatriot showed that the explosion of a substance often determined the decomposition of another which was found in its neighbourhood. Thus, if a quantity of chloride of nitrogen be exploded at a certain distance from a mass of gun-cotton, the latter explodes almost at the same time as the former substance. It has been found also, to use the words of the author of the *mémoire*—"That certain explosions are accompanied by vibrations powerful enough to disturb the chemical equilibrium of some bodies by instantaneously determining their molecular disintegration, whilst other explosions, although developing a mechanical force at least equal, if not superior, produce no results." For instance, the mechanical force which is developed by the explosion of fifty grains of chloride of nitrogen far exceeds that produced by five grains of any fulminate, enclosed in some envelope, and yet it is necessary to employ the two bodies, in the proportion of 100 parts of chloride of nitrogen, covered with water, to one part of fulminate of mercury, in a metallic envelope, to induce an explosion of gun-cotton. The decomposition and explosion of the cotton cannot, in this case, be accounted for alone by the mechanical force liberated by the explosion of the two chemical products. Some other reason must be given for the cause of the explosion, for it is independent of the direct action of the mechanical force developed.

As Mr. Abel observes, certain musical vibrations determine synchronous vibrations in certain bodies, and are without action upon others. Chemical decomposition may be provoked by making certain substances intercept certain luminous undulations, and he accounts for the phenomena of explosion just described in an analogous manner.

As we have not to do here with the *mémoire* of Mr. Abel, except as

introducing that just read by M. Morren upon *Some Phenomena of Decomposition Produced by Light*, we need not refer to it more; but, bearing the facts in mind which are set forth in it, we are better prepared to appreciate the arguments of M. Morren. This gentleman has been examining similar facts, which are found in another branch of science—that of the action of light upon substances—and he was naturally pleased to find that the conclusions of Mr. Abel supported the views he had been led to form. He instances the experiments of Mr. Tyndall on the decomposition of vapours by means of light, and which have been described in these pages, I believe. In these experiments the substances studied were of an organic nature, and the light employed in their analysis or synthesis was the electric.

M. Morren has pursued a similar course of experiments, using the solar light and examining inorganic substances. The molecules of these substances are less complex, less mobile, and are, therefore, more easily studied. The rays which compose solar light are well known to be divided into three groups—calorific, luminous, and chemical, and the corresponding undulatory movements of each group differ in rapidity. All chemical substances, says M. Morren, can be classed in two series—the first of which (sulphurous acid SO_2 is the type) is that composed of bodies formed under the action of heat, the second (hydrochloric acid as a type) is composed of bodies which are produced under the action of the chemical rays. From a large number of experiments, the author has come to the following conclusions:—If a body be formed and maintained in a certain undulatory condition, it is requisite that the oscillations proper to the atoms which constitute its molecule be *different* from that of the medium where the body has been produced. But if the body be transported into another medium, when vibrations are produced synchronous with those of its atoms the vibrations of the latter become more energetic, and the active force which they thus accumulate becomes rapidly considerable. The atoms are thrown to a greater distance from each other than the circuit of their sphere of action. The atomic edifice previously formed is demolished, the atoms keeping their special attractions form a new edifice, which is possible in the conditions of oscillation which surrounds them, and consequently possessing only the same synchronous vibrations as those of the medium.

One example taken from many will serve to render this reasoning clearer. Sulphurous acid SO_2 is built up with facility by the action of heat upon sulphur and oxygen. This gas produced under the action of calorific undulations is able to exist in the midst of them; they can traverse it without producing any alteration. It does not vibrate as they do, just as an elastic sonorous body does not vibrate if the aërien undulations which strike it are not synchronous with those which are possible to it. But, if SO_2 be placed under the action of the proper chemical rays, immediately and with a facility as marvellous as powerful the atomic edifice SO_2 is demolished, sulphur is precipitated and may be collected, and a new molecule SO_3 is formed, which can also be collected and even estimated. This molecule is heavier, and does not vibrate any longer in a synchronous manner with the chemical rays which give rise to it. The movements of the atoms are become slower, for SO_3, if again brought under the influence of the calorific rays, sets to work to oscillate under their action, and collects the active force which, increasing, will destroy the molecule SO_3 recently formed. "In these atomic evolutions," says M. Morren, "the molecules powerfully lighted up, which demolish and reconstruct each other under the eye of the experimentalist (who should place himself in darkness to see the phenomena to the best advantage), give rise to extremely remarkable effects of polarisation, colouration, movement, and even of extreme *tranquility*. This last case is presented when a body formed under the chemical rays is transported into the calorlfic rays, which it absorbs and *stores up* with extreme energy."

M. Morren asserts that he finds that an acid solution of sulphate of quinine placed between sheets of glass and about a quarter of an inch thick, serves admirably to replace yellow glass for stopping the passage of chemical rays. I think that it is not at all improbable than the phenomena of the production and development of the photographic image, if examined from the point of view indicated by the foregoing, would become of easier comprehension. Already, I believe, your talented correspondent, Mr. W. H. Harrison, has looked at the subject in a similar way; and I hope the *resumé* of the works of Mr. Abel and M. Morren may prove an addition to the stock of knowledge already in existence.

Visitors to Paris would do well to pass a few hours in the Palais de l'Industrie in the Champs Elysees, where not only is the Exhibition of the French Photographic Society, but there is an exhibition of various objects collected by the Central Union of the Fine Arts Applied to Industry. I was pleased to see photographs included in this collection, as well as photographic apparatus; and I am glad to be able to call attention to some good and neatly-mounted portraits upon plain paper, the production of M. Modeste Chambay, whose coloured productions were once the subject of criticism in these pages. An ingenious tent for outdoor photography is to be seen, but as it cannot well be described without an engraving, I will wait till I can procure some woodcuts for your readers. The fixing of crayon and charcoal drawings upon paper so that they shall not rub off has always been a subject of interest to artists, and I observed that an exhibitor has been devoting his attention not only to the best means of accomplishing this, but he has included in his researches the best way of fixing photographs so as to protect them from the action of the air, damp, &c. I called upon the inventor yesterday for full information, but, not finding him at home, must defer full particulars of this process for a future communication.

R. J. Fowler.

Home.

FOREIGN JOURNALS.

To the Editors.

Gentlemen,—As I have a great objection to having opinions attributed to me which I do not entertain, allow me to say a few words in reply to "our friend and correspondent," Mr. R. J. Fowler, whom I am glad to meet with again in your pages. In speaking of the foreign journals, he says:—"In which Mr. G. Price believes there is so much hidden wisdom and the most recent information." If Mr. Fowler will take the trouble to read again what I said at page 381 respecting them, he will not find there, nor indeed elsewhere, any warranty for this statement.

I know full well that not only novel ideas but also startling assertions, are sometimes published in the foreign journals which are not noticed by the English ones; and I could mention several instances in which this should not have been the case.

Now, I hold the opinion that all such should be republished here, in order that their truth or fallacy might be rendered evident. Methinks this is akin to a belief in the "wisdom" of our *own* journals.—I am, yours, &c.,

George Price.

THE DEEP MENISCUS.

To the Editors.

Gentlemen,—I believe Mr. Sutton claims as his own every improvement in photographic lenses (and, in fact, in everything else photographic) since, if not previously, to the date of Daguerre's discovery. His statement that the properties of a deep meniscus for photographic purposes were unknown previously to 1864, when he enlightened the world on the subject, is preposterous. I commenced the practice of photography in 1839, and for some months used a lens taken from an opera glass. This was, of course, of short focus; but wishing to produce larger pictures than it was capable of taking, and having read somewhere of the great capabilities of a meniscus with curves 3 to 2, I had one of three inches diameter made by Mr. Davidson, of Edinburgh, and with this I took some excellent Daguerreotypes on the whole plate.

If this be not a deep meniscus, I am at a loss to imagine what would be so considered. The great drawback to this lens was the trouble in adjusting the focus to the chemical rays, and which caused me to abandon its use.

In the second number of the *Journal of the Photographic Society*, published in April, 1853, is an article by Mr. Robert Hunt, in which he refers to a paper published in the *Philosophical Magazine* by Mr. Towson, showing the best method of obtaining the chemical focus of a meniscus. This needs no comment.—I am, yours, &c.,

Cheltenham, August 14, 1869. Baynham Jones.

[The above is one of several letters that we have received on the same subject. One correspondent, alluding to Mr. Sutton's "weakness in making discoveries which when good are already well known, and when new are unworthy of serious atttention," thinks that it is a pity that respect for his own reputation does not prompt him to visit England once a year, in order to make himself acquainted with the contents of some of those establishments where lenses are manufactured or apparatus sold. This, he thinks, might prevent him in future from committing himself to so many inane and conflicting statements as he was at one time rather celebrated for.—Eds.]

DIPPER MARKS.

To the Editors.

Gentlemen,—I have now seen two letters in The British Journal of Photography regarding these marks or stains on negatives.

Last summer I was very much annoyed with them. After the picture was developed, I found three or four dark lines coming down from the top of the plate, about an inch in length, then dying out. After a time I supposed the fluted dipper was the cause of all the mischief, and was then minded to throw it away and get another. But second thoughts sometimes come to one's aid, so I began to think the evil lay with myself by inserting the plate in the bath too rapidly. I at once collodionised a plate and lowered it down in the bath very slowly and steadily. I exposed it, developed it, and got a negative without spot or wrinkle. I tried a few more with the same results, and have never been pestered with anything of the kind since.—I am, yours, &c.,

Brechin, August 18, 1869. Amateur.

THE IVORYTYPE.

To the EDITORS.

GENTLEMEN,—I have been for some time practising the "Ivorytype," but cannot succeed in getting the photograph to *adhere* to the glass. I have tried albumenised and plain paper, but it amounts to the same in the end—it *will not* stick. I have tried wax, Canada balsam, and turpentine—same; and gum eleim, thick and thin, hot and cold, but all are no use. The almanacs and other instructions say—make the glass hot, and pour on melted wax, &c., pressing out air-bubbles, until the picture adheres; that is all very well—it *wont* adhere. Can you tell me, or can any of your clever readers tell me, where I fail in this simple thing? for it is always spoken of as something simple, and I know others do it with ease. If you or your readers can help me you will much oblige,—Yours, &c., A STUPID ARTIST.

August 17, 1869.

QUERIES ON LIGHTING.

To the EDITORS.

GENTLEMEN,—Will you kindly inform me when we may expect the long-promised reduction in the price of magnesium ribbon. Also by what means the oxygen gas is compressed in the iron jar or tube that is recommended instead of gas-bags and pressure-boards; and whether zirconia is used in a flat or round piece?—I am, yours, &c., A. G.

August 18, 1869.

[Several weeks may probably elapse before the reduction the price of magnesium. Oxygen is forced into the iron bottle by means of a strong force-pump. Zirconia may, like lime, be used in any form, but the piece with which we tried our experiments was a small solid cylinder with flat ends.—EDS.]

EXCHANGE COLUMN.

A good three-wheel velocipede will be exchanged for a Davenport or handsome carved table with changes.—Address, C. FARLEY, photographer, 8, Laurence-street, Drogheda.

A half-plate camera and quick-acting *carte-de-visite* lens, also a triple achromatic lens for 10 × 8 pictures, will be exchanged for a good portrait lens for 12 × 10 pictures.—Address, J. BRADSHAW, Bookseller, Dollar, Scotland

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

Edmund Rogers, Salisbury.—*Portrait of the late Bishop Hamilton.*

P. P. Skeolan, Harrogate.—*Two Portraits of Dr. Sheridan Muspratt.*

T. M'Kay & Co., Armagh.—*Group of St. Martha's Sunday School, Armagh.*

☞ *Correspondents should never write on both sides of the paper.*

THOMAS SUTTON.—Received. In our next.

J. M. MUNRO.—We have tried the lens, and believe it to be a useful instrument.

A. G. GRANT.—We shall be glad to receive the promised account of your dark tent.

F. W. REYNOLDS (Cambridge).—We cannot advise you better than to read Mr. Dawson's series of articles on the subject, recently published in this Journal, and try the formulæ and instructions therein given.

F. M. D.—We refer you to an article on the coffee process in the present number, in which you will find your first two questions answered. If the information there given be insufficient, please write again.

J. B. (Darlington).—Either of the opticians whose announcements you find in our advertising pages will supply you with the kind of lens you require. You will get *detailed* information from their price lists.

W. H. C. (Liverpool).—A good coating of varnish or paint will make your extemporised cistern all right. The thinness of your pictures is probably owing to the bath being too acid and weak. Have you ascertained its strength?

H. ERRINGTON.—We have exposed the plates you sent for precisely the same time as we exposed others of our own preparation. Want of time has compelled us to delay their development. We shall intimate to you how they turn out, and shall at the same time inform you of the probable cause of your failure.

J. B. AND S.—The best method of treating a faded photograph must be determined by circumstances. We have, for example, restored a faded sulphur-toned print by the bichloride of mercury process. Other prints would not be improved by this treatment, but would be so if immersed in a weak solution of pyrogallic acid to which aceto nitrate of silver had been added.

S. P. (Preston.)—If both lenses are stopped down to the same degree there will or ought to be no difference between the resulting pictures, but, if both be used without stops, that having the larger diameter will produce portraits in a much shorter time than the other, a three-inch lens, for example, working with about four times the rapidity of one of an inch and a-half in diameter. The smaller lens, however, will give a picture having much greater depth of definition than the other. The larger will be the more useful, because by stopping it down you may get all the effects you could obtain with the small one.

"NITRATE."—1. Boil the bath in a clean earthenware vessel; or, if time be no object, render it neutral with bicarbonate of soda, and allow it to stand in the sun for a few days, shaking it up at intervals; then dilute with a little water, and, after filtering, add fresh nitrate of silver to make up to the proper strength.—2. Oxide of silver is soluble in nitric acid, forming nitrate of silver.

J. P. (Wood Green).—The plate you send is certainly far from being successful; indeed we may say that it is the worst example by the coffee process that we have seen. If you call at our private address, which will be furnished on application when you send for the plate, we can, in a few minutes, give you such information as will set you right. Please intimate where the view was taken; we do not remember to have met with it in the vicinity of Wood Green.

"ICELAND SPAR" (Corstorphine).—Yonr question is an important one, but we are not yet in a position to answer it. Had you put it to us a month ago we should have expressed our belief that the rhomb of spar would have required to be larger than the lens; but, from some experiments we are making we begin to indulge the hope that a piece of very small dimensions may yet be rendered available for the purpose. In the meantime see an article on a branch of the same subject in another page.

PHILO. (Strathingle).—The "purplish tint" in transparencies may be produced either directly in the development or by a toning agent. Unless we knew what process of printing—that is to say, whether wet or dry—you intended to adopt, we could not give you directions under the former head. A weak solution of chloride of gold makes a good toning agent, but the tones yielded by transparency are more frequently black or grey than purple. The solution ought to be very weak. A more extensive range of tones may be obtained from dry than from wet plates. Tannin plates yield fine tones, which may be varied by the nature and proportions of the restraining acid mixed with the pyrogallic acid. Acetic acid, for example, gives warm tones; citric acid much colder ones.

"NESS" (Kirkwall) has a magic lantern, with the defining qualities of which he is dissatisfied, and he wishes to know if he can adopt a portrait combination so as to be useful to the lantern in the way of improving its definition. For giving crisp and intense definition nothing can surpass the portrait combination; but unless the focus of the lens be long the image is often wanting in equality, being sharper at the centre than at the margin. One of the most *generally* satisfactory objectives for a lantern capable of showing a three-inch picture consists in having a plano-convex achromatic lens of about six inches focus and one and three-quarters in diameter, mounted with its convex side next to the slide. If a large flame be used a stop will be required in front; but if the light be small, such as the lime light, there need not be any diaphragm. In a trial we made last spring with an object glass of the kind described, we were much gratified with the results, the field being flat and the definition good.

IN TYPE.—Communications from George Price, D. Winstanley, &c.

VIEWS OF IRISH SCENERY.—Mr. Payne Jennings, of Belfast, has sent us some views of Irish scenery which are very charmingly executed, the composition being equally excellent. The views are what may be designated artistic "bits," the tone being a rich warm brown. Specially desiring of commendation are a pretty scene entitled *The Hermitage of the River*, and a companion picture, *A Peep Under the Bridge.* Mr. Jennings will "make his mark" as a landscape photographer.

SUICIDE.—On Tuesday, the 10th inst., an inquest was held at Folkestone on the body of Ellen Weston, the daughter of a photographer of that town. About nine o'clock in the evening she called out to her sister, "I am dying; I have poisoned myself with cyanide," and although medical assistance was procured, and everything possible done for her, she died in about twenty minutes. No reason was assigned for the act. The jury returned a verdict of "Temporary insanity."

METEOROLOGICAL REPORT,

For the Week ending August 18*th*, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Aug. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
12	30·09	70	48	53	58	WNW	—	Cloudy
13	29·91	70	54	63	65	WSW	0·31	Overcast
14	30·04	—	54	58	62	NNW	—	Fine
16	30·33	74	52	60	68	WSW	—	Overcast
17	30·36	68	54	56	64	ESE	—	Bright
18	30·40	76	50	57	65	NE	—	Bright

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 486. Vol. XVI.—AUGUST 27, 1869.

STREAKS IN THE FILM.

We have lately had several inquiries relative to the production of lines in the collodion film coinciding with the direction of the dip, and a few words here may serve to set at rest any difficulties our correspondents may find about the matter.

The question of the cause of these streaks or marks in the direction of the dip, and the remedy for this annoyance, was explicitly stated by Mr. Sebastian Davis, in a paper which he read before the South London Photographic Society, and which appeared in this Journal at the time (1865, Vol. XII., page 26). Prior to the publication of Mr. Davis's paper the remedy for this particular defect was known and used to some extent; and now we find, from the interesting letter of "Amateur," which we published last week, that he has worked the matter out for himself, and now recommends the adoption of a plan precisely similar to that of Mr. Davis, *i.e.*, to immerse the plate in the bath *very slowly*.

The lines or streaks in the negative which we now refer to are much more common than many think, as it is only when strongly marked that they attract attention. These streaks are always in the direction of the dip, and have often very strongly-marked edges; even before the plate is developed they can be sometimes distinctly seen, so that developers and fixers have nothing whatever to do with their production. We are, therefore, limited to the collodion and the nitrate bath—so far as solutions are concerned—in searching for the cause of this trouble. The presence of impure alcohol in the former and the absence of sufficient free acid in the latter, as well as the use of very old baths, certainly tend to the production of streaks very similar to those we are dealing with.

On tracing the matter further it is found, just as stated by Mr. Sebastian Davis and by "Amateur," that the streaks have their origin in a slight error of manipulation, and not necessarily in a fault in the chemical condition of either the collodion or the bath. When a plate, after coating with collodion, is plunged rapidly into a bath, it is found that the whole surface is not instantly wetted by the silver solution. In descending in the liquid, one or two small spots at the bottom of the collodion film may repel the bath solution; a little lane is thus made in the liquid while other parts of the film are wetted by the solution. The time during which the line in the film can remain unmoistened by the bath solution is of course extremely minute, but it is quite sufficient to establish a difference in density between the contiguous portions of the film. We have little doubt that many of the streaks are produced in this way, as we have been able to watch their development in the bath in some peculiarly aggravated cases.

It is impossible to cure the evil, but extremely easy to prevent it troubling us, when the plan stated by "Amateur" is employed, as it is only necessary to immerse the plate in the bath very slowly and evenly, when all trouble from these streaks will disappear. This is a preventative measure of such extreme simplicity that we need add no more to what we have already written, but conclude by mentioning that attention to this apparently trifling point enables us to use a "skinny" collodion or a very old bath with impunity, so far as the streaks in the direction of the dip are concerned.

HÆMATOXYLIN AS A DEVELOPER OF THE LATENT IMAGE.

Our readers may recollect that in July, 1868, Mr. M. Carey Lea described in these columns a new and very curious developer of the latent image called *hæmatoxylin*, a white crystalline substance which has been long known to be the source of the red colouring matter of *logwood*. Mr. Lea found that when an exposed plate is treated in the usual way with a weak solution of hæmatoxylin, containing a little acetic acid, that a clear, clean picture can be obtained with about the same exposure as is required when pyrogallic development is employed.

Knowing the above, we were not a little surprised to find an account extracted from the *Zeitschrift für Chemie* in our excellent contemporary, the *Chemical News*, in which Dr. Tabensky announces the discovery of the developing power of hæmatoxylin as his own. Dr. Tabensky, remembering the facility with which hæmatoxylin reduces silver salts, was induced to study the reaction more closely, and was subsequently recommended by Professor Von Babo to ascertain whether the alcoholic extract of logwood might not prove a valuable photographic agent. Accordingly he prepared some hæmatoxylin, and tested its power of developing the latent image against pyrogallic acid, and found the results to be so satisfactory that he pursued the experiments, and arrived at the following as the best formula for the new developing solution :—

Hæmatoxylin	$7\frac{1}{2}$ grains.
Water	2 ounces $6\frac{1}{2}$ drachms.
Acetic acid, 33°................................	$5\frac{1}{2}$,,
A little glycerine.	

The author believes hæmatoxylin to be a very feeble acid, instead of being the rather indifferent body which it is generally believed to be. He also states that it is very easily dissolved by a solution of borax.

It would appear, then, that this is simply a rediscovery of the fact which was fully stated in these columns more than a year ago by Mr. M. Carey Lea. But though not the original discoverer of the developing power of hæmatoxylin, Dr. Tabensky appears to have worked independently, and his observations will probably attract more attention to the subject than it has hitherto received.

As some of our readers may wish to try a few experiments with this new developer, we give Mr. Lea's simple process for preparing the hæmatoxylin in a sufficiently pure state from the commercial extract of logwood :—

"Take a drachm of the extract, grind it up in a mortar with three or four drachms of clean, dry sand, to prevent it from agglutinating in the subsequent treatment. Introduce it into a phial, and pour over it an ounce of ether. Agitate occasionally for some hours; then let it subside, and pour off the clean solution, which will be of a very pale straw colour, nearly colourless.

"A portion of this solution mixed with an equal bulk of acetic acid and three or four times its volume of water, and then poured over an exposed plate, developes it very well and without difficulty."

LABORATORY MEMORANDA.

Comfort and satisfaction in carrying on operations in a work-room, or set of rooms, are greatly dependent upon little matters of arrangement—matters that often seem almost too unimportant for special attention, or which have been overlooked until too late. Habit, also, will in many cases lead us to be content with arrangements in which small changes, if properly understood, would result in a saving of both labour and time. It is this consideration that leads me to set down a few suggestions which, though they may seem trivial, are really not so—at least to those who desire in each day to accomplish the largest sum total of work.

Tables.—Almost all tables arranged for laboratories are *too high* by several inches. Twenty-nine to thirty inches is the common height; it should be twenty-six to twenty-seven. Most manipulations are performed, not on the table, but over it. In heating operations the object exposed to heat is almost always at some little height above the table; and, if this last be too high, the operator does not see the object upon which he is working with the same facility as if the table were lower. He is obliged to stand more and is sooner fatigued.

It is always a mistake to put *drawers* into a laboratory table. Accidents will happen, vessels will boil over or break, liquids are spilled, and, sooner or later, the contents of the drawer are rendered worthless.

On the other hand, a *case of drawers*, so placed in front of the table that the operator has room for a chair between; a chair with a pivot, so that he can turn in a moment to the case of drawers and obtain whatever he wants; filters, cork piercers, files, writing diamonds, &c., &c.—such an arrangement is exceedingly convenient, and the articles themselves are safe from danger.

Water-faucets.—To have hot water as well as cold at command from the tap is exceedingly convenient, and a new sort of cock lately introduced is most excellent. Frequently we wish to introduce tepid water into thick glass vessels which will not bear hot water without great precaution. The faucet to which I refer has only one mouth-piece, but has two handles or keys. If one be turned, hot water runs from the spout; if the other, cold. By turning both at once, and regulating the amount to which both are turned, we get a stream of tepid water of just the temperature we desire—the hot and cold being thus mixed in the pipe. I have recently had two sets of these put up, and find them very useful.

A tray, supported on two cross-shaped pieces, running on castors, and standing about as high as an ordinary table, I find very convenient for transferring apparatus from one room to another, or from one part to another of the same room. Many journeys are saved by the quantity that it permits to be moved at once.

Gas.—The best method of arranging gas is to have pipes coming from the floor up through the tables, at all such points where it is intended to work. Each tube passes perpendicularly through the table; at a height of two or three inches above the table, it has a branch right and left for slipping on rubber tubes. The main stem continues eighteen inches or two feet above the table, and terminates in an argand burner. The convenience of having such burners everywhere round, and to have at command a strong light just where wanted, to continue one's work when daylight fails without a moment's intermission, is inappreciable.

Examining Negatives.—Those who do not keep by them a regular *retouching desk* will find the following arrangement very convenient:—A piece of smooth pine board, about eighteen inches square, has an upright piece attached to each side, about six inches high in front and eight or nine at the back. A groove cut in these lets in a piece of finely-ground glass, on which the negative lies; a ledge in front keeps it from slipping down. A piece of looking-glass laid underneath, or even a piece of clean white paper, sends up light enough, and the negative may be studied at leisure, and any little retouching that may be wanted can be conveniently done.

Precautions Against Fire.—The photographer deals with some singularly inflammable substances, and no one who works, as he does continually, with alcohol and ether, can consider himself safe from danger by fire; therefore, it is a useful precaution to have a piece of India-rubber hose, of a diameter suitable for fitting quickly over the water faucet, and of length sufficient to carry water instantly to any part of the premises. It should not be forgotten that water will not extinguish ether, because the ether floats upon the water, continuing to burn, and is thereby extended more rapidly. Wet sand is the best means for extinguishing ether.

Those who are temporarily or permanently out of the reach of illuminating gas are driven to use alcohol. Alcohol lamps, in any but careful hands, are a most fruitful source of accident, and, even where the best of care is taken, are not very safe. The glass alcohol lamps, with ground caps, are especially dangerous. These have repeatedly blown up with me, throwing the burning wick and spirits of alcohol in various directions, so that I have wholly abandoned their use under any circumstances. Even when a channel has been carefully filed in the cork I have known them explode, and, where this is not attended to, the danger is very great. Explosions are most apt to come when the lamp is used for heating; the heat is sent down again from the surface to which it is applied, the lamp becomes warm, the air within expands and drives out the wick. As just said, a channel should always be filed in the cork—a sharp notch lengthwise, made with a three-cornered file. But sometimes, again, the air inside seems to take up sufficient alcohol vapour to become explosive, and accidents happen in this way as well as from expansion. Wherever gas is attainable, no one should admit an alcohol lamp into his laboratory; but, where they are a necessary evil, the "Berzeline lamp" is the best, the body of the alcohol being kept cool. But even with these a little tilting sends a burning stream of alcohol over everything in the way. As alcohol can readily be extinguished by water, it is less seriously dangerous than ether.

Labels.—Those who trust to mucilages for fastening labels to glass will find them in time drop off, thus giving rise to inextricable confusion. *Paste* is the only suitable thing for use, as it may be made to keep almost indefinitely with the aid of carbolic acid. A drachm of carbolic acid to eight ounces of paste is what I have used with great satisfaction, and always keep it by me. Labels should never be written on *thick* paper; there is treble the danger of their becoming detached. The paper need not be very thin, but stiff writing-paper is to be avoided.

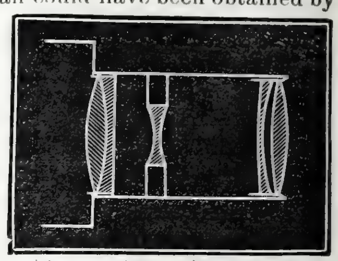
M. Carey Lea.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER VII.—TRIPLE LENSES.

The designation "triplet" as applied to combinations of photographic lenses, although commonly made, cannot be considered as quite accurate. Strictly speaking, the term applies to a lens composed of three elements—a sort of optical "trinity in unity." An achromatic lens composed of three pieces, whether cemented together or not, is a triplet; and, if the nomenclature be correct, as we believe it to be, a "triple" combination lens differs from a "triplet" in the lenses of the former being composed of three separate lenses each complete in itself, while the latter is represented by one apparently single lens really made up of three. This principle also applies to "double" lenses and "doublets."

Archer's Triple Lens.—The first triple combination of which we have any notice is that of Archer. This gentleman, with a view to increase the resources derived from a portrait lens, introduced between the front and back lenses a third lens—a small concave which, when placed in this position, lengthened the focus so as to permit a picture to be taken of a much greater size than could have been obtained by the combination in its normal condition. In this way, a concave spectacle lens may, if it be properly selected and properly used, enable the operator to take a half-plate picture (or larger) with a quarter-plate lens. Archer, so far as we know, was the first to use a third lens, and hence we must consider him as the first in this field.

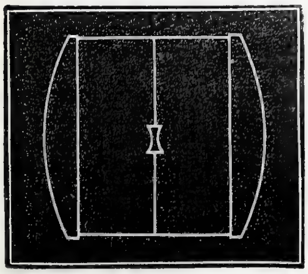


The foregoing engraving conveys an idea of Archer's triple lens, which gave pictures practically free from distortion, but which, owing to the death of the inventor, was not generally introduced.

Sutton's Symmetrical Triplet.—In 1859, Mr. Sutton, of Jersey, invented a triple lens under the above designation. It differs from Archer's and also from Derogy's (which was also introduced in 1859) in respect of its having both front and back lenses alike, and the central concave placed equidistant between them. We shall describe its structure and properties in Mr. Sutton's own language, taken from his writings of that period:—"The combination is a symmetrical triplet consisting of two equal achromatic plano-convex lenses, one at each end of a tube, placed with its convex side outwards, and a small double concave lens of equal radii placed exactly midway between them. In contact with the double concave lens a small stop is placed." In order to effect freedom from distortion, "it is requisite," he says, "that the combination must be strictly symmetrical, and the front and back lenses must be equal and similar in all respects;" "truth and symmetry seem to go hand in hand."

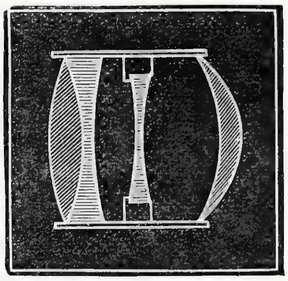
We subjoin an engraving of the lens from a drawing furnished by Mr. Sutton to the *Journal of the Photographic Society*. When subjected to the test of trial by the public it was not found to fulfil

the expectations formed of it, and, in spite of all the efforts made by its author to secure for it a different fate, it came to a premature end.

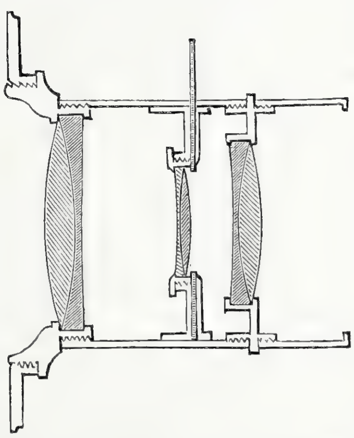


Notwithstanding the dogmatical assertion of Mr. Sutton that *the front and back lens must be equal and similar in all respects, and a small double concave lens of equal radii must be placed exactly midway between them* before distortion could be cured, the practical Goddard demonstrated the futility of this by introducing, in the same year, a lens which, although he did not at the time call it a "triple," will, we believe, be characterised as such by our readers. We therefore again, for the purpose of comparison, present an engraving of—

Goddard's Triple Lens.—As we gave a description of this lens in our last number, we content ourselves at present by observing (in opposition to Mr. Sutton's assertion) that the Goddard lens gave perfect freedom from distortion, at the same time that it was very far indeed from being in any sense "symmetrical." The great defect of this lens, as we have previously remarked elsewhere, was its objectionable flare. When the camera was directed to a landscape, and the lens was examined through a hole in the back, the concave lens appeared as a luminous disc, radiating light in every direction and thus producing the "flare."



Dallmeyer's Triple Achromatic Lens.—In the summer of 1860 Mr. Dallmeyer announced the completion of a triple combination lens on which he had been for some time engaged. It differed from any previously-existing combination in respect of its front and back lenses being each achromatic menisci of slight curvature, the front being smaller in diameter and shorter in focus than the back, and the centre lens being a concavo-convex achromatic, with its convex surface next to the anterior lens. The configuration and general arrangement will be seen from the accompanying engraving. This lens is well known. It gives a picture free from distortion, copies well, works with a wide aperture, is practically free from flare, and, taken altogether, is an exceedingly useful instrument. Some recent triple combinations that we have seen by other makers, American and continental, appear to be quite similar to that described. Mr. Ross's combination of this kind differs from that in the engraving by the lenses of which it is composed being plano-concave and plano-convex instead of the slightly meniscus form figured above.



The triple combination lens is aplanatic—that is to say, it defines sharply even when no stop is employed. Its great advantage over the single achromatic combination is its freedom from distortion. Much has been said concerning its excellence as a copying lens. It *is* excellent for this purpose; but we cannot permit this opportunity to pass without saying that it is not superior, even if it be equal, to those cemented double combinations still more recently introduced, and now recognised by their trade names of "doublets" and "rectilinears."

On the subject of copying, photographers who purpose bestowing their attention on this branch of the art should not use wide-angle lenses, but should prefer those which are of "narrow" angle, and hence permit the use of a large diaphragm. Of the two families of double combination lenses named above as the "doublet" and "rectilinear," the most useful copying lenses for every purpose connected with this department are the "*narrow angle* doublet" and the "*rapid* rectilinear."

But we shall have more to say on this subject in our next, when we come to describe the lenses in question.

Donation to the London Photographic Society.—An announcement having appeared in a contemporary to the effect that Dr. Diamond, the late Secretary, had presented to the Society the sum of fifty pounds, we are informed by the President that the statement is incorrect.

NEW TRANSPARENT PAPERS TO BE SENSITISED IN THE ORDINARY MANNER OF ALBUMENISED PAPERS, BUT WHICH DO NOT REQUIRE TONING.

PREFATORY CHAPTER.

A short time ago, whilst engaged in taking photographic prints from leaves, I thought that certain species of them—such as the *Aucuba japonica* or variegated laurel—would show well as transparencies.

It then became a subject for cogitation what would be the best and easiest method of rendering the paper transparent, for I considered that the waxed-paper process introduced by M. Le Gray was too troublesome, and therefore abandoned all idea of employing it—troublesome, because this process not only requires the waxing of the paper, but also requires an after immersion and floating upon two separate solutions, and sundry washings, before the paper is ready for use; and then, to develope the print, another solution must be employed.

M. Geoffry's and M. Tillard's cereoline and turpentine processes were discarded for the same reason. Moreover, I wanted a transparent paper, the use of which would not necessitate a developing solution, but would merely require the ordinary treatment of albumenised paper to produce a print. As I did not know of any such, I resolved to make one myself.

My first attempt was with a thick, rough drawing-paper, that had been a voyage to the Cape of Good Hope and back, and which had been in my possession for more than thirty years. This paper was not chlorided, and no chloride or other salt was mixed with the preparation that was employed to render it transparent. I succeeded so well in this first attempt that I afterwards used a better paper, viz., a medium Saxe, such as is used for albumenising; this was also *un*chlorided.

Although the preparation I made use of to render the paper transparent gave very excellent results, I considered it too expensive for ordinary use; I therefore sought for a substitute that would be cheaper.

I tried four substitutes, one of which was *un*chlorided. With this one I could get nothing but unsatisfactory results. I then added a chloride to it and obtained excellent prints with it, as well as with each of the other three substitutes, all of which were chlorided.

With all these four chlorided substances as well as with the first *un*chlorided preparation, I can produce transparent prints of a brown, black, or purple colour, without the employment of any toning solution, the purple colour being either reddish or bluish, as I wish. Moreover, these purple prints cannot be distinguished from those which are gold-toned. This I can do by merely using a strong and *fresh* solution of hyposulphite of soda.

According to my own knowledge and experience this is, I believe, a novelty, inasmuch as I have never before obtained such tones myself, nor have I ever heard of others doing so, without having recourse to toning.

In the waxed-paper process of M. Le Gray, after the paper is impregnated with the wax, it is necessary to iron it with a moderately hot iron between folds of blotting-paper in order to remove any excess of wax, as this excess is then absorbed by the blotting-paper. However, in my first experiment to render the paper transparent, I did not iron it, but used other means to remove the superfluous transparency-producing materials.

Notwithstanding that, in the numerous trials of all the five substances I made use of to render the paper transparent I always met with unvarying success in producing good prints. In my next experiments—in order to remove any superfluity of transparency-producing materials from the surface of the paper—I tried the effect of ironing it between folds of white blotting-paper.

This ironing produced not only a difference in the appearance of the paper, inasmuch as it looked harder and drier, but the colouration produced by exposing the ironed papers to sunlight was totally different from that of the papers which were not ironed; and so, also, was the effect of the hyposulphite of soda fixing bath upon them.

So marked was the difference of colouration in the two sets of papers throughout all the stages of printing, &c., that many persons would be almost induced to believe a different salt or compound of silver was formed by the act of sensitising the ironed transparent papers to that which was formed by sensitising those which were not ironed.

However, be that as it may, it would, most assuredly, puzzle any person to explain satisfactorily how the ironing or not ironing these transparent papers before they were sensitised caused different effects to be produced; but such was, nevertheless, the case, whether it be inexplicable or not.

For the present I leave this curious subject to the cogitation of

the readers of The British Journal of Photography; but in a short time I will enter more fully into it by stating the various methods I employed to render the papers transparent, and also the means I took to produce the tones I have named without resorting to a toning solution.

It will, perhaps, be as well to state here that I have a small view by the waxed-paper process; from this I took a negative on my own transparent paper, and from this negative I printed several transparent positives. These are superior to the original positive from which they were produced. George Price.

British Association.

EXETER MEETING, 1869.

On Wednesday evening last the thirty-ninth meeting of the British Association for the Advancement of Science came to a close. Exeter, the scene chosen for the operations of this year, is rather a smaller place than those usually honoured with so many distinguished visitors, the total population being only about 42,000. Although the powers of accommodation possessed by the city were strained to the utmost—inasmuch as it was necessary to complete with some haste the building of the Victoria Hall for the delivery of the address of the President—all the business of the Association has been transacted with the usual comfort and smoothness. Yet, in the matter of public halls for the use of the seven scientific sections of the Association, Exeter had less freedom of choice than either Norwich or Dundee. Exeter has no manufactures, being solely dependent upon the surrounding agricultural district for whatever prosperity it enjoys. It is a strongly ecclesiastical city, although, as shown by the members returned to Parliament, the ecclesiastics themselves have little or no temporal power. The scenery about Exeter is rather too hilly to be called "undulating," but the hills are not precipitous, and, being richly wooded, form scenes of the most picturesque beauty. The city itself has handsome houses, few of them of antique appearance; and altogether a more prepossessing or pleasing place to a stranger than Exeter is rarely seen.

Purely photographic subjects have had, as usual, no prominence this year in any of the sections of the British Association; but subjects connected with the scientific elements of photographic phenomena—such as the physical nature of light—have occupied more or less attention. A very great continental philosopher, Professor Gustav Magnus, made known an exceedingly curious new discovery respecting the longest waves of the spectrum. He has found out that the invisible waves emitted by hot rock salt are more completely reflected by fluor spar than by any of the very large series of polished surfaces of other substances which he submitted to experiment. Therefore, supposing that the waves from hot rock salt were visible to the eye, fluor spar would reflect them more brilliantly than either steel, silver, or other substances noted for their power of reflecting the luminous waves of the spectrum. As this was an absolutely new discovery in physics, and not, like those in most of the papers read, a new application of facts already known, the communication drew forth high commendation from Professor Stokes, the President of the British Association; also from Mr. J. Norman Lockyer, F.R.S., and Dr. Balfour Stewart, F.R.S., the Superintendent of the Observatory of the British Association at Kew. The latter gentleman detailed some well-known but highly philosophical experiments of his own, tending to prove that the waves emitted by hot rock salt are of very great length, and belong in all probability to almost the very extremity of the hottest end of the spectrum.

More nearly connected with the practical applications of photography was a paper read before the Geological Section by Mr. J. Thomson, of Glasgow, the communication being a *Report of the Committee on Sections and Photographs of Coral.* The particular fossil corals spoken of in this paper are the polypes, which, to the general public, look more like sea anemones than corals, though the naturalists class them with the latter animals. Mr. Thomson takes these fossils, cuts and polishes a very thin plate out of the centre of them, and uses this translucent thin plate as a negative wherewith to print upon paper, to show the internal structure and organs of the extinct animals to those geologists who necessarily cannot all obtain the privilege of seeing the valuable little stone negatives themselves. At one time Mr. Thomson printed these pictures for museums and for naturalists upon albumenised paper by the ordinary process; but, more recently, with a view of securing the greatest possible permanence in prints from negatives of such scientific value, he has had them printed by the carbon process of Mr. Swan. Many of the pictures thus printed were exhibited last week in the Geological Section, and gave as much satisfaction to the observers as they had already done to Mr. Thomson. Messrs. Thomson and Swan are now experimenting together upon a new process, by which they hope to get metal blocks from the coral sections, for direct printing in the ordinary way with printing ink.

The little stone negatives are made with much care and trouble. The fossil corals are first searched for in Ayrshire, Lanarkshire, and Linlithgowshire, in those bands of shale which interstratify the thin beds of limestone so characteristic of the lower members of the carboniferous formation in Scotland. In some places he has had the work of searching for them by the seaside, in muddy spots, when the tides were unusually low. The smooth, stony, egg-like lumps, which nobody but a geologist would dream to be corals, are then taken to a lapidary, who cuts off the thick end of each coral transversely. The cut end has then to be polished to see the internal structure, and, when this is done, the larger proportion of the cut corals are thrown away, as too imperfect or commonly known to be of scientific interest; but those of value have next a thin plate cut out of them longitudinally.

Mr. Thomson then takes this plate, attaches it to a small piece of glass, and, by means of fine emery and putty powder upon a larger plate of glass, grinds and polishes down the slice of stone upon both sides, till it is of the necessary thinness. The result is a valuable little stone negative, which can print nothing but a truthful picture of the internal organism of animals which lived upon this globe nobody can tell how many thousands of years ago. Mr. Thomson received both last year and this year a grant of £25 towards his expenses in carrying on this work.

A paper was read in the Chemical Section by Mr. C. Tomlinson, entitled *The Supposed Action of Light Upon Combustion.* Everybody knows the general idea that sunshine will put out the kitchen or any other fire. By experiments with candles—which are not very reliable things for accurate experiments—Mr. Tomlinson comes to the conclusion that, beyond a slight difference caused solely by increase of temperature and nothing else, sunlight has no influence upon combustion. The flame of a candle, however, exhibits a different phase of combustion to that of a red-hot and non-flaming coal. One explanation we have heard respecting the common belief that sunlight puts out fire is that the bright light so eclipses the light emitted by the coals, that the observer thinks the fire too nearly extinct to be recovered by poking. Consequently, he or she does *not* poke it, and soon out goes the fire in consequence; whereas, had it not been for the optical illusion, the fire would have been poked at the right time, and recovered its proper intensity. Some there are who think that the sun really puts out the fire, and that, too, by altering the temperature of the room, and changing the velocity of the draught up the chimney—an explanation which looks very shaky. Does sunlight put out a coal fire or does it not?

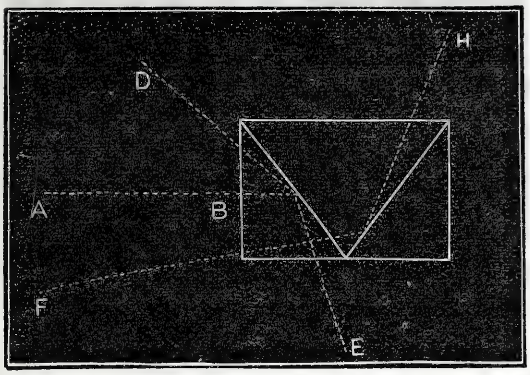
Dr. Gladstone, F.R.S., gave a short address to the Mathematical and Physical Science Section upon the relation of the specific refractive energies of the metals to their combining proportions. As the metals are practically opaque, though not absolutely so, he explained that he learnt their refractive energies through the medium of their salts in solution. The general result, not without exceptions, was that the lower the combining proportion of the metal the greater appears to be its refractive energy; or, in other words, the greater the power of refracting light the greater is the power of the metal to saturate the combining affinity of other substances. This irregularly general principle holds best with those metals which give well-defined salts, such as magnesium, zinc, and iron.

Last Tuesday an important paper on Professor Tyndall's recent discoveries respecting the action of light upon vapours was read by M. Morren. The speaker said that, living in the South of France, he employed sunlight in his experiments instead of the electric light, and that in his earlier experiments he used glass tubes with glass ends, exactly like those employed by Professor Tyndall. The stopcocks were of glass. Upon putting a mixture of absolutely pure and dry hydrogen and nitrogen into the tube, and exposing them to a cone of sunlight, he was surprised to see a cloud in the tube, caused by some chemical reaction. Suspicion fell upon the cement used to fix the brass ferules at the ends of the tube, as such resinous cement might have liberated turpentine or other volatile hydrocarbon. He therefore substituted for the great tube a long, narrow measuring glass, with a foot and a widened circular mouth ground flat. A plate of glass was cemented over the mouth, with a mixture of oil, tallow, and wax, and a glass stopcock inserted in the side. Still, with pure dry hydrogen and nitrogen, the cloud was produced by the decomposing action of light. He next varied the method of drying the gases, and found that the cloud was produced only when the gases were

dried by sulphuric acid, from which they must have carried some sulphurous acid gas into the experimental tube. The mercurial pump was employed to produce the vacuum. He also detailed the steps he had taken to ascertain the real nature of the chemical reactions taking place in his tubes with the different gases submitted to the action of sunlight. Dr. J. H. Gladstone, F.R.S., pointed out the value of these experiments as a step towards the discovery of the chemical action taking place in the atmosphere when foreign gases and vapours are intermixed with the pure air.

Mr. G. Johnstone Stoney, F.R.S., exhibited a new and very good and cheap heliostat, without two mirrors, but it is impossible to describe the instrument without sectional drawings. The one he exhibited cost about £2 10s., but others can be made at even less expensive rates. Mr. Cornelius Varley spoke in praise of the evident practical value of the instrument. Mr. Stoney also read a paper upon the numerical relations between the wave lengths of the hydrogen rays, and in his remarks he confirmed the accuracy of the figures in Angström's map of the spectrum. On the same morning, M. Janssen, of Indian eclipse celebrity, explained his method of seeing the solar prominences by means of a revolving wedge-shaped slit.

In the course of a discussion in Section A, Mr. Stoney pointed out a method of getting rid of oblique rays not wanted in spectroscopic apparatus, while at the same time direct rays are permitted to pass. It consisted of three prisms cemented together, as shown in the diagram. It is evident that the direct ray A B would find its



way through all the prisms, whilst the oblique ray D is totally reflected to E, and the oblique ray F totally reflected and thrown out at the side of the prism at H. Thus all but the light really wanted is deflected, and not permitted to reach the eye.

Such are the principal features at the British Association in any way connected with photography. The business of the Association closed on Wednesday evening with the Mayor's dinner, though yesterday there were a few excursions to different parts of Devonshire. Next year the great scientific gathering will take place in Liverpool; but, at the meeting of the general committee on Monday last, the competition between that town and Edinburgh was so great, that Liverpool carried the day by a majority of five votes only. Professor Huxley has been elected as the President of the British Association for next year.*

The Lectures.

Two of the lectures delivered at Exeter were upon the application of spectrum analysis to stellar astronomy. The first of these lectures, delivered by Professor W. Allen Miller, F.R.S., to working men, was necessarily of an elementary nature. The following were his concluding remarks, of a rather more orthodox nature than usual from the leading members of the British Association:—

"How amazing the thought that throughout the whole of this unbounded range of space, matter is to be found of the same kind. Aggregated into masses which, though differing from one another in composition, like the various veins of ore which occur in mines upon the surface of our globe, yet all are evidently of common origin, all obey the same laws, and all possess a nature similar in kind. Surely, one is tempted to think, if the discovery of such marvels, the measurement of such distances, the estimate of the mass and the magnitude, the calculation of the velocity of these bodies in space, and from the determination of their chemical composition at distances the accurate conception of which transcends even the ability of imagination, if these, I say, be not beyond the power of man, it may well be supposed that there is no limit to the discoveries which are within his reach. In one sense this is true. The visible works of God are laid open to our investigation to an extent which is really unlimited; and one of the noblest occupations in which man can be engaged is in thus tracing the footprints of his Creator, and in discovering the laws which He has imposed upon matter, and by which suns and systems are controlled. But, if there be a spiritual as well as a material universe, we must not the less have our material on which to work before we can attempt its investigation. It is just for the purpose of supplying this material, and in instructing us in this most important of all knowledge, that the Bible professes to have been given, since it is a knowledge which, however successful in unveiling its secrets by scientific investigation, we might for ever seek in vain in meditating on the works of creation."

With the scientific facts in Professor Allen Miller's lecture our readers are already familiar, so they need no repetition here.

In the lecture by Mr. J. Norman Lockyer on the sun, an abstract of which we published some time ago, accompanied by a picture of a storm on the sun, he mentioned one new scientific fact, namely, that under one pressure magnesium gives a spectrum of two lines, and under another pressure a spectrum of three lines, as shown by experiment. As similar phenomena are witnessed in the ignited magnesium vapours of the solar atmosphere at different levels, it is evident that a clue has been obtained to a method of measuring the pressure of the sun's atmosphere at certain levels above its surface.

The Soirees.

Two *soirées* have been held during the week in the Albert Museum at Exeter, but the show of philosophical apparatus was small, calling for no special notice. Mr. Apps exhibited several of his induction coils at work, and Mr. Ladd had some spectroscopic apparatus upon his table; the latter gentleman also exhibited the great Nicol's prisms belonging to Mr. Spottiswoode, which are, probably, the finest in the world, and are often used in lecture experiments at the Royal Institution. A model of the great Australian telescope, made by Messrs. Grubb and Son, of Dublin, was also on view, and showed the massive character of the masonry on which it is to be mounted. Mr. Birt, F.R.A.S., exhibited a large photographic transparency of the moon, taken by Mr. Gill, of Aberdeen; and Mr. Mayall ornamented one of the passages with some photographic solar camera enlargements, coloured and uncoloured, which included good likenesses of Tennyson, Mr. Peabody, the Prince of Wales, and other well-known personages. Mr. Walter Bradnee, of Torquay, also exhibited some excellent coloured portraits at both the *soirées*.

Although photography made little or no "sign" at the meeting just closed—our brethren of the "black art" connected with Exeter being conspicuous by their absence from the sections and *soirées* of the Association, at the same time some good displays of photographic art were prominent in several of the windows of the local artists—there were present a goodly number of gentlemen well known in connection with our art-science. Amongst them, besides the representatives of the photographic journals, we noticed Mr. Dallmeyer, Mr. Howard Grubb, Mr. Mayall, Mr. Huggon, and others.

Very general pleasure has been expressed by the visitors to Exeter at the hospitality of their reception in that ancient city.

Photography at Kew Observatory.

In the report of the Kew Committee of the British Association for the Advancement of Science, 1868-69, we find the following remarks about the photographic instruments at Kew Observatory:—

The Kew heliograph, in charge of Mr. De la Rue, continues to be worked in a satisfactory manner. During the past year 274 negatives have been taken on 168 days. Forty pictures of the Pagoda in Kew Gardens, as a fixed terrestrial object at a known distance, have likewise been taken, with the object of determining, by measurements of these pictures which are taken in different parts of the telescope, both the optical distortion of the sun-pictures and the angular diameter of the sun.

A paper communicated to the Royal Society by Messrs. Warren De la Rue, Stewart, and Loewy, entitled *Researches on Solar Physics: Heliographical Positions and Areas of Sun Spots Observed with the Kew Photoheliograph during the years* 1862 *and* 1863, is the first of the series of reductions of the photographic solar records. It is in course of publication in the *Transactions*, and will shortly be distributed.

It is hoped that, during next winter, a paper containing the heliographical positions and areas of the spots observed at Kew during the years 1864, 1865, and 1866 may be communicated to the Royal Society, as well as a paper representing, both numerically and graphically, the spotted area of the sun during three complete solar periods, the results being partly derived from Schwabe's and partly from Carrington's observations, in addition to those made with the Kew photoheliograph.

Another paper by the above authors, entitled *Account of Some Recent Observations on Sun Spots made at the Kew Observatory*, has likewise been ordered to be published in the *Philosophical Transactions*.

M. Berg, of the Wilna Observatory, has during the past year received

* We have been informed by Mr. Mayall—who was one of the deputation from Brighton entrusted with the invitation to the British Association to visit that town—that it has been mutually arranged between the deputations from Brighton and Edinburgh and the officials of the Association that the latter body is to visit Brighton in 1871, and Edinburgh in 1872.

instruction at Kew in the method of taking solar photographs, and in that of measuring the positions and areas of sun spots, the Director of the Observatory with which he is connected being desirous of working along with Kew, and of following out the same methods of observation as well as the same researches.

The number of sun spots recorded after the manner of Hofrath Schwabe, together with a table exhibiting the monthly groups observed at Dessau and at Kew for the year 1868, have been communicated to the Astronomical Society, and published in their monthly notices.

We regret to mention that Hofrath Schwabe, owing to his great age, has found it necessary to discontinue his observations; but the committee have the satisfaction in stating that arrangements have been made for continuing at Kew the grouping of sun observations which has been carried on for some time according to Hofrath Schwabe's plan, and for publishing the results annually.

A minute comparison of the records of Hofrath Schwabe with the simultaneous photographic records at Kew has revealed the great trustworthiness of his drawings, which are at present in the possession of Kew Observatory. The proposed communication already alluded to as representing the spotted area of the sun during three complete solar periods is thus rendered possible; and while it is imagined that by this means a valuable record of the past will be obtained, it is hoped that the interest now displayed in solar research will secure the uninterrupted continuance of such a record for the future.

The report points out the following sources of error in the barographic records:—

Want of definition arising from an improper adjustment of the lens ought to be noticed, but it is believed that the definition is good in the case of all the observatories. As the instrumental constants for all the various barographs have now been determined, it would hardly seem expedient to alter the position of the lens, which would alter these constants, for the purpose of procuring greater perfection in definition.

The photographic sheet which is attached to the cylinder of the barograph ought to be evenly put on without any *bagging* or *bulging;* as, if it bulged, besides giving a bad result, it might come into contact with the end of the temperature adjustment bar.

Care ought to be taken that there is no *want of light*, especially in the case of a low barometer; and, finally, great precaution should be taken to avoid *finger-marks* and every species of *bad photography.*

Suppose that the sheet has been placed in an unexceptionable manner upon the barograph cylinder, the next point is for the operator to set the instrumental clock before starting to correct Greenwich mean time, as given by his chronometer. Now the instrumental clock has an arrangement for cutting off the light for four minutes every two hours, beginning to do so two minutes before an even hour and ending two minutes after it, and the practice is for the observer to read the standard barometer about five times every day at periods two minutes after even hours, as ascertained by his chronometer, or when the light should be about to be restored after having been cut off by the clock-stop. If, therefore, the instrumental clock keeps good time and its stop acts, and if the observer reads the standard barometer correctly and at the proper moment as ascertained by his chronometer, and if he finally reduces his curves properly, the near coincidence between the corresponding curve and standard readings will be a good practical test not only that all these operations have been properly performed, but also that throughout the curve the instrumental clock keeps good time with the chronometer. A further check with regard to time is afforded by the comparison made between the chronometer and the instrumental clock at the moment when the curve is taken off the cylinder, the results of which are recorded on the curve.

The clock may sometimes possibly stop, or the clock-stop may go wrong. Without discussing minutely these possibilities, it may be sufficient to state that when any such misadventure occurs the curve ought to be inspected by the Director of the Central Observatory.

There still remains the question of *date.* The security that a curve is rightly dated depends ultimately on the strong improbability that an observer at any of the observatories should make a mistake with regard to the first day of the week. When, therefore, he returns the barograph journal filled up, we may be quite certain that the observations entered on the line with Sunday were really made on that day, although he may possibly put the wrong day of the month on the form beside it.

Again: the photographic operator, when he takes off a curve, should mark on the back in pencil the day of the week and month when the curve was taken off, and should also, after drying, write upon its face the hour and day of putting on and taking off as recorded by the journal. If, therefore, the accuracy of the observer in assigning the proper day of the month to Sunday be checked at Kew as each week's journals are transmitted to that establishment, and if it also be seen that the date written in pencil on the back of the curve corresponds to that written on its face, and if the times of starting and ending of the curve, as described in front, are found to agree with the curve itself as measured by a simple time scale, there can hardly be any doubt that the curve has been properly dated; if there still remain any doubt it will be dispelled when the tabulations from that curve are examined, and it is found that the tabulated readings agree well with the simultaneous readings of the standard barometer.

FLARE FROM THE SOLAR CAMERA.

In The British Journal of Photography for January 22nd the writer called the attention of photographers to what he conceived to be an explanation of the cause of the annoying flare which frequently presents itself upon the screen during the use of Woodward's solar camera. In the article alluded to suggestions were thrown out not only for the amelioration of the inconveniences resulting from this flare, but also for the construction of apparatus by which the writer believed its presence might be entirely prevented. Since the date of the article alluded to he has been enabled to make a few more experiments in investigation of the circumstances attendant upon the production of this phenomenon. The experiments, whilst confirming in the main the ideas thrown out in his former article, have apprised him of one or two facts with which he was previously unacquainted.

FIG. 1.

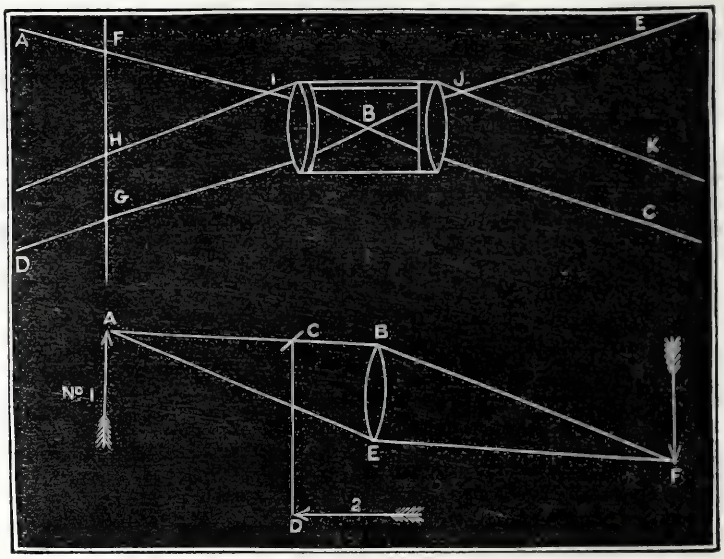


FIG. 2.

In *fig.* 1 the lines A B C and D B E indicate the direction taken by rays of light proceeding from a condenser situated to the left of the points A and D, and by which the image on the plate F G is projected through a portrait lens on to a screen situated to the right of the points E and C. The lines H I J K indicate something approaching the direction taken by a pencil of rays deviated from their normal path by the convex surface of the condenser in conjunction with the proximate end of the mirror, as shown in the figure given with the article already alluded to as having appeared on the 22nd of January last. This figure, by-the-bye, is, in the matter of one of its angles drawn with some slight inaccuracy on the part of the engraver, to which the writer accidently omitted to direct attention the week following its publication.

In order to render his remarks intelligible to the general reader, it is necessary to make use of one slight drawing, which, at first sight, seems somewhat unconnected with the subject. It is that contained in *fig.* 2, in which an arrow placed with its barb upwards upon the left, has its image projected by a double convex lens in an inverted position on the right. As rays of light proceed from every portion of the arrow in every outward direction, it is obvious that some must reach the top as well as the bottom, and some the right hand as well as the left hand side of this lens. Yet all these rays are used for the production, in respect of each part, not of many images, but of one image only. This unity is brought about, as has often been shown, by the differing angles presented by different portions of the lens. If between the points A and B, *fig.* 2, a fragment of a mirror C be interposed at the angle shown, then the barb D of a second arrow, situated in a totally different place from the first, will be represented after reflection from the mirror C through the upper portion B of the lens, in exactly the same place as the barb A of the arrow No. 1 is represented by the bottom portion of the lens E. If the barb of arrow No. 1 were blue, and that of No. 2 yellow, we should have, at the point F, where the image is projected, a green tint, produced by the mixture of the two colours. In this instance, the blue barb of No. 1 would yield a much greater photographic impression than the yellow one of No. 2. Supposing, however, the colours to be reversed, it would then be impossible to obtain a correct impression of arrow No. 1, because of the overpowering influence brought about by the light reflected from the tip of arrow No. 2.

Suppose in *fig.* 1 a ray of light from the point A to be obstructed by an opaque spot in the negative on the plate F G, no impression should be given at the termination of the line C; but an extraneous ray, or rather one which has been caused to deviate from the general direction, as for instance H I, and which after refraction in the direction I J and J K terminates at the same point as the line C, then this ray, passing through a clear portion of the negative at the point L, produces the effect of flare upon the sheet of paper.

Whilst making an enlarged print from a negative of a church, in which the sky had been completely stopped out on the glass side with dead black varnish, the writer observed that some figures drawn in black upon different parts of the collodion side of the sky were distinctly shown upon the sheet of paper. Had a shapeless flare been there it would have been understandable enough; but that the light should pass through a thick film of Bates's black, and yield very distinct images of figures behind, was something certainly not easy to believe. Thinking it just within the range of possibility that the film of black varnish might have some slight and hitherto unobserved transparency, he placed between that film and the condenser a piece of sheet iron painted black. Through this it was quite impossible to suppose the light could by any means find its way; and yet there were the images of the figures as before, though between them and the source of light there were now three films of Bates's black and a sheet of metallic iron.

Determined to find out the cause of what at the time seemed so extraordinary, the writer pierced a hole in the front of his camera and just above the objective. Looking through this hole on to the collodion side of the negative, he observed upon the figures behind the black-varnished side of the negative, and which should have been in complete darkness, a circular patch of light. In order to ascertain where this came from, a fragment of mirror was introduced upon the end of a piece of wire on to the illuminated spot, and when inclined at various angles, and observed through the hole pierced in front of the camera, it showed that this small patch of light proceeded from the posterior surface of the objective on to which it had been projected from the corner of the mirror through another unobstructed portion of the plate. The clear varnish on the negative, with its glassy surface, had, in this instance, reflected light, producing flare upon what ought to have been a dark portion of the sheet, whilst the figures in dead black upon the same side had absorbed the light falling upon them, thus yielding their image. These facts suggest, as within the range of possibility, another variety of cure for this particular kind of flare, and that is to have the whole of the film side of the negative which should not give an actinic impression dead and dark. A sulphurised, unvarnished collodion film would, from its being of this nature, probably afford but few symptoms of flare by double reflection. The writer has not yet had an opportunity of continuing these experiments, but, after having done so, he will again write a few words directing attention to their results. D. WINSTANLEY.

MONOCHROMATIC RIGHT ANGLE REFRACTION, COMMONLY CALLED FLUORESCENCE OR EPIPOLIC DISPERSION.

THIS property is considered to be best exhibited by sulphate of quinine, and it is in connection with this solution that the following remarks are made.

Upon a proper understanding of the behaviour of this solution depends most, if not entirely, all our conceptions of the more interior causes in operation which bring about this phenomenon. We cannot do better than refer to the following diagrams:—

FIG. 1.

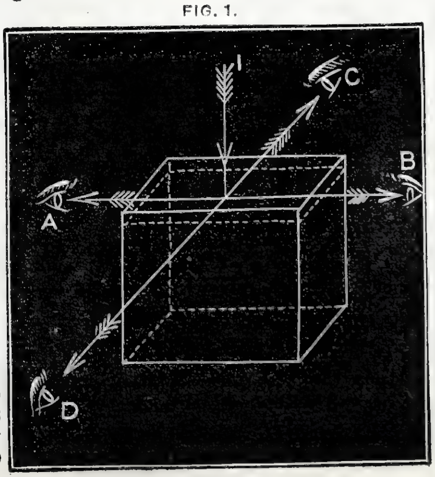


Fig. 1 represents a square glass trough full of a solution of quinine. The arrow I represents the incident ray as just entering the open surface of the solution. The arrows A and B represent the blue rays on the under surface of solution as seen by the eye placed opposite the points of the arrows. These arrows are consequently at right angles to the incident arrow. The nearer this position is taken up by the observer the more vivid the colour becomes; the reason why will appear further on. But at some 20° or 30° from this point the colour becomes very faint. The arrows C and D represent rays at right angles to A and B, but still in the same plane. We might multiply these arrows around I, and all of them be at right angles to it. If the light be allowed to enter the solution only in the direction of the arrow I, the colour is wholly confined to the under surface of the solution not in contact with the glass. If the eye be placed either above or below the trough, and the liquid looked into, no colour will be observed.

FIG. 2.

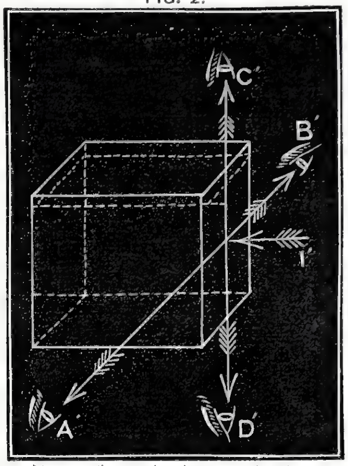


Fig. 2 is a representation similar to the preceding, with the exception of the direction of the incident ray, and consequently the direction of the emergent rays A′, B′, C′, and D′. The incident ray I′ enters the solution in the horizontal direction, and has consequently to pass through the glass first. The coloured rays as seen from C′ and D′ will be at right angles to the incident ray. From this position, also, the colour is most brilliant, and gradually diminishes, as before described, when viewed at a different angle. There is a certain amount of deviation from the perpendicular direction of the incident ray which does not interfere much with the result, but the directly perpendicular produces the maximum effect.

Now, if, with the incident ray as represented by *fig.* 2, another trough containing a like solution is placed in close contact behind, the first surface of the solution of this second trough will not be coloured at all.

Let us now examine the transmitted rays by means of a prism, and see what are its properties:—First: by projecting a spectrum on a screen of white paper, and allowing it to pass through a trough of quinine. Second: the same as the last, but substituting a water trough for the quinine. On examining these spectra no difference is discernible, with the exception of some considerable shortening of the violet end of the spectrum from the quinine solution. Third: but if we produce a spectrum with certain precautions, and insert a trough of quinine, *and look into the trough* in the same direction as described in *fig.* 2, the phenomenon is easily observed, and a second trough of the same solution placed in the *path of the affected rays does not stop them.* The following illustrations will assist in giving a more correct view of the phenomenon than any description, however minute it may be.

Fig. 3 represents a water prism P, with a refracting angle of 90°, T Q a trough of quinine, E the eye, I the incident ray, S the spectrum, C C the chemical or invisible rays, and R V the two extreme colours of the visible spectrum, violet and red; these are shown by continuous lines, the chemical rays by dotted lines. It will be seen that one of the dotted lines

FIG. 3.

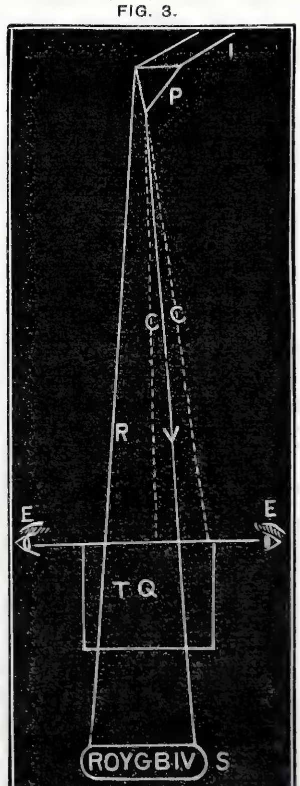
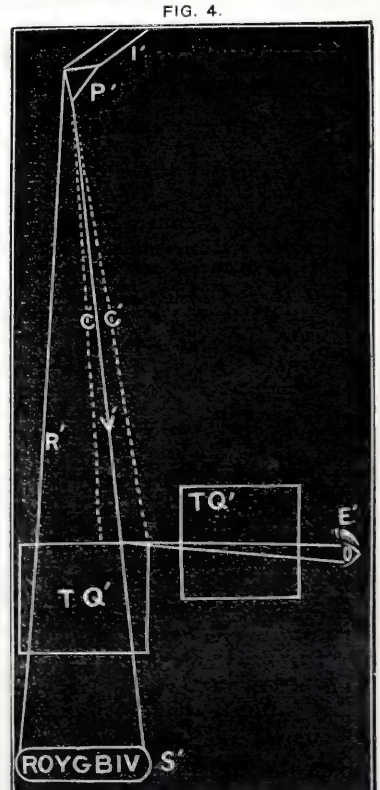


FIG. 4.



is represented in the violet, and the other a considerable distance away. A screen placed at S shows nothing particular but an ordinary spectrum.

As in previously-described experiments, if the eye be placed at E, or if the liquid be looked into from above or below, the altered rays are distinctly visible, and it is curious to observe, when the trough is placed in the violet end of the spectrum and the eye placed in the position as at E on the right, that as soon as the trough reaches the ultra-violet and violet rays the liquid only then shows colour, and gives an appearance of greater luminosity than other parts usually considered most luminous. This appearance of greater luminosity from the altered rays is, of course, illusive, as will be seen by comparing them with the other rays which have passed through the trough in a right line. From the diagrams it might be argued that these rays were refracted still more by the quinine solution, and so produced this extraordinary refractive power. But the observer has only to place the eye on the left hand side of the trough, when the same phenomenon will be observed, so that the refraction of these rays out of the solution extends in all directions, but not equally so, as will be shown further on. It must be borne in mind that these latter remarks only apply to such experiments as are made with the spectrum.

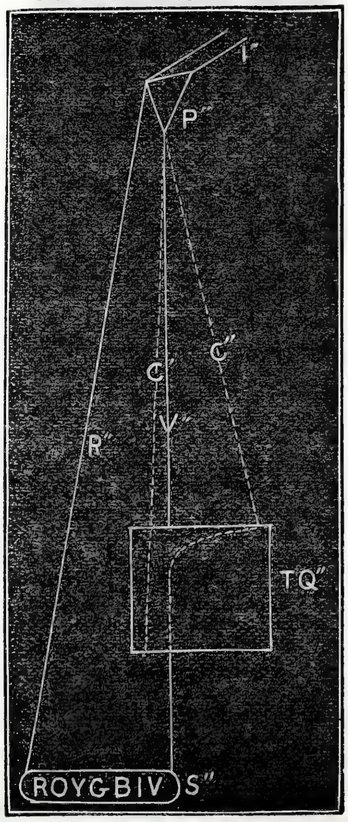
These altered rays obey the same laws that other coloured rays obey, —that is, they are transmittible through other media and the same medium which produces them, notwithstanding the oft-repeated mysterious phrase that a solution of the same material which is used to produce the phenomenon stops the rays thus produced. This is shown by *fig.* 4.

If the nature of these rays had been comprehended, this phrase could never have been coined. From what has already been shown, to place the second trough *behind* the first with a view of ascertaining still further other phenomenon if any existed, and, after finding a negative result, declare that the first or second surface stopped anything from coming through, is a declaration most unphilosophical. The course to pursue would have been to place the second trough where the rays were to be had, and that is at the side as represented by *fig.* 4. It will be seen that these blue rays do not behave in a similar manner when they come in contact with the second trough as the invisible ones did when they came in contact with the first. After having been altered we cannot expect them to have the same properties they had before being altered. They pass through the quinine solution in the same way that the other rays do; they are not turned aside a second time.

In the two last diagrams I have avoided mentioning one peculiarity, in order not to make the description too complicated.

Fig. 5 represents a trough of quinine solution, so placed that the invisible portion of the spectrum and that part of the visible in the extreme violet shall occupy the whole of the side of the trough, or a slit may be placed between the prism and the trough so as to cut off all the rays but those capable of alteration. The quinine not only has the power of rendering these invisible rays visible, but also of diverting or refracting them at right angles from their original course. The rays having the greatest refrangibility are those rays which are invisible, and these are the rays most refracted at right angles; while those rays in the violet which show a similar nature are not so easily directed out of the solution, as shown by *fig.* 5, which represents a trough of quinine when looked into from above, and the prism placed in a vertical position. The dotted lines outside the trough represent the boundaries of the invisible rays, while the dotted lines in the trough represent the form in which the blue rays illuminate the liquid when viewed from the top of the trough. It will be seen that those rays which are changed that accompany the violet traverse the liquid a longer distance before they leave than those rays beyond the violet. The direction of these rays, seen from the top of the trough, is at right angles to the direction of the rays of the spectrum, inasmuch as to be seen from above they must come in this direction. No such appearance or figure is seen when viewed from the side, as in *figs.* 3 and 4, in which position the illumination is more even. This would be due to those of the violet which are altered, and which have been before referred to as penetrating farther into the liquid before they are turned out; and it is probable that some of them do go through, but having been weakened so considerably they are not easily observed. This experiment clearly shows why the solution, when examined by solar light, appears slightly coloured through its whole mass in the position before observed, and also why the maximum effect is seen at right angles to the incident ray. This form shows that the blue rays produced from the invisible portion of the spectrum are refracted out of the liquid almost immediately on being produced. There is, however, a very slight increase of distance before they leave the liquid the nearer they are to the violet; when the violet is reached the difference is very great.

FIG. 5.



Figs. 6 and 7 show the position of the trough of quinine used as a prism, and as used for the production of this phenomenon. When compared with each other the results are very striking. In *fig.* 6 the incident ray impinges on the surface at an angle of 16°, and the mean emergent ray at about 50° from the course of the incident ray. *Fig.* 7 represents the direction of the incident ray required for the phenomenon of "monochromatic right-angle refraction." It is represented at 0°, being perpendicular to the first surface. The difference between the incident rays in the two experiments will be 74° to start with. The mean angle of refraction for polychromatic disperson is about 50° towards the base of the prism; but for monochromatic refraction it is about 62° in the opposite direction, towards the apex of the prism. But the angle of maximum effect is about 90° from the incident ray. We have, then, varying degrees of refraction with similitude of colour, which in itself constitutes a striking difference between it and ordinary dispersion, besides the refraction in the opposite direction. But it would appear from *fig.* 5, that it is the invisible rays that furnish the blue colour seen in close contact with the surface, and the violet rays that give to the body of the liquid its pale blue tint, and probably they are the rays, described and illustrated by *fig.* 7, that are seen at the angle of 34°.

FIG. 6.

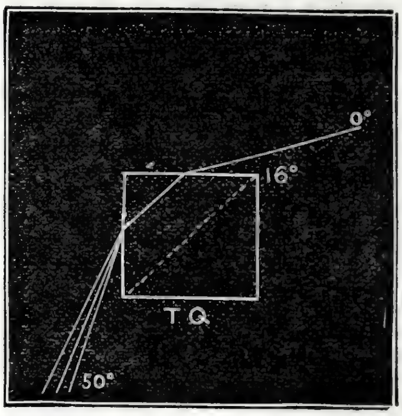
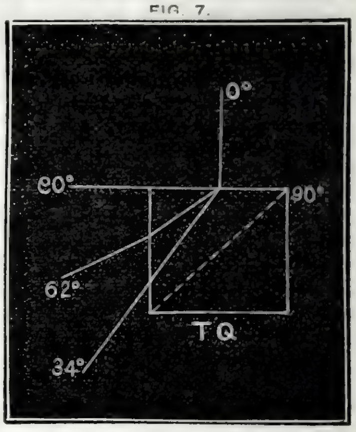


FIG. 7.



Concerning the mode in which this phenomenon is brought about, it would appear that some writers have very queer notions. By some it is called "epipolic dispersion," which means "surface dispersion." But the probability is that this phenomenon is the result of a mutual action or relationship existing between the quinine solution and the rays affected, and to say the quinine solution produces the phenomenon is only stating half the case; for, unless the rays had some relation to the quinine, they could not have been altered, and unless the quinine had been related to the rays it could not have altered them. We also see by *fig.* 5 that this apparent surface action, as it is called, is due to the excessive refrangibility, by this liquid, of the most refrangible rays of the spectrum; for as soon as they are changed at the surface of the liquid they are refracted out again at right angles, and consequently cannot be expected to be seen anywhere but as proceeding along the surface. It is no peculiar unknown or mysterious action of *surface;* it is the result of refrangibility. To describe it merely as a surface action is, to my mind, a very incomplete description.

In order not to be considered hypercritical, I cannot do better than quote the following from one of our scientific text-books.* It says:—"The cause of this phenomenon is a *peculiar and internal dispersion* of the refrangible rays of light. * * * It is found that light which has been affected has not the power of *transmission* through a solution similar to that which has been employed to produce it. Thus, a solution of quinine placed in a glass vessel, and viewed through another vessel containing a similar solution, does not present the blue appearance which may be seen when it is viewed alone. In other words, the passage of the epipolised rays is completely *stopped* by the *second solution.*" 2nd. Mr. Hunt says, after giving a description of the phenomenon with one trough:—"Then we have the curious fact that, if we take a second glass trough containing the same solution and place it *behind the first,* we cannot reproduce the same effect; so this peculiar class of rays, supposed to be the chemical rays rendered visible, are *stopped* at the very *first surface* of the solution of quinine. From this singular surface action the term epipolised light has been applied to these rays." Ganot is silent on this point altogether. It is evident that writers on this subject have not the least idea that these blue rays are passing in a different direction to that in which they were seeking them.

Again: if they are dispersed, where are they dispersed to? and if they are stopped, how can they be dispersed? To say they are stopped, and call it "dispersion," is a very questionable mode of procedure.

* The *Circle of the Sciences.*

Again: if they were stopped at the first surface, how is the phenomenon seen at all? But if the phenomenon be seen the rays must be passing in the direction they are seen, and are, consequently, not *stopped*. Instead of describing it as a refraction of the altered rays, mysteries are introduced in place of a plain, straightforward narration of facts.

Concerning the name this phenomenon should go by, it would seem that its present one is most unsatisfactory. Professor Stokes called it "fluorescence;" it has since then been termed "epipolic dispersion." It can hardly be called dispersion, at least in the same sense as dispersion in the usual way, when colours accompany refraction produced by a prism. One of its properties as shown by all the illustrations is extraordinary refractive power; the other is, the rays thus affected are all of one colour. This is one of its great peculiarities. These two principal properties combined would suggest the term "monochromatic right-angle refraction." The term "right angle" is included to distinguish it from ordinary refraction; by this means we shall get rid of the objectionable term dispersion.

More recently, according to the Report of the British Association for 1867, in a paper *On the Radiant Spectrum*, Sir D. Brewster, in his theory respecting the manner in which the radiant image beyond the violet end of the spectrum is rendered visible, says :—"In this theory the invisible radiations of the chemical rays is rendered visible by being scattered by granular surfaces, just as the invisible chemical rays in the ordinary spectrum are rendered visible by being reflected and scattered by the particles of fluorescent bodies." Even supposing this hypothesis to be correct as far as it goes, how are the invisible rays rendered visible by this process of reflection? There is evidently some other action going on besides that of reflection and scattering. There must be two phenomena taking place simultaneously—one for the rendering of them visible, and the other whereby they are observed at a right angle to the course of the incident ray. But the question might be asked—Is the one the effect of the other—that is, is the right-angle refraction the result of the rays being rendered visible, or is the visibility the result of the right-angle refraction? To make a choice between them, I should be inclined to the latter; for it may probably be shown that, during the refraction, interference may occur which would result, probably, in a lowering of the rate of vibration, and so bring the vibrations of the invisible rays within the range or down to those of visibility. But why should we, in this case, any more than in ordinary refraction, consider that this phenomenon is due to granular faces reflecting and scattering the invisible rays? If it were simply reflection, like reflection all the rays of the spectrum should be reflected; but there is evidently something more than reflection, and something more than ordinary refraction, as before observed. G. MARLOW.

Contemporary Press.

SUCCESSFUL OBSERVATIONS OF THE GREAT SOLAR ECLIPSE.

[DAILY NEWS.]

THE most interesting results cannot fail to accrue to science from the success with which the American astronomers have been able to observe the great eclipse of August 7th. In many respects, this eclipse was even better suited to the requirements of photographers and spectroscopists than the eclipse of last year. It did not, indeed, last quite so long, but the operations of the photographer were not interfered with by the effects of the tremendous heat of the tropics; and again, the eclipsed sun was not, as in 1868 (in India), close to the point overhead, so that observers could watch the eclipse with more comfort, and therefore with greater attention. The track of the moon's shadow—the real shadow we mean, not the penumbra—lay across the eastern parts of Siberia, thence to the part of America which formerly belonged to Russia, thence with a south-easterly course across the very heart of the United States from Minnesota to North Carolina; and the shadow left the earth at a point close by the Bermuda Isles.

The American astronomers availed themselves worthily of the favourable opportunity thus presented to them. Along the line of the eclipse several observing parties were stationed; spectroscopy and the difficult processes of celestial photography were successfully applied; and a set of observers devoted themselves to the search for Vulcan, or any other planets which may exist within the orbit of Mercury. Nor were meteorological observations neglected. The phenomena presented by the red prominences naturally occupied a large share of attention.

The recent researches of astronomers have revealed so many striking and interesting facts respecting these objects, that it was looked on as a matter of extreme importance to secure fresh observations of the prominences under the favourable circumstances of a total eclipse. Astronomers have indeed managed to make the prominences visible without the aid of an eclipse; but the red flames are thus seen "as through a glass darkly." It is only during a total eclipse that their most striking features can be distinctly recognised. And then there are particular reasons for looking on them with interest at the present time. Their association with the solar spots has long been a subject of attention, and now the sun's face is in an unusually spotty state, is seamed and furrowed by the great faculous waves, and, in fact, indicates in a number of striking ways the approach of the period of maximum disturbance. Thus the red prominences are just now more than usually significant. They can teach us much, it may be, respecting the laws of that strange periodic process of disturbance which forms one of the most perplexing problems presented to the astronomer.

We hear, therefore, with pleasure that these objects were not only seen with unusual distinctness, but have been photographed successfully, and have revealed under spectroscopic research a new and interesting feature. So soon as the totality had commenced a red prominence appeared on the left side of the sun, resembling a tongue of flame projected horizontally. Presently another was made out, projecting vertically downwards from the lowest point of the sun. In the telescope, however, many more were seen; and doubtless when the photographs have been enlarged, it will be found—as on former occasions—that many prominences existed which even the telescope did not reveal. For Mr. De la Rue, F.R.S., who has mastered more successfully than any other astronomer the difficulties of celestial photography, has noticed that the prominences are sometimes of such extreme delicacy as to reveal themselves only by the influence of their chemical rays. One of the prominences was carefully analysed under the spectroscope of Professor Winlock, who detected no less than eleven lines in its spectrum. Thus the observations of M. Rayet last year, during the eclipse in India, are more than confirmed. He announced the existence of eight lines, but, as no one else had seen them, considerable doubt rested on the observation. Now we may look upon it as certain that these enormous flames, which reach tens of thousands of miles from the sun's surface, contain other elements in combustion than the hydrogen hitherto alone proved to exist in them. What those elements are our spectroscopists will doubtless soon learn. Messrs. Janssen and Lockyer have not hitherto been able to detect the lines seen by Mr. Winlock, but perhaps Mr. Huggins may be able to see them when his new and powerful telescope has been mounted and set in action.

Correspondence.

Foreign.

Paris, August 24, 1869.

AT the end of the last page of each number of THE BRITISH JOURNAL OF PHOTOGRAPHY is to be found a metreological record, stating the daily readings of certain instruments, the due observance, understanding, and comparison of which forms a portion of the science of climatology. But does it not seem that these records are incomplete without some account having been registered of the chemical action of light—a power for the production and influence of climate as powerful as that noted by thermometer or barometer? It is a well-known fact that the actinism of light is not so abundant at some portions of the year as at others—that it is in excess in some countries and at a minimum in others. Imaginary lines have been traced around the globe, touching those places which enjoy the same mean temperature. These lines are called the isothermal lines. Why should not climatology be enabled to add a series of lines, which could be termed isoactinic? The influence of heat on the productions and aspects of a country are well recognised, and that of light is not less to be observed. The quantity of light which a given surface receives every day should have a capital importance on the evolution of animal or organic life which it effects. So that whilst we speak of thermic climates, we should take account of what may be termed chemical climates.

These reflections have been given rise to partly by the bright and beautiful weather we are enjoying here at present, and which tells upon the health and spirits of all, as is well known, and by the perusal of an interesting article from the pen of a popular French writer, M. Radan, on *Light Considered as an Element of Climate*. Photographers are liable to consider the element with which they work from their point of view alone, as though light was created in the main for affording them a living, through its influence upon salts of silver and other substances. It is well for us at times, and especially in the midst of bright, sunny weather, to consider a little the more important actions of light, and its great influence upon the character of various parts of the globe. In the polar regions, where there is a minimum of light, organic nature is chiefly distinguished from the absence of all colour; and as we enter the regions where the luminous influences become greater, we find colours to increase, and in the little humming-bird we find, as it were, the *chef d'œuvre* of the solar radiations. Again: what a difference there is between the dull eye of a Scandinavian and the dark lustrous eye of an Arab woman, or that of the gazelle, which appears to reflect all the beams of an oriental sky. Light, too, acts indirectly upon the vital evolutions, by the incontestible influence which it exerts upon our sensations, and even upon our animal instincts. It awakens life on the globe, rejoices and encourages it.

Humboldt has well brought out the influence of light upon the moral condition of man, in a passage from which I venture to give a few extracts:—

"There exists a natural physiognomy which belongs exclusively to each country of the globe. The expressions, 'Swiss nature or Italian skies,' have

had their origin in the confused sentiment of these characters proper to such or such a region. If the first progress of civilisation has not been always determined by physical influences, the route which it takes later on—the national character, the dispositions of mind—depend in a great measure upon climatic circumstances. What power the sky of Greece has exercised over the inhabitants of that country? How the people who established themselves under this happy and beautiful climate were early awakened to elegant manners and delicate sentiments? The poetry of the Greeks, and the songs of the northern nations owe, in a great degree, their distinctive characteristic to the forms of the plants and the animals, the mountains and valleys which surrounded the poet, and to the air which played about him. To take examples from things which are familiar to us, who does not feel differently affected by the dark shadows of the yew trees—upon the hills crowned by fir trees—and in the prairies, where the wind murmurs through the trembling blades of verdure? These vegetable forms of our climates awake in turn, in our minds, melancholy, severe, or joyous images. The influence of the physical upon the moral, this reciprocal and mysterious action of the outward world, and of the immaterial world, gives to the study of nature, when we have attained to a sufficiently high point of view, a singular fascination which is often too much despised in our days."

That our familiar friend light has its part to play in the history of nations must be conceded, and perhaps it will not be long ere its peculiar actions will have the recorders and observers as much as the other climatic phenomena. The action of light upon plants is not yet sufficiently studied, but active researches are being pursued, and from time to time we have them published.

I trust these remarks upon a large and most interesting subject will not be considered as out of place in the pages of a journal devoted to our art-science, but that the subject may be taken up and handled in a better manner by some of your readers.

A new kind of photograph is being offered by photographers here, and I think it is one likely to please. It is a photographic paper weight, and consists of a small slab of handsomely-cut glass, upon the top of which is attached a transparent photographic likeness, face downwards. These photographs are easily produced; they can be taken from *carte-de-visite* negatives, and, I think, if introduced would help the revenues of photographers. What is required is a good vignetted transparent positive, which is obtained in the camera like other transparencies. It is varnished and well warmed, the slab of glass is well warmed also, and the two are fastened together by means of a little Canada balsam, to which has been added a little impalpable white powder, to give the picture a "mat" appearance. When stuck together the excess of balsam, &c., should be taken from the slab of glass by means of a little turpentine on a rag.

I do not know if the following table has been given to your readers before. It may sometimes be useful. It is found that glycerine of a density of 1·250 boils at a temperature of 295° Fahr., whilst, if mixed with varying proportions of water, it affords liquids with boiling points of different temperatures. In making use of these mixtures, "water baths" of various degrees of heat can be readily obtained.

Glycerine alone boils at	295°
,, 1 part, and water 1 part, at	261°
,, ,, ,, $1\frac{1}{2}$,,	255°
,, ,, ,, $1\frac{3}{4}$,,	248°

Glycerine is a good substitute for an oil bath, which is very offensive in use.

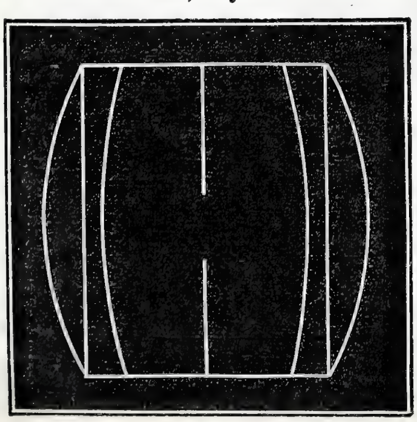
R. J. Fowler.

THE DOUBLET AND DEEP MENISCUS.

Redon, August 14, 1869.

Judging from your remarks at page 392, you seem not to know what I mean by a deep meniscus lens. I mean a meniscus having its hollow surface as deep as that of the front lens of Mr. Ross's doublet or Mr. Dallmeyer's wide-angle single lens. I call these lenses *deep* meniscus as compared with the common view lens, which is a *shallow* meniscus.

You say that "Mr. Ross's doublet is quite different from that suggested by Mr. Sutton." No such thing. I send you my letter to him, of which you published a copy at page 391. That letter, you will see, contains the diagram of my suggested doublet. You will do me a favour, and Mr. Ross also, if you will have that diagram engraved full size, as in my letter, so that your readers may judge for themselves of the *amount* of difference between my proposed doublet and his. The front lens of his doublet scarcely differs at all from mine. Its interior surface is so very nearly flat that the eye could scarcely detect its curvature, its radius for a line of that size being about thirty inches, whilst in my lens it is a plane. Outwardly the lenses would be quite undistinguishable one from the other. The difference between his doublet and mine consists in his having achromatised the back lens differently from the front one, its outward form remaining the same. The general proportions of my doublet are the same as his. My doublet does not differ from his more than Herr Steinheil's doublet does. I am as sure as I exist that the doublet proposed in my letter to Mr. Ross, bearing date Feb. 15, 1864, would be a very fine instrument. Those doublets in which one lens is smaller than the other I regard as an entire mistake, and as being comparatively slow workers, necessitating the use of a smaller diaphragm suitable to the smaller lens.



When I was in London in the spring I dined with Mr. Ross, and, on leaving, he placed in my hands a packet containing the whole of my correspondence with his father and with himself during the past eleven years, "in order," as he said, "that you may publish it, and let the world know how much we are indebted to you for your researches in optics." This was an act of generosity worthy of a man whom I have long known to be one of the most noble-hearted fellows I ever met.

Thomas Sutton.

P.S.—You are wrong about Goddard. He never made but one deep meniscus, as an experiment, which he described in my *Notes*, but *after* I had published my own.

[On Mr. Sutton's own showing in the first paragraph of the above communication, what *he* calls a "deep" meniscus is really very much shallower than any of the lenses in the old Harrison globe lens, which, by the way, differs from our correspondent's suggested doublet only in its being composed of deeper menisci, the contact surfaces being consequently curved instead of flat, as in Archer's old lens. Ross's doublet differs in a greater degree from Mr. Sutton's than that of the latter differs from the globe, which, as our correspondent is aware, was in the market some years before his own suggested modification. Although Mr. Sutton may regard doublets in which one lens is smaller than the other "as an entire mistake," it is unfortunate for his opinion that such lenses are found in practice to fulfil all that is required of them in the most satisfactory manner. We really enjoy the quiet sarcasm implied in Mr. Ross's remarks to Mr. Sutton with regard to publishing the letters of the latter in order that the world may see *how* much (or how *little?*) the late Mr. Andrew Ross and his son, Mr. Thomas Ross, were really indebted to him for his "researches in optics." Concerning Goddard's investigations, Mr. Sutton will, by this time, have seen from our last number that he is quite mistaken. Mr. Goddard made several deep meniscus lenses. As requested, we present an engraving of the proposed doublet.—Eds.]

Home.

ALKALINE DEVELOPMENT.—PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—Does it not strike you as remarkable that any question should arise, in relation to alkaline development, as to the effectiveness of other alkaline bodies than ammonia? Surely Mr. Dawson is right in his statements. Years ago I proved, to my own satisfaction, that not merely such analogues as the carbonates of the ordinary fixed alkalies, but basic salts, such as the usually-called phosphate of soda and borate of soda, with many others, may be used for the purpose, furnishing the scientific and tasteful photographer with important resources for modifying his results, and assimilating them to nature's truth. Nay, more, although I most unfortunately and unintentionally crossed Mr. M. Carey Lea's path by a certain application of the basic acetate of lead, it was in truth a mere inference suggested from experiments with other basic salts.

I congratulate you on the excellent papers which have recently appeared in your Journal on lenses. It has often struck me that a double concave, well stopped down between two achromatics, would be an excellent resource, especially for achitectural subjects.—I am, yours, &c.,

George Kemp.

1, *West Mall, Clifton, August* 23, 1869.

[From an article in the present number, our respected friend Dr. Kemp will see that his idea respecting the employment of a concave lens between two achromatics had previously suggested itself to the late Mr. Archer.—Eds.]

RULES FOR PRODUCING ENLARGEMENTS & REDUCTIONS.

To the Editors.

Gentlemen,—From time to time I observe, in your Answers to Correspondent's column, replies to inquiries concerning the distance at which the ground glass and the picture respectively must be in order to obtain a copy of a picture of a definite size. A publishing firm having employed me to produce reproductions of maps, plans, and other subjects of a similar kind to an exact and definite scale, I should esteem it a great favour if you would give me such a rule as would enable me to work at all times in confidence and certainty, without the necessity of my being tied down to the focal lengths and degrees of enlargement or reduction usually given in your Almanac.

I desire, in short, to construct a table of enlargements that will suit my own lenses, and as such would be a somewhat protracted job, were I to request you or any other person to do, I am induced to ask you for a *rule* by which I can do it for myself. I have very carefully examined your published tables with the view of ascertaining the rule by which they are constructed, but have been unable to discover it. If it, therefore, be not asking too much at your hands, you would oblige me exceedingly by giving me, in your Answers to Correspondents, or otherwise, the rule by which, with a lens of any focus, I can obtain definite degrees of enlargement, and find the exact distance at which the ground glass, on the one side, and the map to be copied, on the other, ought to be distant from the lens. This will oblige—Yours, &c.,

August 25, 1869. THE MANAGER OF A LARGE ESTABLISHMENT.

[To find the distance at which the ground glass, or plane No. 1, must be from the centre of the lens, proceed as follows:—To the times of enlargement add one, and multiply by the equivalent focus of the lens. The product is the length sought for. To find the place for the picture to be reproduced, or plane No. 2, divide the equivalent focal length of the lens by the times of enlargement (or reduction) required, and add it to the equivalent focal length. The sum is the length sought for. The relative place of the object and image will depend upon whether we have to enlarge or reduce the model. To give an illustration of the working of this rule, let us suppose that we have a lens the equivalent focus of which is eight inches, and we want to produce an enlargement twice the size of the original:—One added to two (the times of enlargement) give three, which multiplied by eight (the equivalent focus of the lens) make twenty-four. At this distance, therefore, must the ground glass of the copying camera be from the lens. We have still, however, to find the proper distance for the picture or negative that is to be copied, or, in other words, the other *conjugate* focus. Observing the rule above given, we now divide *eight* (the equivalent focus of the lens) by *two* (the times of enlargement), which gives *four*, to which we add the focus of the lens, *eight*, the sum *twelve*, being the number of inches the picture to be enlarged must be from the lens. If now you turn to our table of enlargements and reductions in the Almanac, you will find, on reference to the proper columns, that from the data given the figures indicated there are $\frac{24}{12}$, precisely as we have made it to be. We need scarcely reiterate what we have many times previously stated, that the ground glass and negative must change places when, instead of an enlargement, a reduced picture is desired.—EDS.]

IMPURITIES IN WATER.

To the EDITORS.

GENTLEMEN,—I quite sympathise with your correspondent, "A Professional Photographer" (page 380), in his experience of the slime-depositing properties of the West Kent Company's water.

From careful trial, and in opposition to "Another Professional," I am compelled to say that the water supplied by the New River Company *does* deposit slime, and that, too, in no small quantity. When the correspondence on this subject was commenced I felt much interest in it, and lost no time in testing the water which was laid on in my establishment, and which is supplied by the New River Company. It deposits slime, *and no mistake*. I placed a thoroughly clean plate of glass in a clean tank of this water, and, after a few days, I found that it had received an indubitable coating of slime. I send along with this the plate in question, which, you will see, is very dirty indeed.—I am, yours, &c., A THIRD PROFESSIONAL.

London, August 25, 1869.

MR. HALL'S LOGIC *VERSUS* SPIRIT PHOTOGRAPHS.

To the EDITORS.

GENTLEMEN,—Your number of the 13th inst. has found me out in this somewhat out-of-the-way place, where I have arrived *en route* for a still more remote locality. After perusing Mr. Fowler's letter of the 9th, I desire to make a remark or two upon it.

No person who knows me personally will accuse me of agreeing with all that Mr. S. C. Hall has written, and into no person would I more unfrequently desire to have a "pitch in," especially on the subject of "spiritual photography." But at the same time I cannot help arriving at the conclusion that the materialistic zeal of your excellent Parisian correspondent has prevented him from looking at the case in its true logical bearings.

He protests, he says, against the illogical and impious matter attributed to Mr. Hall. Now, waiving altogether the impiety of the matter, there certainly is nothing "illogical" in Mr. Hall's statement. He saw, when he was in company with a Scottish nobleman and several others, a certain thing or person which he says was luminous enough and stationary enough to permit of its being photographed; and this thing or person was seen by others than himself. Now, this is simply a matter of *observation*, not of *reasoning*. There is nothing "illogical' whatever in recording a fact alleged to be observed. My remarks on the other side may have more force if I say that I not only am not a "spiritualist" but I do not believe in the existence of spirit as apart from matter. Writing myself thus down as a materialist I cannot perceive that Mr. Hall, who narrates an incident without comment, is so illogical as is represented by Mr. Fowler, who deduces from the narrative that a physical body, the recognisable part of man, may possibly reappear, but not so a garment, whether it be a "mutch cap" or "flowing raiment of white apparel."

Does Mr. Fowler not perceive that if the spirit render itself visible, either for photographic or other purposes, the body it once occupied, as well as the "mutch cap," are still resting in a definite spot—the grave, and that if it be possible for a recognisable semblance of a physical body to make its appearance, it is quite as possible that it should appear as it was wont to do, even if instead of embroidered garments it may have the more homely "mutch cap?" I know hundreds of estimable friends who profess to believe in visible angelic or spiritual visitations in the former times, some of which visitants could accomplish the matter-of-fact feat of taking a substantial meal from off a slain kid. Now, if angels or spirits could do this at *one* time, is it so very "illogical" for the editor of the *Art Journal* to say that he has, in the presence of several other persons, seen a similar form or being sufficiently illuminated and for a sufficient length of time to permit of its being photographed? If Manoah could show his hospitality to visitors of this nature who were able to dispose of a hearty meal, what is there unreasonable in Mr. and Mrs. S. C. Hall, with the Hon. Mr. Lindsey and others, seeing a similar figure?

I have only confined myself to the logical bearings of the case.—I am, yours, &c., AN OLD M.D.

Peterhead, Scotland, August 23, 1869.

Miscellanea.

THE NEXT MEETING OF THE BRITISH ASSOCIATION.—Our spirited contemporary, *Scientific Opinion*, we are glad to observe, entertains a high opinion of the probable great success of the next meeting of the British Association, which, as we have announced elsewhere, is to be held at Liverpool. Speaking of Professor Huxley, the President-elect, our contemporary says:—"We venture to predict that the meeting at Liverpool will be one of the largest that the Association has yet known; that the address will be one not limited to one or two points in science, but which will deal with generalisations arising out of all scientific 'questions of contact,' and bearing on the vast problem of human advancement; and, that the President-elect will be received with all the enthusiasm, applause, and admiration which greeted him when, on Friday last, he unwillingly stood on the platform of the Biological Section at Exeter."

THE ELECTRIC LIGHT IN AMERICA.—According to the American journals a novelty in railway management is to be introduced by the Erie Company, who propose to illuminate the whole line of that road at night by electric lights at the ferries, in the tunnels, on all dangerous curves, and on every engine. Mr. E. C. Morse, who has charge of the matter, states that he has made several important improvements, among others a plan for preserving the carbon points from wasting away and keeping them for months in good condition, a self-sustaining battery, and an invention by which the turning of the wheels of the engine shall collect electricity for use in illumination. There will be a light at each end of the ferry, which it is believed will make a collison practically impossible on the darkest and foggiest night. Even with the diminution of light caused by the jarring of the locomotive, it is estimated that the head-lights will show the track to the engineer on a straight line for three miles.

INVISIBLE LIGHT.—Many years since, says Professor O. N. Rood, a photograph was made at Berlin of the well-known bronze statue of the Amazon; and it was observed that, in the negative, a black streak occurred at the tip of the lance (held by the figure in an almost vertical position) while two other analogous marks appeared in other locations. This picture was sent to Professor Dove (Berlin), whose investigations in connection with light are widely known, and he came to the conclusion that these markings might be due to electrical discharges going on from prominent points of the figure at the time the picture was taken, and which, though invisible to an observer, would, nevertheless, by reason of the high actinic power of electric light, produce an impression on the photographic plate. This conjecture has been fully confirmed by the author, who, in a series of ingenious experiments, proved that electric discharges, entirely invisible to the observer in the presence of daylight, might, nevertheless, produce images of themselves in a picture of the adjacent objects taken at the same time, the photographic plate being relatively more sensitive to these impressions than the human eye. The author describes at length his mode of experimenting; but, without a reproduction of the woodcuts illustrating this paper, it is not possible to enter into more details on this subject.—*Chemical News*.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A quarter-plate camera and tripod, one and a-half dozen printing frames, and two dozen Cornish views, or a silver watch, for a 45s. or 55s. everybody's printing press and type.—Address, J. Beringer & Son, Helston.

Will be exchanged, for a whole-plate camera, in good condition, a very handsome chair, with scroll back, upholstered in brown velvet, with fringe and tassels, quite new in May last.—Address, G. Harris, 98, Brearley-street, Birmingham.

I shall be glad to exchange Ross's 10 × 8 wide-angle landscape lens, or lantern microscope, &c., &c., for a lantern with upwards of 3½ inch condensers, gas bag, burners, &c., for oxycalcium or oxyhydrogen light. Values adjusted.—Address, S. S. Crewdson, Union-street, Ulverston, Lancashire.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photograph Registered During the Past Week.—

A. M'William, Kirkcowan.—*Five Views of Cumloden Cottage, and Three Views in Minnigaff Church Yard.*

☞ *Correspondents should never write on both sides of the paper.*

A Mother.—As an accomplishment, yes; as a profession, no.

"Uranium."—Thanks; but the verses are unsuitable for our pages.

Frederick Sheppard.—The hardness in your pictures will be overcome if you give a longer exposure. In every case they have been under-exposed.

Peter Pindar.—About ten grains to the ounce will be sufficient. It is quite impossible for us to say where you are at fault, seeing that you give no description of your mode of manipulating.

W. H. C. (Liverpool).—Thanks for your portrait. Surely your bath is much too strong. If it were in good condition otherwise, it would give you a satisfactory negative, even if it were not much over half the strength at which it is at present. Reduce a portion of it to thirty grains to the ounce, and then try a plate.

J. F. (Lambeth-road).—Hayter makes some observations which will, we believe, exactly meet your case:—"Every colour that is reflected on by its directly opposite colour will be neutralised thereby; such as green against red, blue against orange, or purple against yellow, in an equivalent degree with the power of light."

W. Judge.—1. The lighting of the landscape is good, but that of the "parochial schools" is far from being so.—2. We do not approve of the process about which you inquire, and we are not aware of any person who now practises it.—3. Negative collodion is unsuited for producing glass positives of the best kind, but by reducing the strength of yours by ether and alcohol you may obtain much better results than you get at present, judging by the small specimen you enclose.

D. R. Starkie.—A pair of lenses in a stereoscopic camera are doubtless better than only one, because you can then take two pictures simultaneously, which you otherwise could not do. You must not pay any attention to what Sir David Brewster wrote on the subject of the impossibility of obtaining two lenses alike. He entertained some foolish notions on the subject of lenses, and this was one of them. It is neither impossible, nor in the least degree difficult, to get two lenses which shall be similar in their focal distance.

Medicus.—The high glaze on the old French photographs was imparted in the following manner:—On a clean plate of glass, moistened with ox-gall, pour some clarified gelatine, and, when cold, lay down upon it the photograph, the surface of which has also previously been coated with gelatine. They are pressed in close contact, and, when dry, the photograph may be removed from the glass, the film previously placed upon it being now transferred to the picture. This method is objectionable, because the gelatine is affected by the atmosphere; but if the glass receive a coating of plain collodion previous to the application of the gelatine, a very beautiful and durable enamel-like surface may be obtained. We have, in former numbers, described this process in detail.

Inquirer.—The salt you inquire about is sulphate of copper. To get the proper effect you must dissolve it in distilled water, and crystallise it on several "slides" or pieces of glass at various temperatures. When you examine them through a microscope, using a low power—say an inch—you will then realise the effects produced on crystals by the temperature at which they are crystallised. Concerning your query about objects for the polariscope, we do not know of any which exceeds in beauty and brilliance of colour the bromide of cadmium. Make a solution of this salt, and, having previously warmed the glass slide, wet a portion of its surface with the solution. Now place it on the stage and watch the progress of crystallisation with the polariscope. A mass of gorgeously-coloured vegetation will burst out, the colours being exceedingly brilliant. If you are desirous of keeping it, lose no time in dropping upon it a little Canadian balsam, and cementing on a protecting glass cover; because if you allow it to remain unprotected for several days its beauty disappears.

Mary B.—We have tried the colours of several makers, but find none more transparent or easy of application than those of Newman. For skies you should try his "cyanine," which is much superior to Prussian blue.

A. M'W.—1. We do not think that the lens mentioned gives any distortion; at any rate we have never heard that it does.—2. Of the lenses, the portrait combination will be much the better of the two for your purpose; it works with considerable rapidity.

Reuben.—The blue stain is caused by your having neglected to wash the plate sufficiently after the application of the developer. Mix together weak solutions of an iron developer and a cyanide fixing bath, and you will see on an intensified scale that which you now appear to meet with in your ordinary practice.

M. H.—1. With a good argand lamp and condensers of short focus you can illuminate a four-feet disc in a satisfactory manner.—2. This arrangement will not give a picture so well illuminated as would be obtained on a ten-feet circle by a good oxyhydrogen light, but it will not be *much* inferior.—3. Pictures of a smaller size than three and a-quarter may be magnified up to the size indicated; but do not forget that in proportion to the degree of enlargement so is the diminution in the intensity of the light.

George Ekralc.—Thanks for directing our attention to the matter, which, however, we had previously seen. The person in question is well known to be utterly unscrupulous and reckless in his statements; hence few attach any importance to them. His morbid craving for notoriety must be gratified, no matter at what cost. Thanks also for the flower seeds, which we shall use as directed by you. You are, however, not correctly informed concerning the poisonous properties of the *lobelia inflata*; it is not poisonous, unless in the same sense as common culinary salt,—that is, when taken in inordinate quantity.

D. F. and J. S.—There is much ingenuity displayed in the construction of the camera; but, in our opinion, it is misdirected. Two simple wooden bodies, one sliding within the other, would answer the purpose equally well, with a much less expenditure of mechanical resources, and, consequently, a lower price. There would be no advantage in using a non-distorting lens for furzy bushes and undulating landscapes such as those in the locality that you purpose visiting; but it is quite another matter when you come to take views of architectural subjects. In this case a non-distorting lens is a necessity. Do not, however, mistake one kind of distortion for another. The most common kind of distortion in taking buildings at the present day arises, not from using unsuitable lenses but from tilting the camera, and it is to this cause alone that we owe the existence of so many views of buildings in which perpendicular marginal lines are convergent.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.

Seizure of Indecent Photographs.—On Tuesday last, the police made a well-concerted raid on some of the low print and book shops in Hollywell-street and Wych-street, London, and managed to secure a large quantity of indecent books, engravings and photographs. It is gratifying to be able to record that establishments of the nefarious character hinted at are getting rapidly rooted out.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Aug. 31st	Liverpool Amateur	Free Public Library and Museum.
Sept. 2nd	Glasgow (Annual Meeting)	Andersonian University.

METEOROLOGICAL REPORT,

For the Week ending August 25th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Aug. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
19	30·34	64	53	54	61	ENE	—	Dull
20	30·35	68	53	56	63	NNE	—	Dull
21	30·31	74	50	58	63	ESE	—	Dull
23	30·24	73	54	55	62	SW	—	Dull
24	30·25	83	55	60	65	WSW	—	Fine
25	30·26	—	59	63	68	W	—	Dull

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 487. Vol. XVI.—SEPTEMBER 3, 1869.

CHEMICAL CHANGES PRODUCED BY LIGHT OF CERTAIN GASES.

It was not without some regret we found ourselves obliged to state last week that the recent congress of the British Association had been of little value to our art-science. But few of the papers read at the sections of Chemistry and Physics respectively had any direct bearing on photography, though in one or two isolated cases valuable observations were made which will, no doubt, in the future attract more general attention than they appear likely to do at present. One paper more especially deserves the special consideration of photographers: we refer to Professor Morren's very interesting communication on the action of sunlight on vapours. This is a subject about which but little is known at present, and M. Morren's paper (which will be found in another page in the present number) is essentially a continuation of the recent researches of Professor Tyndall upon the same subject; but we will now content ourselves by dwelling on the probable bearing of some of those remarkable investigations upon our art-science.

Our readers are already aware that Professor Tyndall has lately made some very interesting and curious observations on the precipitation of clouds by the action of light in perfectly transparent vapours. In these experiments a long and wide glass tube was employed, each end being closed with plates of glass or rock crystal. The tube was then exhausted of air, and next filled with a gas, such as hydrogen or nitrogen, charged with the *vapour* of some volatile compound, such as the nitrite or iodide of amyl. When filled in this way the tube presents the same appearance as if filled with ordinary air; it is, therefore, perfectly transparent, and the atmosphere within it is seen to be quite free from any mist or haze. Professor Tyndall now passes a convergent beam of light from the electric lamp through the tube, observing carefully any change which may take place in the path of the cone of rays. When the vapour of hydriodic acid is submitted to experiment a cloud quickly forms in the course of the rays, and the strange phenomena which succeed the precipitation of this cloud are thus described by their observer in the following passage:—

"The cloud extended for about eighteen inches along the tube, and gradually shifted its position from the end nearest the [electric] lamp to the most distant end. The portion quitted by the cloud proper was filled by an amorphous haze, the decomposition which was progressing lower down being here apparently complete. A spectral cone turned its apex towards the distant part of the tube, and from its circular base filmy drapery seemed to fall. Placed on the base of the cone was an exquisite vase, from the interior of which sprung another vase of similar shape; over the edges of these vases fell the faintest clouds, resembling spectral sheets of liquid. From the centre of the upper vase a straight cord of cloud passed for some distance along the axis of the experimental tube, and at either side of this cord two involved and highly iridescent vortices were formed. The frontal portion of cloud which the cord penetrated assumed in succession the forms of roses, tulips, and sunflowers."

These strange and beautiful forms are seen to be evolved chiefly at or near the focus of the violet and extra-violet rays within the tube, and no doubt result from a true decomposition effected by these rays of the compound whose vapour fills the tube, so that light in passing through even a perfectly transparent gas is capable of most materially modifying the medium through which it passes. We have been long familiar with cases in which two or more transparent gases are made to *combine* under the influence of the chemical rays—as in the union of chlorine with hydrogen—but the possible *decomposition* of substances diffused through the atmosphere in the state of vapour is a subject which has been hitherto little considered.

Professor Morren has extended Professor Tyndall's experiments, using sunlight alone, and has succeeded in tracing out some of the reactions which actually take place in certain of these decompositions. All these investigations tend to show that, in the atmosphere in which we live, decompositions are constantly in progress during the daytime, owing to the action of the solar beams on the vapours or gases present in the air.

Now, it is chiefly in the daytime that the photographer works; the sunbeams are his agents, and his camera and its convergent rays of sunlight are the equivalents of Professor Tyndall's glass tube and electric beam. The photographer substitutes for the eye of the experimentalist the almost infinitely more sensitive collodion film. If, then, Professor Morren has been able to ascertain, by means of ordinary chemical tests, that a beam of solar light easily breaks up even sulphurous acid gas into its constituents—sulphur and oxygen—may not the more highly-sensitive photographic film be constantly detecting similar decompositions in the atmosphere around us? And these changes in the surrounding medium, or rather the atmosphere within the camera, are, probably, often registered on the plate, if we could but read their indications aright.

We have been long convinced of the importance of attending to the constitution of the atmosphere surrounding the sensitive photographic film, as it is quite possible that the variations in sensitiveness which we so frequently note may be due to the presence or absence of certain accidental constituents of the air. Such considerations led us, some years ago, to make many experiments on the subject, and, amongst other things, to the discovery that the action of *ozone*—a frequent constituent of the atmosphere—is directly antagonistic to that of light on the sensitive layer of iodide of silver.

It may be recollected that we found when a plate which had been exposed in the camera was placed in an atmosphere containing ozone no image could be evolved by the developer, though a plate similar in every respect to the foregoing, and which had been exposed in the camera under exactly the same conditions, yielded a good picture when treated with the iron developer. Therefore, ozone has the power of neutralising the action of light on layers of the iodide or bromide of silver. In our experiments the amount of ozone present in the atmosphere to which we exposed the impressed film was very small, and yet its action was very strongly marked. So distinct was the effect observed in the course of our experiments, that we were led to infer that the well-known variations in apparent power of certain films of retaining a latent image after exposure may, in many cases, be explained by supposing that the films have been exposed to a more or less ozonised atmosphere. If the amount of ozone be large the image would be quickly destroyed, whereas a very minute proportion of ozone would take a much longer time to counteract the effect of light upon the film.

The researches of Professors Tyndall and Morren now show that the photographer may easily have other atmospheric enemies in addition to ozone, the presence of which may materially affect the success of his operations.

The whole subject of the action of different gas on the sensitive and exposed film has now become a fit matter for special investigation, and we have little doubt that the results to be obtained would amply repay the labour incurred in making the experiments.

COLOURING PHOTOGRAPHS WITH PASTELS.

Photographs and enlargements finished in crayons are often very beautiful and effective, but from the nature of the pigments employed, and the slender tie which exists between each mechanical particle and its fellow, they cannot stand such rough treatment as a photograph coloured in water or oil.

Inquiries have frequently reached us concerning the best method of fixing the crayon colours employed in the retouching or painting of photographs without destroying the peculiar softness and bloom of the pastel. With the view of supplying the desired information we have made copious notes of the hints supplied to us, for the benefit of our readers, by an artist who has achieved some reputation in this department of art.

Pastels or crayons are readily procurable from the artists' colourmen at a very cheap rate, and in boxes or parcels of assorted colours. They are formed by mixing colour of the required kind with a colourless base, with which, by means of a suitable mucilage, they are all intimately mixed together and formed into small sticks or cylinders. A good crayon is quite free from grit and works smoothly.

Among the bases are finely-ground chalk, pipeclay, plaster of Paris, oxide of bismuth, kaolin, and magnesia.

The colours are varied, among them being lamp and ivory black, the various greens obtained from copper, Prussian blue, cobalt, chrome red, vermilion, carmine, red chalk, cadmium yellow, Naples yellow, oxide of zinc, and Spanish white.

The mucilages comprise gum arabic with a little saccharine matter, gum tragacanth, milk, white curd soap, decoctions of barley, malt, linseed, and similar substances.

The photograph must be on a description of paper which has sufficient "tooth" to remove from the crayon a small portion when it is rubbed on the surface. It will be obvious that a hard, highly-glazed paper would not form a proper surface for being worked upon. One of the means commonly employed to give a biting surface or "tooth" to a paper of this kind is to rub it with cuttle-fish bone, by which means the desired surface is obtained. Another way, preferred by some, is to apply to the surface a weak solution of starch or gelatine, afterwards dusting it over with pumice stone reduced to an impalpable powder.

On the artistic phase of the question—that of applying the colours—we have here nothing to say. The mechanical application of the pigments is not difficult. When it is desired to soften or subdue an over-bold tint, or to cause it to blend with another, a leather or paper "stump" (sold for the purpose), or even the finger, is employed. This blending or softening must be executed with discrimination, otherwise, from the too frequent use of the finger, there arises the danger of the tints being rendered flat and opaque.

The colouring having been (rightly or wrongly) executed, we now arrive at the fixing process, with an allusion to which we commenced the present article. It will be apparent that, if the crayon painting were washed over in a haphazard manner with one or other of the numerous spirituous or aqueous varnishes, such as albumen, gelatine, gums, or resins, the colour would be fixed; but it will be equally obvious, on the slightest consideration, that, by such a proceeding, the characteristic soft, velvet-like texture and down would be entirely destroyed. There are other means which are advantageously adopted for the same purpose unaccompanied by any objectionable features, or, rather, involving the smallest possible degree of lowering of the colours; for by no means yet employed can the full freshness of the colour be maintained. This lowering of certain portions is rectified by retouching at a subsequent period of the operation.

A good fixing liquid is made as follows:—Place in four or five ounces of ordinary weak acetic acid an ounce and a-half of isinglass or colourless gelatine, and add to it a quart of hot water. Keep this hot but not boiling, and allow it to stand until it is quite dissolved, stirring it occasionally to aid the solution. When cold, filter, and, having placed it in a bottle, add to it an equal proportion of spirits of wine. Shake thoroughly for a few minutes, and the fixing solution is made.

To apply the solution, lay the photograph face downward, in a horizontal position, and then, by means of a broad camel's-hair brush, apply the solution to the back until the colours acquire a moist and shining appearance. After a short interval repeat this application, and then place the picture aside to dry. The simple proceeding here described is quite sufficient to cause the colours to adhere so closely as to stand a considerable amount of friction without being injured.

Some artists fix their pictures by immersion. The fluid generally employed for this purpose is composed of half-a-pint of water saturated with alum, and half-an-ounce of isinglass. After being allowed to digest for a day, apply heat to dissolve the isinglass; then filter, and add three pints of spirits of wine.

Before using this liquid it is made slightly warm and poured into a flat vessel; the picture is then dipped into it face downwards, and allowed to remain for a few seconds.

Instead of the preceding solution, the following may be used:—Dissolve half-an-ounce of gelatine in three pints of water; heat it to boiling point, and then add half-an-ounce of white soap cut into thin slices. Allow it to boil for fifteen minutes, and add a quarter of an ounce of powdered alum. When nearly cold filter through muslin, and when quite cold add to this mixture half-a-pint of spirits of wine.

By care and attention to these hints photographs coloured or touched with crayons may have these pigments rendered sufficiently hard and durable to permit their being freely handled and even rubbed without danger of being destroyed; for, as we have already hinted, an unfixed crayon drawing is a very tender work of art indeed, and ought not to be exposed without being protected by glass.

NEW TRANSPARENT PAPERS TO BE SENSITISED IN THE ORDINARY MANNER OF ALBUMENISED PAPERS, BUT WHICH DO NOT REQUIRE TONING.

IN TWO CHAPTERS.—CHAPTER I.

In a prefatory chapter [*ante* page 409], I said that I would in a short time enter more fully into the above subject, and state the various methods I employed to render the paper transparent, and also the means I took to produce prints of the tones I then named, viz., brown, black, and purple, without the aid of a toning bath, and which prints cannot be distinguished from those that are gold toned. I, therefore, now proceed to redeem that promise.

In my first attempt to render the paper transparent, I used a mixture of castor oil and absolute alcohol—three parts of the former to one of the latter. This I rubbed in on both sides of a sheet of *unsalted* medium Saxe paper with a tuft of wool; I then held it before the fire in order to enable the oil to penetrate the paper more readily, and rubbed it again. I continued alternately holding the paper to the fire and rubbing it on both sides till it became evenly and perfectly transparent, sometimes using more of the mixture and sometimes not, as I thought was required.

When I had thus rendered the paper perfectly and uniformly transparent, without its showing any streaks of semi-transparency, I took fresh tufts of wool, or soft pieces of linen, to rub off the superfluous transparency-giving materials; occasionally warming the paper, and rubbing both sides of it, until the finger would leave no mark when pressed upon its surface.

Thinking that the oil would perhaps repel the solution of nitrate of silver sufficiently to prevent the sensitising from being perfectly effected if the paper were merely floated upon the surface of the bath, I immersed the paper in it, and let it remain so for full five minutes. I found that the repellent nature of the oil rendered the paper so buoyant that it was not an easy matter to get it below the surface of the bath.

It is scarcely necessary to say that the immersion should be accomplished as quickly as possible, or the paper will not be uniformly sensitised, but will present patches of more or less sensitiveness according as portions of it have remained a longer or shorter time without being immersed.

Upon taking the paper out of the sensitising bath I found that the solution would not run off freely, but collected and remained on both sides of the paper in prominent drops. I therefore pressed it with the hand between folds of white blotting-paper, and dried it by the fire.

In consequence of an accident my sensitising solution was made in an unusual manner. Having an old negative bath, which had been unused for the last six years, I resolved to utilise the silver it contained by converting it into a printing bath, and try some experiments with it, considering that the iodide, or whatever other salt it might contain, if not beneficial would not, perhaps, be injurious.

I intended to make an ammonia-nitrate of silver bath, and, therefore, precipitated the silver by means of strong liquid ammonia, and meant afterwards to add just sufficient to redissolve all but a minute portion of the precipitate. However, by accident I poured a large quantity of this strong liquid into it—in fact, so much did I pour into it that reddened litmus paper was instantly turned deep blue by the fumes of the ammonia, even when held over the mouth of the bottle at the distance of three or four inches.

This large excess of alkali I then proceeded to neutralise by the addition of strong fuming nitric acid, and found that it took a large quantity to do so. This bath—which, I suppose, in consequence of containing an iodide cannot, strictly speaking, be designated an ammonia-nitrate of silver bath—must have been rendered very weak by these additions, as it was originally only thirty grains to the ounce, and had been frequently used. This was the bath I employed to sensitise the transparent papers.

It is well known that a satisfactory print cannot be produced by floating a plain unsalted paper upon a solution of nitrate of silver, and that in order to do so the paper must be previously salted with a chloride. However, the paper which I rendered transparent by the mixture of castor oil and absolute alcohol was not only unsalted itself, but no chloride or other salt was mixed with the transparency-giving materials; nevertheless I obtained most excellent results. This showed, in my opinion, that the silver had entered into combination with the castor oil. I name the castor oil alone because, I presume, the alcohol had been entirely evaporated by the repeated warming which the paper had received before the fire.

Upon taking the prints from the pressure-frame I immersed them in a strong solution of salt and water in order to convert the whole of the free nitrate into chloride of silver, and, perhaps, also the combination of nitrate of silver and castor oil, whatever that may be.

When I considered the prints had been immersed sufficiently long, I washed them and placed them in a strong and fresh solution of hyposulphite of soda, to which I had added some carbonate of soda. In this fixing bath the prints sometimes changed to a rich brown colour; however, sometimes they did not turn brown at all in the hypo., but changed at once to a reddish-violet. It therefore appears to me, as far as I can judge at present, that when the immersion in salt and water has thoroughly and completely effected the change into chloride of silver, the prints are prevented from assuming a brown tone, and it is only when this conversion is not complete that they will do so, excepting, perhaps, in the cases that will be mentioned in the next chapter.

From the viscid nature of the castor oil, and the tendency of the alcohol to evaporate, it is not an easy matter to render the paper evenly transparent. This difficulty, and the comparatively high price of the castor oil and alcohol, induced me to seek for a substitute that would be cheaper.

The first substitute I tried was butter, and as it was the best salt butter that I used it was, of course, chlorided. I made use of this in exactly the same manner as I had done with the mixture of castor oil and alcohol, and found the results to be equally good and in no way different, inasmuch as giving the prints the same treatment as I had given the castor oil prints produced the same range of tones.

As a mere matter of curiosity, and not because I was dissatisfied with the results, I next tried lard. This, from being salted to enable it to keep, was, of course, chlorided. I employed the same means to render the paper uniformly transparent with this material as before. The prints, upon being subjected to the same treatment as the others had been, were similar in tone.

I then tried melted mutton suet. This also, of course, was not chlorided. I employed the same means as before to render the paper transparent by its aid, but found that I could not get any satisfactory prints, as the paper would not yield any depth of tone. I then salted the suet with the chlorides of barium and calcium, and obtained as satisfactory results with this melted and chlorided suet as I had previously done with the other materials. The same treatment also produced a similar range of tones.

Still, as a further matter of curiosity, I next tried the fat of uncooked ham. This, too, was well chlorided. I rubbed it on the paper, and employed the same means to cause it to render the paper evenly transparent as I had previously done with each of the other materials. I obtained the same satisfactory results as before, and by a similar treatment obtained the same tones in the prints.

When the paper which was rendered transparent by one of these four substances was taken from the sensitising bath the solution would not run off freely from it, but collected and remained in prominent drops upon its surface, as it had done upon the paper that had been rendered transparent by the castor oil and alcohol; I therefore pressed all these papers also between folds of white blotting-paper, and dried by the fire.

The transparent papers that I had hitherto used had all been immersed in the sensitising bath; I therefore next tried the effect of simply floating them upon it, and found that good transparent pictures could be produced by both methods of sensitising. However, as was to be expected, the dark background did not show so intense at the back of the prints, when the paper was floated, as they did when it was immersed, nor did the pictures print through the paper quite so much. George Price.

NEWTON'S RINGS FROM A PHOTOGRAPHIC POINT OF VIEW.

If two surfaces of glass not absolutely counterparts of each other, but one of them sufficiently convex that it shall touch the other at an enlarged point (if such a contradiction in the phraseology of physics may be allowed)—if, we say, two such surfaces be brought into contact, a spot will be found at the point of contact; but it will be surrounded by a series of concentric rings of colours more or less vivid.

These concentric colours may be seen when a convex spectacle glass of the weakest power is laid down upon a small and flat piece of glass. If the two be pressed together with a certain degree of force the diameter of the rings will be increased. From the fact of Sir Isaac Newton being the first to investigate this subject, the concentric colours referred to are now popularly known as "Newton's rings."

Starting with the knowledge that a thin film of air of a certain thickness produced a definite colour, Sir Isaac Newton investigated the subject by pressing together a plate of glass with an absolutely plane surface and the convex surface of a lens whose radius was fifty feet. These surfaces were made to touch in the centre, and when pressed into contact by means of a suitable mounting with adjusting screws, the rings were formed and extended wider and wider uniformly with the pressure.

When these rings are examined through a monochromatic glass we see only bright and dark rings. If a pure and deep blue glass be employed for this examination, the appearance presented conveys a very good idea of that which would be obtained by photographing it. The rings are broader for red than for green light, and narrower for violet than either of the former colours. If they be examined with white instead of coloured light, they will be seen to be neither thoroughly white nor black, because* neither the light nor the dark rings of the different colours coincide. We see colours throughout which, instead of being the pure hues of the spectrum, are mixed colours. These phenomena of colours are explained in the following manner:—If rays of light fall upon any lamina of a transparent body they will be reflected partially at its upper and partially at its lower surface, and the rays of light reflected from its two surfaces will interfere, either destroying or strengthening each other according to the difference of the paths which they have traversed.

We have said that a spot is found at the point of contact of the two glass surfaces. When looked down upon—that is, when viewed by reflected light—this spot appears black; but when viewed by transmitted light it appears white. By reflected light the spot is surrounded by six or seven coloured rings, each colour of which is exactly complementary to the same when viewed by reflection.

With this subject many photographers are, probably without knowing it, and certainly without desiring it, to some extent familiar; for it is to "interference," as this phenomenon is designated, that the beautiful iridescence or play of colours is attributable on a collodion film which is not firmly attached to the glass, or an albumen film similarly disconnected from the paper. Exceedingly thin films, whether they consist of air, glass, collodion, or soap (as in the soap bubble), are all subject to this law.

With the scientific investigation of this question we do not now propose to meddle. It is sufficient for our present purpose to be aware of and to notice the fact that a very thin film of air produces a certain colour, which is red, yellow, green, or blue, according to its thickness.

For many years we have been cognisant of this as a scientific fact, but only of late have we known it to be invested with photographic interest. A few days ago we were shown, by Mr. Woodbury, a picture which a hypercritical observer would have considered as, to some extent, defective, the defect arising from a "set" of Newton's rings. In the act of printing by Mr. Woodbury's photo-relief process, a thin sheet of bichromatised gelatine faced with collodion is pressed into close contact with the negative. This contact at one place caused the phenomenon of Newton's rings, and these in turn have acted precisely as though they were concentric rings painted

* Müller.

on the glass by means of coloured transparent varnishes, the result being very apparent in the finished picture, in which the colours caused by the varying thicknesses of the intervening air have ultimately resulted in concentric rings of light and shade, or, in other words, of greater or less insolubility of the gelatine relief, and, consequently, greater or less depth in the metallic plate, the cavities of which determine the intensity of the shadows in the picture. Here, then, is a fact at once scientific and practical in its photographic relations, and we thank Mr. Woodbury for calling our attention to it in its latter connection.

We now take our leave of the effect of thin films of air as retarding agents in printing, and view them from quite another standpoint. The front lens of a portrait combination is composed of two pieces of glass united together by a transparent cement. In order that the two surfaces may be in a proper condition for being cemented they must be of the same radius; but it sometimes happens that lens-grinders of limited resources have not their tools in such perfect condition as to ensure these contact surfaces being absolutely co-equal. Let us, then, suppose that they do not quite coincide in their radii, but that the convex surface is "fat." When lenses of this kind are screwed in their cell a beautiful and large, although mischievous, circle of concentric colours will be seen near the centre, and this circle is more or less large in proportion to the force with which the two are pressed together.

Since we began to investigate this subject we have been fortunate enough to obtain a lens which yields these beautiful Newton rings; and, by placing it against a clear sky, we have taken several photographs of it, in every one of which the rings show quite distinctly. The presence of this film of air, or, rather, the non-cementation of the lenses, retards the force of the light, both by causing a reflection from the surfaces of the lenses and, more especially, from interposing between the surfaces what, *in effect*, is a coloured non-actinic medium.

Such of our readers as desire to try the effects obtainable from "Newton's rings" may realise them by pressing together in close contact a *very* slightly convex (or weak) spectacle glass and a flat piece of glass. The rings thus produced are visible both by reflected and transmitted light.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

Now that the pamphlet of which I spoke in my last has been published by Mr. Sutton, I find, on carefully comparing the outline I gave of it with your more elaborate and detailed description, that I have, in that outline, been wonderfully close to the mark. Concerning its merits, I cannot, among a somewhat large circle of photographic acquaintance, find one who has yet tried it. Probably some of them may yet do violence to their present feelings in that respect, and try the process before I make my next monthly appearance; if so, I shall give you the conclusions arrived at. I observe, however, that a correspondent of a contemporary has tried it, with the unsatisfactory result of the plate not being so sensitive as wet collodion, which, in this respect, it was stated to exceed by many times; and, moreover, it is said to have given a feeble and foggy picture. This is very far, indeed, from being encouraging. In connection with this process, M. Chauvin is said to have found that the gelatine "organifier" is not necessary, all that is required being a wash of a three-grain solution of carbonate of soda. By the way, what has become of the borax (biborate of soda) and gum arabic process of which we heard a good deal five or six years ago? Does any person practise it? It was said to be very sensitive.

Becoming "small by degrees and beautifully less," the photographic papers at the British Association have this year got to zero. When things are at the worst they begin to mend, and as the minimum point has at last been reached, the advent of improvement may now fairly be anticipated. Two things are immensely in favour of the next meeting of the British Association, viz., Professor Huxley being the President-elect, and Liverpool being the chosen place of meeting. On the latter head there ought to be a good photographic appearance "put in." Apart from the fact that intending visitors need not be frightened away from Liverpool from that fear of obtaining accommodation so commonly felt when the British Association visits a smaller town, or from the dread of being "fleeced," as on the memorable occasion of the Newcastle meeting, there is a great deal of photographic ability in Liverpool, Manchester, and the surrounding districts, which is now lying half dormant and only needing the stimulus of a scientific congress such as that contemplated to rouse it into action. Short communications, and plenty of them, on points of interest to photographers are what is needed. Successful modifications of things already known *may* be more valuable than a new discovery. Therefore, the eyes of the photographic world will be on Liverpool and Manchester next year; hence I trust the photographers of the great seaport and the cotton metropolis will endeavour to acquit themselves on that occasion so as to make it a memorable year so far as their photographic efforts are concerned. They *can* do it; whose will be the shame if they do not?

What a comfort for all decent people it is to perceive that the low mercantile dens in Wych-street and Holywell-street are to be rooted out! Photography is disgraced by such a connection. About a month since I passed through the latter of these two streets—which run in parallel lines at a distance of twenty or thirty yards apart—and was quite disgusted at the filthy abominations to be seen displayed in the windows. There was not any one thing which in its nature could be called indecent, but it was only too obvious that the foul presence of these suggestive prints in the window was indicative of a state of moral filth and degradation in the interior of those places. Let the police know that when they make such raids as they did last week they have the heartiest good wishes of all respectable photographers for their success. Compared with the immorality here indicated, that other form of photographic immorality—the pirating of engravings—is of small moment.

In addition to the usual way of remedying cracked films, viz., rubbing over them a little fine lampblack, a correspondent of a contemporary describes a method for stopping out these cracks, very successfully adopted by Messrs. Holroyd, of Harrogate. A finely-pointed camel's-hair brush is charged with a little Prussian blue, and run over the cracks; after being dried it is breathed upon, and then with a piece of blotting-paper the superfluous colour is removed, by wiping it gently over the cracks.

The Quekett Microscopic Club has issued its fourth annual report, from which it appears that upwards of 140 new members have been admitted during the past year. Mr. P. Le Neve Foster, an ardent amateur photographer, is President of this active body; and from the fact that the Rev. J. B. Reade, F.R.S., is President of the Royal Microscopic Society, I am warranted in saying that photography is well and honourably represented in these scientific associations.

Every careful photographer endeavours to keep his nitrate of silver negative bath at as uniform a standard of strength as possible. Not long ago an amateur friend found that he could not get good pictures, and, imagining that his bath was too weak, he added about ten grains of silver to each ounce of solution, with no better results than before. Thinking that his bath must have been much weaker than he had previously imagined, he tested it, by immersing an argentometer, when, lo! it was twice as strong as it ought to have been, and as it originally was. This, doubtless, had occurred from evaporation, although it may also have arisen from an inadvertent addition of nitrate of silver, for many amateurs are in the habit of dropping in a few crystals now and then, in order, as they say, to keep the bath fresh, and provide against the necessary abstraction of silver. In this case an addition of water restored the bath to its originally good condition. A correspondent of the *Philadelphia Photographer* has, in like manner, had to dilute his printing bath. Finding his paper to be covered with spots, and running into lines and drops when removed from the sensitising bath, he tried the strength of the exciting solution, and found that by evaporation it had gone up to ninety grains to the ounce, instead of sixty, the original strength. Having added water to bring it down to the required strength, he filtered it and tried it once more, with the agreeable result that the spots had disappeared and the paper become clean.

I observe that some of my remarks on fluorescence and spirit photographs, made in my notes of two months ago, have been reproduced in the various journals devoted to this singular subject, both in this country and some parts of America; but in every case has the sense been somewhat marred by the persistence with which the word "florescence" has been substituted for "fluorescence"—two words of very different meanings.

It is becoming the fashion among some advertising clothiers to issue *carte* portraits of well-known public characters, dressed, of course, so as to "illustrate" a certain style of coat, vest, or trousers. Let them not, in adopting this system of advertising, forget that if they caricature a man in an offensive manner he may proceed against them for damages. One of the deputies of the Seine has been taking proceedings against a clothier of the class referred to.

EXHIBITION OF THE ROYAL CORNWALL POLYTECHNIC SOCIETY.

The thirty-seventh annual exhibition of this Society was opened at Falmouth on Friday last. Judging from the reports in the local papers the exhibition was highly successful, both as respects the number and quality of articles exhibited and the attendance of the public.

The judges in the photographic department appear (according to the *Western Daily Standard* of Monday last) to have borne testimony to the "marked advance which had been made in this art, as exhibited by the fine specimens sent in for competition, this year's display being far superior to that of any preceding year, both with regard to artistic feeling and photographic manipulation. There being such a collection of really high-class pictures, prepared by such varied processes and on such different materials, the judges, owing to the limited number of medals offered by the Society (four), had experienced the greatest difficulty in selecting the best. A greater number of classes was proposed for the future, to meet the varieties of composition in figures and landscape, and also of manipulation and material."

The photographic prizes awarded were as follow:—

Professional Photographers.—For the best landscape: First-class silver medal to George Wardley, Manchester, for his picture *On the Beach, Conway*. For the second best landscape: First-class bronze medal to William Brookes, Penzance, for *Land's End Road, Penzance*.

For the best portrait or group: First-class silver medal to R. Slingsby, Lincoln, for *Portrait of a Gentleman;* and first-class bronze medal to Augustus Lafosse, Manchester, for a frame of *cartes*, and also a number of studies.

Special medals were also awarded as follow:—A first-class silver medal to A. L. Henderson, of London, for his photo-enamels; a first-class silver medal to Col. Stuart Wortley for several *Studies from the Life;* and a first-class bronze medal to J. Hubbard, of London, for his pictures, *Pensive Thoughts* and *Preparing for Dinner*.

Amateur Photographers. — To T. M. Brownrigg, second-class silver medal, for *The Cathole Waterfall;* a second-class silver medal to Henry Cox, Cadgwith, Cornwall, for four *Views in the Valley of Poltesco;* and a first-class bronze medal to James Tregaskis, Jun., Redruth, for some *cartes de visite*.

We confine ourselves, at present, to the mere intimation of the prize award. Next week we may have something to say on the merits of some of the pictures exhibited. We may here, however, state that the other professional exhibitors were Messrs. Fradella and Leach, Mr. England, Mr. Warlich, and Mr. E. Cocking, of London; and Mr. Row, of Redruth.

ON THE CHEMICAL REACTION OF LIGHT DISCOVERED BY PROFESSOR TYNDALL.

By Professor Morren.

Since the last session of the British Association Mr. Tyndall has published in several papers highly interesting researches on a particular species of luminous reactions, thus providing physicists and chemists with a new instrument both of synthesis and analysis, to which he invites the attention and inquiry of all whom it may concern. In obedience to this scientific challenge I have repeated with the utmost care all the learned gentleman's experiments. I have found them all as rigorously exact as they are ably described. They refer to atomical evolutions in which we almost seem to detect Nature in her most mysterious operations. The molecules of bodies when powerfully lighted, the observer himself being in absolute darkness, may be easily perceived in their infinitely minute motions; in following which Mr. Tyndall, and everyone who is passionately desirous of penetrating the secret of the constitution of bodies, cannot but feel the most exciting curiosity. Mr. Tyndall has made use principally of electric light, and has caused it to act mostly on organic bodies. I have followed in this respect a quite different method and object.

Most favourably situated with respect to solar light, in Provence, where for months together we enjoy a cloudless sky, I purposed to limit myself to the use of the solar rays only, and to confine myself to those conditions which the atmosphere affords us. I have carefully avoided organic bodies, the molecules of which are too complicated and most difficult to follow in their multifarious evolutions. I have even preferred the simplest bodies of mineral chemistry, as offering an easier field of observation to the physicist desirous of arriving at clear and precise answers.

In this exposition I shall follow step by step the order which, without any preconceived or systematical ideas, directed my successive experiments. It is, so to say, a journey in an unknown land. I shall thus the better show what deceptions I met with, the incessantly supervening difficulties, the necessities of modifying the apparatus, and the various incidents of the route. I hope by this means the better to illustrate the object I had in view.

At the outset I made use of an experimental apparatus entirely similar to Mr. Tyndall's; a crystal tube, eight or nine centimeters in diameter and one metre long, fitted at each extremity into a broad, brass ring, luted with cement, and carefully planed in the anterior part; two plain pieces of plate glass perfectly transparent, resting on the ring and slightly lubricated on the edges with a fat substance, constituted an air-tight closing under the action of vacuum. A glass cock fitted on each extremity, and let into the cylindrical rings, allowed of making the vacuum at one end and introducing at the other the gas or vapour on which the experiments were to be made. An extreme, if not absolute, cleanness and perfectly dry tubes are indispensible requisites.

When light arrives in the tube after its condensation by a lens, which everything induces me to believe not to have been achromatic in Mr. Tyndall's experiments, as in his apparatus two cones are formed joined at the apices; the first, the converging cone, with an orange-red periphery, the other, the diverging one, with a violetish-blue periphery; circumstances which I notice here, because the white molecules which are about to appear will often assume, in passing through them, the hues of the luminous bands in which they circulate. When the vacuum has been produced in the tube the light passes through it without the cones being in the least perceived; the tube is optically vacuous. But when the gas or vapour is introduced a blue cloud, or blue precipitate of an incomparable delicacy, appears after a varying lapse of time, first at the summit of the cones, then in the converging cone. As long as the precipitate is of that beautiful blue colour the light which it sends to the eye is perfectly polarised, as Mr. Tyndall has described it. Then by slow degrees the precipitate increases and slowly becomes white, the light emitted still remaining polarised; but, as the sides of the tube lighted by the cones send to the eye light which is also polarised, and, as it were, the produce of a polariser, the whitish vapour of the cones then behaves like a thin polarising lamina under the inspection of the Nichol held by the observer; and when the two polarisation planes are perpendicular to one another, the whitish cone assumes a magnificent blue colour, exactly as thin lamina of selenite of the required thickness would do. But, in proportion as the whitish precipitate increases, all polarisation disappears. The precipitate molecules become heated bolts at the summits of the cones and against the entrance glass plate, and there arises a motion, slow at first, which brings to the cones other particles of the body under experimentation, not yet acted on by the light; and as these particles are transparent and black, their intermingling with the white particles produces a series of the most beautiful, varying, and often most regular images, such as have been described with expressions of genuine admiration by Mr. Tyndall.

The precipitated molecules seem to increase in diameter, and the two cones are then resplendent with reflected light. But there are for the eye certain points where the cone takes a fine rosy colour, and the position of these points varies in the course of the same experiment. They are sometimes on a line which forms an angle of 45° with the axis of the converging cone, sometimes on a line forming an angle of $90° \times 45°$ with the same axis. There is, as in the rainbow, a line of position, and for the precipitated molecules a zone of efficacious rays which will provoke special and ulterior inquiries.

Let me resume the exposition of facts already so well described by the English physicist.

It will be easily seen that either a synthesis or decomposition of a body has taken place, *i.e.*, a new grouping of the atoms, when under the influence of concentrated solar light the blue cloud invades the cones.

The first body of which I have attempted the synthesis is that which I have so often and so easily obtained by electricity, in causing the induction spark to pass through a gaseous mixture formed of 1 oxygen, 2 nitrogen, 3 SO^2.* It is the compound which is formed in the leaden chambers in the preparation of sulphuric acid.

I submitted the gaseous mixture to the solar action immediately the compound was produced; the same gaseous mixture enabled me to recognise, like Mr. Tyndall, that the special rays which produce these reactions are neither the less refrangible calorific rays, nor the red rays, even when highly concentrated. I have for this object made use of the greatest variety of screens, smoky quartz, iodine dissolved in bisulphuret of carbon (CS^2), then coloured glasses, red, orange, yellow, green (but I dislike and I fear the glass screens—I prefer by far liquid screens). The action produced was insignificant. It became, on the contrary, extremely energetic with blue and violet glasses.

It is, therefore, under the shock of the more rapid oscillations of the chemical rays that these reactions are produced. And here I wish to notice, in passing, an interesting fact, important especially for photographers. I mean the power of intercepting only the chemical rays of solar light, without stopping the luminous rays, possessed by a solution of bisulphate of quinine well filtered and confined by means of gutta-percha between two glass plates. This screen, of five millimetres in thickness, is of an extreme transparency to light, but the chemical rays

* Vide *Annals de Physique*, Vol. VI., 4th series.

are intercepted. It might be advantageously used instead of the yellow glass, which, in photographic operations, cast on all objects such peculiar hues as require a special education of the eye which has to judge the reactions.

This screen proved inestimable to me, as it allowed of my disposing and regulating the apparatus suitably beforehand, while it enabled me to permit the chemical rays, which the screen had intercepted, to act at the proper moment only.

After the experiments on NO^3 2 SO^3, I tried to unite the most resistant bodies. I introduced into the tube hydrogen and azote perfectly pure and dry, and my surprise was extreme when I beheld the formation of the white cloud. This unexpected result, and one which I had considered as utterly impossible, obliged me to look still more closely into the matter, and to proceed with still greater caution.

The brass rings at the extremity of the tube were luted with the usual resinous cement. Against this cement my first scruples were now directed; it might still contain some volatile essence, spirits of turpentine, for instance, which might have penetrated into the tube under the action of energetic vacuum; and so small a quantity of matter suffices to produce, perhaps, an appreciable result, that this might have given rise to the unexpected cloud. It became necessary to suppress these rings, and simplify the apparatus, which I effected in the following manner.

I took a cylindrical glass tube (a glass with a foot) thirty centimetres long and 8in. to 9in. in diameter, and of 1,200 to 2,000 centimetres in capacity. The upper edge, somewhat bell-mouthed and carefully planed, of above eight millimetres in thicknesss, is slightly lubricated with a little tallow, wax, and oil melted together. A flat plate glass, very transparent, is placed on the oil and sharply pressed down upon it, and some wax is melted all round the contact surface with a hot iron. At the bottom of the gauge, on the side, a glass tube with a glass cock is carefully fitted in. With this apparatus the vacuum may be preserved during a long time—even for months together. The vacuum is produced and the gases introduced by this sole tube. But there is another method, very important to notice, for introducing into the tube the body to be examined when it is solid, or liquid and volatile. A very small quantity of the substance is put into a very fine thin cylindrical tube, which is closed with the lamp at both ends, after the introduction of the body, and can be, when necessary, easily broken to pieces by a slight shock or shake of the gauge. The mercury gasometers, which receive and conduct the gases, are in crystal, and carefully divided so as to measure the volume of the gases experimented on. In lieu of an air-pump I have always made use of a mercury exhauster, the only apparatus which can absolutely be relied on, and which enables the operator, when the reaction is completed, to withdraw the gases from the gauge for analysis; the mercury exhauster likewise enables us to measure the elastic force of the gases before and after the reactions, and thus indicates the variations of volume of the gas employed.

Therefore, what gives these experiments a peculiar character is the complete elimination of all gaseous vehicles employed to convey the vapour. The conditions of my experiments differ in this respect from Mr. Tyndall's. The smaller dimensions of the tubes which I have employed do not allow, indeed, of the splendid experiments which Mr. Tyndall presented to his delighted audience; but these tubes are easier to fit up and to clean; the mercury exhauster possesses, moreover, another advantage—it allows us to ascertain whether the gases are perfectly dry, a most essential point, as will be seen further on.

As to the means of conveying the solar light, the process was the following:—A broad mirror receives and reflects horizontally a voluminous pencil of rays, which is refracted into a lens of twenty-two centimetres in diameter, and *forty centimetres* of focal distance. The luminous cone is enclosed in a metallic box, whence it issues to penetrate into the gauge through the glass plate. The summits of the two cones, the conveying and the diverging, are situated pretty nearly in the centre of the gauge; the two cones are, therefore, easily visible when the modifications of the bodies contained in the gauge are produced. It must not be forgotten that the periphery of the two cones is coloured, as I said before, in consequence of the non-achromatism of the large condensing lens.

Under these circumstances I was very much surprised to see that a mixture of hydrogen and azote, perfectly pure and dry, produced the reaction-cloud. They had been dried by a very slow passage through pounded glass, which had been calcined and moistened with SO^3, pure and highly concentrated. I changed the desiccating substance, and successfully made use of potash, chloride of calcium, and phosphuric acid, all recently melted. In the three latter cases the cloud did not appear, the action was null, and the solar light passed unperceived. What could the *sulphuric* acid then convey? Evidently some little *sulphurous* acid, for *sulphuric* acid is, in fact, a real emitter of SO^2, and always adds a certain quantity of it to any pure gas which passes through it in minute and successive quantities, and which acts, in fact, as an absorbent of a different gas. Therefore hydrogen and azote cannot be united under solar influence when perfectly pure of other gases. But actually what could the action of the sulphurous gas be?

I applied myself to a special study of SO^3, and have ascertained how easy the decomposition of this gas is. As soon as the light passes through it the white cloud appears, and, if its manifestation is followed with care, it will easily be seen that it is produced not only at the summits of the cones, but likewise on the blue periphery of the first part of the diverging cone, and in the interior of the converging cone. I know of no other body more sensible to luminous action, and the use of condensed light seems hardly necessary for the purpose, since the cloud is formed at other points than the summit of the cone. With this body it is certainly both easy and admirable to behold the coloured bands which form the outline of the cones, and then even the violet rays, scarcely perceptible under ordinary circumstances, can be easily seen in the interior of the first cone. One may thus easily follow and account for the varied hues which the whitish vapour assumes when the variations of temperature waft it about in the cones intermingled with the black streaks arising from such portions of the gas as have not yet been acted on.

But to return to the sulphurous acid. What was the substance—blue at first, then whitish—thus obtained? The two so different hues were merely the consequence of a difference in diameter; the first hue belonging to the bodies, perhaps atoms precipitated in the minutest state of division. The white and pearly colours appear when the diameter has sufficiently increased, and it still goes on increasing. These circumstances induce me to endeavour to measure this diameter—a thing feasible by different means, but not with ease and facility by microscopic inspection, however, for the small spark-like bodies move too rapidly through the field of the microscope. But there were other methods. It may be first observed that if you expose, for a sufficient length of time, SO^2 to solar action, the precipitated substance becomes sufficiently abundant for a sort of haze to become perceptible in the gauge; a part of the gas has been acted on, and the two luminous cones, when moved about in the gauge, find everywhere reflecting precipitated molecules. If the gauge is left long enough in repose and darkness, the cloud collapses, forms a deposit, and the gas is restored to its primitive transparency. If at this point the gauge be again placed under solar action, the same successive phenomena of haze and return to transparency may be repeated indefinitely, till there remains no more gas to be decomposed, which is a very long process, for the very formation of the precipitate intercepts itself the chemical rays which form it.

But since transparency has been produced, a deposit of molecules must have taken place; and, in this case, if the gauge remains in a horizontal position, and a broad slip of glass be placed inside it, it is on this slip that the molecules will be found. Their diameter might then be measured, either directly or by the rings of diffraction; but, unfortunately, it became impossible to use this expedient, the sulphur was dissolved by sulphuric acid, and instead of the molecules which I expected to find, very small drops only were perceived; but, nevertheless, it was possible to obtain the molecules of sulphur in large quantities, and to submit it to all requisite reactions, so as to recognise it completely. It suffices to place in the gauge after, and with the sulphuric acid, three or five cubic centimetres of distilled water; and, after the solar action has sufficiently acted on the gas, the gauge is then shaken, the water dissolves the sulphuric acid, and renders it powerless for dissolving the precipitated sulphur; the water then becomes milky, and collects the sulphur. It is then boiled in a glass cup (in order to drive out the sulphurous gas), and filtered to collect and prove the sulphur; the water then gives abundant proofs of the presence of SO^3.

The atoms of the molecules of SO are, therefore, not able to support the shock of the undulations of the chemical rays; they divide into S and SO^3, 3 SO becoming S and 2 SO^3 (and from the form $\circ O \circ$ they change to $\underset{\circ}{\circ O \circ}$, in which state they are able to resist the shock of the chemical rays; but they offer other phenomena, to which I shall come back a little later). I have, during sixteen days of uninterrupted sunshine, from the 14th to the 31st of July, exposed to solar light 1,900 cubic centimetres of SO in a gauge of 2,000 cubic centimetres in cubic capacity, and the decomposing action was, after that lapse of time, being still carried on in an always sensible and wonderful manner. It is evident that every day the solar action is only partial; it stops as soon as the precipitated molecules of sulphur in motion in the tube are abundant enough to intercept all the chemical rays as an opaque screen. The action of light on SO^3 was interesting to study; it is one of the most beautiful and instructive experiments which can be executed.

SO^3 smokes abundantly on exposure to air, and this effect is attributed to the absorption of aqueous vapour by this substance. This is not even exact, since in a perfectly dry vacuum the same phenomena takes place. In the gauge, with a dry vacuum of a half to one-tenth of a millimetre, I had introduced a very fine thin tube containing anyhdrous SO^3. When I broke the tube the little explosion, and probably the great and sudden expansion of SO^3 produced, scattered about the vapours of SO^3, which are white, and appear with a dazzling resplendency in the luminous cones. Here the chemical rays are powerless; they cannot destroy what they have produced. There is no more decomposition, but SO^3 is, if I may use the comparison, like water in the vesicular state, in a medium in which heat is about to penetrate it. Insensible to the chemical rays, the sulphuric acid absorbs the calorific rays, on the contrary, with prodigious energy; and it is easy to see this absorption is so perfect that all molecular motion ceases instantly, the molecules remain motionless, as if busy sucking up the heat, and, as an aqueous vapour does when heated, they pass into the state of a transparent gas, assuming, previous to their apparent annihilation, all the most magnificent hues. If during the

operation the cock is rapidly opened and immediately stopped, the great movement of molecules so rapidly and so greatly produced ceases at once.

This invisible vapour, when still further and sufficiently heated, will have its component atoms so shaken by the amplitude of their new oscillatory vibrations that they will be removed beyond the radius of their sphere of action, and the molecular edifice of sulphuric acid (at his turn) destroyed.

I should fear to fatigue the attention of the honourable assembly if I developed at greater length the details of various experiments upon a great number of gases and vapours. We must stop here. Yet what results to be signalised?

Thus, for instance, in the most natural, perhaps, of all the groups that constitute the family of metalloids—those which comprise cholorine, bromine, iodine, and fluorine—strange anomalies are observed. Chlorine and hydrogen unite under the action of chemical rays, and form hydrochloric acid; the latter, either dry or humid, and prepared with pure crystals of mineral salt of chloride of sodium, cannot be decomposed by chemical rays of solar light. Whereas hydriodic acid can, on the contrary, be deposed, it is true, and this circumstance must not be overlooked. It is very difficult to procure this gas free from atmospheric air; a curious circumstance in the examination of hydriodic acid is that the first shock of light frees part of the iodine, which appears with its peculiar violet hue at the summit of the cones, amidst the movements which destroy the molecular edfices, and movements, perhaps, made by the calorific rays only.

Bromine presents the peculiarity that, as in the circumstance of the oxygen with chlorine, if pure and dry hydrogen is introduced with a small quantity of bromine into the little tube which is placed inside the gauge previous to the experiment, and which is broken before submission to solar action, after a few seconds the brownest colour of the bromine disappears, and hydrobromic acid is formed, smoking abundantly on contact with atmospheric air.

I could prolong still further the list of bodies submitted to this interesting means of investigation and experience; I shall limit myself to a summary of the theoretical considerations which these facts have impressed on my mind.

We know that the calorific, luminous, and chemical rays are placed side by side, and even intermingled in the solar spectrum with undulatory lengths successively decreasing.

Now all chemical bodies may be classed in two series—the first (having sulphurous acid, SO^2, for prototype) comprises all bodies formed under the action of calorific rays; the second (having hydrochloric acid for prototype) comprises all bodies formed by the chemical rays.

The following are the conclusions which the foregoing facts induce me to admit:—

If a body is formed and maintained under certain oscillatory conditions the peculiar oscillations of the atoms which constitutes its molecules must differ from those of the medium in which the body has been produced. But if this body is transferred into another medium in which it meets with oscillations isochronous to those of its own atoms, these oscillations increase, and the *vis viva* which the atoms acquire may become so great as to drive the atoms beyond the radius of their sphere of action. The atomical edifice is demolished, and as the constitutive atoms preserve nevertheless their peculiar affinities, they form a new edifice adapted to the oscillatory conditions in which they are now situated. Thus they escape the shocks of the creating medium by ceasing to vibrate synchronically with that medium, exactly as an elastic sonorous body does not vibrate and gives no sound when the aërial vibrations which strike it are not synchronous to those which it is capable of reproducing. But if the new edifice is again submitted to the action of other synchronous rays it is again demolished.

Most curious evolutions! which seem to ask of the chemist—(1) Under what peculiar circumstances and influences bodies are formed? (2) Under what vibrations precisely their atoms oscillate? (3) Finally, under what other vibrations the molecular edifice may be destroyed?

Ozone, and all bodies capable of themselves of uniting with other bodies, would be simply molecules whose atoms would be possessed of a *vis viva* sufficient to animate and set in motion the atoms of the other body with which they unite themselves.

Will a *simple body* even always remain such for us, if it become possible to discover what oscillations have assembled the atoms of its constitutive molecule, and what can destroy it? Such is the question which the future lovers of nature and science may be one day enabled to solve.

One word more upon a probable conjecture. I had often seen that, under some circumstances not yet known to me, the concentrated action of solar light is not without effect upon atmospheric air; in such case an appreciable whitish-blue colour is produced. Then might it not be presumed that the fine whitish-blue vapour, which in Alpine valleys bathes the foot of the mountains, is produced by the action of brightly luminous sky under favourable and unknown circumstancesof heat, light, and aqueous vapour?

Seizure of Indecent Photographs.—Michael Saunders, Paul de Paris, and Richard Groves were again charged at Bow-street Police-court, on Tuesday last, with illegally selling obscene books and photographs. The prisoners were committed for trial.

Contemporary Press.

ON THE ACTION OF CHLORIDE OF GOLD UPON CERTAIN SALTS OF SILVER.

[Journal of the Photographic Society.]

Whilst experimenting, some time since, with the view of establishing the possibility of preparing a mixed gold and silver solution which, when applied to paper, would furnish at once the means of producing prints that either did not require toning, or assumed an agreeable colour whilst undergoing the operation of fixing, I was led to study the chemical reactions involved in the precipitation of nitrate of silver by chloride of gold. My object was to obtain, if possible, the nitrate of gold by double decomposition of the two salts, at the sacrifice of an equivalent amount of silver as chloride; but, contrary to my expectation, it was found impossible to prepare a gold solution in this manner, for the whole of the metal went down in combination with the chloride of silver, leaving only a very acid solution as the supernatant liquid. Desirous of ascertaining the composition of the precipitate, I made the following experiment:—Chloride of gold crystals were dissolved in water, and the solution then evaporated as far as possible in a porcelain basin mounted on a water-bath. In this way the gold salt was obtained with a *minimum* of free acid, and its constitution may fairly be assumed, and subsequently proved to be represented by the formula $Au\,Cl_3\,HCl$. This was again dissolved in water, and slowly poured, with constant stirring, into a large excess of pure nitrate of silver solution. A heavy ochrey-yellow precipitate was thrown down, which could be easily washed by decantation, and the reaction of the liquid became powerfully acid to test papers, and caused great effervescence with carbonate of soda.

The yellow product was dried in a warm closet, accurately weighed, and then analysed in the following manner:—A known quantity of the substance was fused with a mixture of the carbonates of potash and soda in a porcelain crucible, when the metals became reduced and formed an alloy, which remained insoluble upon treating the fused mass with water. The metallic sponge was well washed and then treated with hot nitric acid to dissolve out the silver; the residual gold proved to be pure, with the exception of a trace of silica (derived from the porcelain crucible), the weight of which was ascertained and deducted. The amount of silver dissolved out by the nitric acid was determined by precipitation as chloride, and, finally, the existence of chlorine in the alkaline flux was established by the usual tests. The results furnished by this experiment were as under:—

Weight of substance taken	10·00	grains.
Weight of gold obtained	2·50	,,
Weight of chloride of silver	7·18	,,

A small deficiency is accounted for by the presence of oxygen, which was found to be given off upon heating the substance in a test-tube. Calculating the amounts of chlorine and silver contained in 7·18 grains of the chloride, and, supplying the deficiency as the weight of oxygen, we obtain the following percentages:—

Gold	25·00
Silver	54·03
Chlorine	17·77
Oxygen	3·20
	100·00

The yellow substance is thus proved by chemical analysis to contain one atom of teroxide of gold associated with four atoms of chloride of silver, and its formation may be explained by the following equation:—

$$AuCl_3,HCl + 4AgO,NO_5 + 3HO$$
$$= (AuO_3 + 4AgCl) + 4HO,NO_5.$$

A similar experiment made with the fluoride of silver, instead of the nitrate, and a different sample of chloride of gold, furnished apparently the same yellow precipitate with liberation of hydrofluoric acid. This product was also submitted to analysis, but a lower ratio of silver was found, and the results indicated a composition which nearly coincided with the requirements of the formula

$$AuO_3 + 3Ag\,Cl.$$

I am not able to say at the present time whether the sample of chloride of gold used in the latter instance had been more carefully treated with the view of separating the free acid; but it appears probable that the formation of this compound would be the direct consequence of employing the simple auric terchloride, $AuCl_3$, instead of the acid salt, $AuCl_3$, HCl. If such should have been the case, the product in my second experiment was formed thus—

$$AuCl_3 + 3AgF + 3HO$$
$$= (AuO_3 + 3AgCl) + 3HF.$$

The metal platinum, according to Vauquelin, possesses the property of being precipitated as oxide along with the chloride of silver, when normal solutions of bichloride of platinum and nitrate of silver are mixed. I have confirmed this observation by qualitative trials (obtaining a yellowish or fawn-coloured precipitate), but have not made any analyses.

After obtaining the foregoing results with gold, I tried these compounds on paper and in collodion for photographic purposes. For printing it was necessary to submit the paper to a double treatment in sensitising it, and these operations (floating successively on chloride of gold and nitrate of silver solutions) must be performed immediately before use, in order to escape the effects of spontaneous discolouration. Thus employed, I found that the consumption of the precious metals was larger for the same ultimate results than by the established process; but there is one aspect of the case which I have repeatedly studied in the hope of eliciting a really practical method. I refer to the circumstance that upon matt paper chloride of silver may be produced with a slight excess of common salt, and in this state preserved for a long time in a perfectly dark place. When required for use in rapid printing, its surface may be "extra sensitised" by floating upon a highly dilute solution of chloride of gold, and hanging up to dry. The paper gives from the first very agreeable tints, which remain almost intact whilst in the fixing bath, so that no supplementary toning process seems to be required.

The use of chloride of gold in collodion has, in my hands, invariably led to the fogging of the plate upon development. A mere trace only being employed gives rise to a kind of impenetrable veil which obscures the details of the picture—a result due, I believe, to the exceedingly rapid reduction of gold salts, as compared with those of silver, under the action of sulphate of iron or other developer. JOHN SPILLER, F.C.S.

GENERAL SOLUTION OF THE PROBLEM OF HELIOCHROMY.

[BULLETIN SOCIETE FRANCAISE DE PHOTOGRAPHIE.]

I HAVE discovered a general method of registering, fixing, and reproducing all visible phenomena as a whole and in all their parts—that is to say, in their two orders of primordial characters, figures and colours. I now proceed to explain this method, and the practical rules to be derived from it.

The means which I propose are founded upon the processes already known in photography, and upon the physical properties, equally well known, of the luminous rays; and it is precisely because each of the elements of the idea is given experimentally, and the arrangement alone is new, that it has not been necessary for me to assure myself of the possibility of the result by experiment.

In approaching the problem, I start from a principle of which I will elsewhere give a demonstration, and which is as follows:—Colours are "essences" which, like figures, have three dimensions, and consequently require three independent variations in their representative forms.

It follows from this that if we had an instrument for measuring colours, as the thermometer measures temperatures, it would be necessary that it should give, in order to express the relations of the tints between them, three distinct numbers for each. Therefore, a ciphered representation of the subject of a given picture would be possible with the following conditions:—The painted surface should be divided into a number of contiguous surfaces, sufficiently small for the detail required, and their different tints should be distinguished by means of three numbers for each.

Thus each point of the picture gives rise to a valuation of three sizes, which cannot be confounded in one single number. We may, therefore, say that a picture has five dimensions—two for the representation of the place (the elementary points of the drawing), and three for the representation of the values of the tints.

Now what is it that the photographic apparatus registers? The photogenic intensity which is translated partly by white, partly by black, and the intermediate greys. A single numbered linear scale would suffice to classify and to draw out each of the terms of this service from white to black. In a photographic proof there will, therefore, never be the elements necessary for the whole of the tints of the picture represented, and hence the idea that three different proofs would be necessary, each giving the variations in intensity of one of the three elements of the colours.

The three elementary kinds of colour are the red, the yellow, and the blue. It is therefore necessary to take three different proofs—one of all the points which are more or less red, or which contain red; the second of all which contain yellow, or a portion of yellow; and, lastly, the blue in like manner.

These three proofs, supposing them to be obtained in uniform tints like those of ordinary photography, will express—in black and in grey more or less deep—the respective quantities of red, yellow, and blue which there are in all the points of the picture. Thus we shall have a union of all the particular marks of the proposed picture, but not its reproduction for the immediate view. In a word, the analysis of the picture is made in the point of view as to colour, but not the synthesis.

We now proceed to treat practically these two parts of the problem. In the first place let us look at the processes of analysis.

For obtaining elementary proofs there are two orders of processes of analysis—successive analysis and simultaneous analysis.

The means of successive analyses are of three kinds—analysis by transparency, analysis by refraction, and analysis by monochrome lighting.

The process of successive analysis by transparency is the first means that occurred to my mind. It consists in *sifting the rays through coloured glasses.* A first proof is taken through a red glass; only the red rays pass through. In reality the white light also passes, and the red rays are only a maximum, but that neither affects the theory nor the operations.

The negative obtained in this way expresses, by its variations of opacity and of transparency, the quantities, greater or less, of red which there are in each point of the picture. It is the same with the second negative obtained through a yellow glass, and with the third through a blue glass; the one will express the different quantities of yellow, and the other those of blue, to be found in the different parts of the image.

The unequal photogenic energy of the different rays should be compensated by proportionately strong sensitising and developing baths, and by a time of exposure suitably determined. The feeble chemical action of the red and the yellow is explained up to a certain point by the fact that the sensitive substances are generally yellow or red, and reflect these colours without absorbing them. Equality might be re-established by colouring the sensitive surfaces in blue or green. For this purpose the iodide of starch, soluble indigo, or salt of uranium might be employed, avoiding all disturbing chemical reactions.

The difficulties which may be foreseen are as follow:—The coloured glasses usually purchased in the trade are perhaps a little too dark for first experiments. We should commence with glasses almost white. It is necessary that the glasses should be clear and without defects, and that they should be perfectly plane. They might be replaced by coloured varnish spread on uncoloured glasses, or even on one of the lenses of the objective. Coloured liquids contained between two ordinary glasses might also suit the purpose.

The second means consists of replacing the coloured glasses by a prism, which is made to turn to each proof in such a manner as that in the first place it only sends the red rays into the camera, afterwards the yellow rays, and lastly the blue rays. This system avoids the process of transparent enamels and artificial colours—products always impure, and which allow the white light to pass.

The third means is not so general as the two first, but it will probably be useful in certain circumstances for portraits, the reproduction of paintings, flowers, animals, and anatomical preparations. It consists in taking three proofs with an ordinary photographic apparatus without any modification, but taking care to light the objects to be reproduced—first with the red light, afterwards with the yellow, and lastly with the blue light. These different rays are taken in a spectrum, or obtained by means of coloured, transparent mediums. This method cannot be applied to any reproductions in the open air. However, the facility it presents for practice renders it valuable for scientific or industrial reproductions. It is probably this method which will be first put into into practice.

The second process of analysis consists in taking the three proofs simultaneously in the three regions of simple rays of the spectrum, resulting from the decomposition of the rays emitted by the picture to be reproduced.

A system of lenses is placed in such a manner as to group in a bundle the rays which the picture sends which it is proposed to reproduce. This mixed bundle falls upon a prism which decomposes it and shows it in a spectrum. Three elementary objectives gather respectively the red, yellow, and blue rays, and form three partial images on the sensitive surface, which fixes them. Perhaps it may be necessary to place before each objective a prism which compensates for the additional length of the images.

The difficulties will still be insufficiency in the quantity of light for each proof, and unequal chemical action. As regards the insufficiency of light, that may be compensated by reducing the dimensions of the images, which can be afterwards enlarged. This condition cannot injuriously affect the final result.

I will now endeavour to show how, by means of the three elementary proofs obtained by one of the processes already described, it is possible to adjust the picture and submit to the view the whole image from nature of all the things which change and pass.

In order to resolve this part of the problem it is well to study, in the first place, more precisely what the negatives are which have been obtained. It is necessary, first, to observe, that each of them represents an ordinary negative image, though incomplete, of the proposed picture. If, therefore, the three negatives should be drawn successively on the same sheet of paper, we should have an ordinary and complete photograph.

The negative obtained with the red light represents, in its most opaque points, the reddest parts of the real picture; in its transparent parts it represents those parts of the real picture which have the least red. It is the same with the yellow and blue negatives, the most opaque parts of which correspond with those parts of the real picture which have the most yellow and most blue respectively.

If these relations were reversed by obtaining the positive of each negative, these would be the parts least changed, and the most transparent if printed on glass, which would correspond with the maxima of colouring.

With regard to the positive of the red on glass, it is traversed by the red rays, and its image is thrown upon the screen. The clearest parts of the image in red, as we operate with red rays, will correspond with the reddest parts of the real picture to be reproduced. The darkest

parts will correspond with those which, in the real picture, are either black, yellow, or blue. The positives of the two other negatives will give, in like manner, if traversed by the yellow and blue rays, two other images, where the yellowest and bluest parts will become the brightest.

If, therefore, by any kind of means, the three images can be placed exactly the one upon the other, the image resulting therefrom will contain in all its parts quantities of red, of yellow, and of blue corresponding with those in the real picture. Where there will not be any of the three colours, there will be black; where one alone, or two, or three, in special proportions shall have acted, we shall have all the tints possible, simple or mixed, pure white amongst the rest.

It now remains to give the means of placing the proofs one upon the other.

It is of importance to remark beforehand that the images thrown upon a screen according to the positives are not the only ones which can be made use of. It is necessary to add to them those which are formed in the eye when looking upon them (the transparent positives generally) by a false light, and to which the suitable colour is given by applying to them a coloured glass or a coloured varnish; those which are obtained on ordinary sensitive paper by means of each negative (they are coloured by means of transparent, uniform tints, and are looked at direct); and, lastly, those that are obtained by heliographic engraving on stone or on steel (they should be positives, and printed by the press in coloured inks).

The processes of synthesis are of two orders—successive synthesis and simultaneous synthesis.

The phenakistoscope which has lately come again into vogue under the name of "zootrope," enables me to dispense with any long explanation of the successive synthesis. The elementary images are rapidly substituted the one for the other, under view, and the impressions produced on the retina become confounded. Thus we obtain the combination of the three colours for all the parts of the image resulting therefrom.

This process is applicable to projections upon the screen, transparent positives, and positives viewed directly. The instruments are more simple than the phenakistoscope, for there are only three elementary figures in lieu of twenty or thirty. Such instruments are very easy to imagine and to realise. I will give the preparatory instructions if required.

It is scarcely necessary to say that the principle of this successive synthesis is experimentally demonstrated by the disc turning in coloured sections.

There are three kinds of simultaneous syntheses—the synthesis by reflection, the synthesis by refraction, and the synthesis by transparency through antichromatic positives.

The synthesis by reflection consists in making the three images to be seen in the same place by means of transparent glasses. We know that a transparent glass, while allowing us to see that which is behind it, reflects very clearly the image presented to it. It is upon this property they have based the amusement of spectres and apparitions; I will also give, if it be necessary, the directions for this mode of recomposition. The process is applicable to positives by transparency and viewed directly.

The synthesis by refraction gives one of the most elegant solutions of the problem. It is based upon the following principle:—The passage of a simple coloured ray which traverses a succession of different middle refractions is the same in both senses; that is to say, that the source of the ray and its point of arrival may change their places without the passage varying. Therefore, if we send through a prism a mixed ray, containing red, yellow, and blue, each of these rays will be thrown into a distinct place. If afterwards, from each of the places where these rays have fallen, we send rays of the same kind into the prism under the same respective angles as those of emergence, we shall reconstitute an identical mixed ray; whence the following practical process:—

Three proofs have been taken in the three regions of simple rays of the spectrum. The positive of these three rays is obtained either by transparency or by view direct. Upon these three positives are applied the uniform colours red, white, and yellow, as may be suitable. The three proofs are put back into the places where they were obtained. Looking at them through the analysing prism, they only form one single resulting image. The same effect is obtained by throwing the rays which go out from the prism upon a screen. Pursuing the examination we find a solution still clearer and more simple, where the employment of every predetermined artificial colour disappears. It is the consequence of the following principle:—

A ray of white light traverses a prism, the red, yellow, and blue emerging under distinct angles. If we send, in the inverse sense, and under the same angle as that of emergence of the red, a ray of white light, this ray will be decomposed and that which it contains of red will take the direction of the first white ray. In like manner the inverse white ray, penetrating under the angles of emergence of the yellow and blue, will give in the direction of the direct white ray a yellow and a blue ray. Therefore, the same apparatus which serves to decompose the picture in three proofs, taken in the regions red, yellow, and blue of the spectrum, will serve, when once these proofs are obtained, for making the recomposition. It will suffice for this synthesis to replace the three immediate negatives by their uncoloured positives, and to send through each a ray of white light following the passage of emergence of the corresponding coloured ray. Thus we shall have the reproduction of the natural picture whether in the eye direct or upon a screen.

This solution is remarkable in that it does not make the result depend upon any coloured artificial product. The colours are thus transformed in purely geometrical conditions, and these conditions regenerate in their turn the colours. The apparatus realised only gives in this manner that which it has received.

The antichromatic synthesis consists really in placing the three positives one upon another, upon a white or transparent surface, so as to obtain a fixed result, visible without any intermediate instrument. The following is the manner in which this result is realised:—By means of the three negatives we obtain three heliographic plates upon stone or steel, plates which give positive proofs. The dark parts of the red proof, for instance, represent the parts of the picture where the red has acted least; the clear parts represent those where it has been in the maximum. In those points where there was no red there could only be black, yellow, or blue.

The first proof is printed in green, complementary colour of the red. I call this proof the antichromatic positive of the red. On this green proof is printed the antichromatic positive of the yellow, which is violet; and, lastly, that of the blue, which is orange. It is necessary to make the second and third printing with transparent lac, which allows the tint of the former to be seen below.

In practice, it will probably be better to obtain negatives with the green, violet, and orange rays, and print with red, yellow, and blue inks. The printing will be commenced in blue, for the blue transparent lacs are rare; the red and the yellow are always easy to find.

The final proof obtained thus by a similar process to that of chromolithography, presents in its mixed tints the same relations as those of the real picture, except that all the colours are darkened by a slight proportion of their complemental tint, which gives the effect of a kind of sooty-brown base, in fact, where none of the colours have acted. The three proofs give the maxima of colouring which, placed one upon the other, produce black. Where the colours have acted all three in maxima, the three proofs allow the white of the paper to be seen. In pursuing the analysis it is easy to see that the mixed tints will be realised by this process, but, as has been said, with a slight proportion of the complemental tint. With the exception of the practical difficulties we might even make the three prints upon glass; the result would be similar to pictures painted on enamels.

These are the whole of the means that I have been able to discover as yet. Perhaps others may be found in the course of practice; but I have reason to think that they will be derived from those I have mentioned, and which have been furnished to me by certain general clues of which I shall treat hereafter.

One last remark. For those who do not admit the principle of three elements of all the tints as given above without demonstration, my solutions remain invariably the same. In fact, the result may always be obtained with a perfection which would only be limited by the number of elementary proofs of the different tints. Now let those who feel the desire and have the means of doing so, attempt the practical realisation of these theories. There will be room for their individualities and their talents in this work, the great difficulties of which I do not attempt to conceal. CHARLES CROS.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 9th	Manchester....................	Memorial Hall, Albert-square.

SOCIETY FOR THE ADVANCEMENT OF PHOTOGRAPHY, BERLIN.

A MEETING of this Society was held on the 9th ultimo,—Dr. H. Vogel in the chair.

The CHAIRMAN announced that Herr Oppenheim had presented *Remele's Handbook of Photography* to the Society, in addition to which others were ordered by the meeting.

Herr PRÜMM gave a detailed description of the construction of Herr Schade's electro-magnetic washing machine, which gave rise to a discussion upon the washing apparatus employed at the principal establishments; at the conclusion of which Herr Lindner promised at the next meeting to give the description of a simple apparatus which would answer all purposes.

The Chairman exhibited a number of Woodbury prints, by Goupil. The prints attracted considerable attention, but it was observed, on comparing them, that some prints differed from others, of the same negative, particularly in the details of the foreground and some distant parts. This led to a surmise that the prints were from different metal plates executed from the same negative.

Herr A. Lindner exhibited several new Albert prints, and, amongst them, many good *carte* portraits, which were executed by Herr Albert

during his (Herr Lindner's) visit to Munich. He mentioned that Herr Albert had finished three of the negatives in his presence, and, in two hours afterwards, he showed him the prints from them. Herr Lindner said he was not present at the printing; Herr Albert had told him, however, that about one hundred prints could be delivered from one plate.

Herr GRASSHOFF reported upon Herr Schaarwächter's experiments in the carbon process, proofs of which were laid before the meeting. He stated that the partial failure of that gentleman's experiments in Johnson's process was attributable to the imperfect materials employed. He himself had experimented in the same process, and had not remarked the faults imputed to it. The results were in most respects very promising; but all uncertainty must be done away with, and the materials must be obtainable at a cheaper rate, before the process could compete successfully with silver printing. Herr Grasshoff concluded by presenting to the Society a number of *carte*, cabinet, and group pictures on plates 7 × 9.

The CHAIRMAN exhibited a number of *cartes* by Allen, of Boston, from drawings by Rowe. These "Rowe's Drawings" were from originals executed in the *virtuoso* style, and attracted universal attention. He also laid before the meeting a quantity of "leaf prints;" that is, photographic reproductions of leaves obtained by Gaffield, of Boston, in the simplest manner, by means of the copying press. Many of these pictures showed beautiful arrangements of the leaves, as garlands, and in the forms of crosses and anchors, with as nice detail as might be expected in such works. Many members remarked that in this process only such leaves could be employed as retained little moisture, as the latter, by the pressure of the printing-frame, would have an injurious effect upon the silver paper. It was further supposed that the sheets were fastened, by means of size or paste, to the plate of the copying frame, so as not to be displaced when examined.

Herren Prümm, Lindner, and Grasshoff reported upon the trial of Henrichsen's "essence" for retouching. Herr Prümm said he found it too thick, and that it dried too slowly.

The CHAIRMAN dwelt at some length on the production of pictures with "Rembrandt effects," and laid before the meeting some new pictures of this kind received from Mr. Baker. He showed, by a picture from the Society's collection, that similar effects of light were already being employed on that side of the Atlantic.

Herren MAROWSKY and STEFFENS said the subject was not made clear in the last article published respecting Mr. Baker's productions.

The CHAIRMAN gave a detailed and illustrated description of the lighting, &c., by which the said effect was obtained.

Herr PRÜMM said he differed from the Chairman in regard to the arrangement, and proposed some alteration in the descriptive sketch given by him.

Herr Grasshoff illustrated, by practical experiment, the method recommended by him at the last meeting for roughening negatives to be retouched with the lead pencil.

The meeting was then adjourned.

Correspondence.

Home.

ALBUMEN TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—Will you oblige me in your next number with the formula for printing albumenised transparencies on glass such as the glass stereoscopic pictures done by Negretti & Zambra and some of the French photographers?

If you can or will refer me to any number of your Journal that has the method of printing and preparing the glass, I shall be greatly obliged, as I wish to do some. I like them much better than those printed on collodion. If you say, in as few words as possible, the way to iodise the albumen and make it sensitive, and to develope and tone them, I know the way to go to work.—I am, yours, &c., J. C. S.

Scarborough, August 31, 1869.

[The formula given by Mr. Negretti, in a communication on this subject some years since (1855), was—

Albumen	100 parts.
Distilled water	20 „
Iodide of ammonium	1 part.

The sensitising bath was composed of—

Distilled water	100 parts.
Glacial acetic acid	10 „
Nitrate af silver	10 „

Keep the plate immersed for forty seconds. The developer consists of gallic acid (saturated solution) heated to a temperature of 80° Fah., and having a few drops of aceto-nitrate of silver added to it. The above, be it remembered, was Mr. Negretti's formula in 1855. He has, doubtless, modified it considerably since that time.—EDS.]

PURIFYING WATER.

To the EDITORS.

GENTLEMEN,—In THE BRITISH JOURNAL OF PHOTOGRAPHY for 1868, page 491, is an article on the use of permanganate of potassa for curing the silver bath. The writer of this communication has tried it for the purification of rain water caught in London, but his want of knowledge renders the result somewhat doubtful.

The rain water was caught from the roof of a house after some hours' rain. It did not touch any metal, and was collected in glass bottles well cleaned and rinsed out with the rain water, which was filtered through white blotting-paper.

Previous experience had shown that such water would not keep sweet, and in the present case a solution of permanganate of potassa was dropped in. The solution was six grains to an ounce of distilled water, and of this about seven drops were required to produce a pale pink colour in half-a-gallon of water; but in about ten minutes this pink changed to a golden brown, which could not be removed by filtration.

Thinking that this brown was produced by ammonia, the water was then well boiled in a flask. A brown deposit was thrown down, leaving the water with a faint yellow colour.

Having thus given my experience in attempting to purify, I shall feel obliged if the Editors will be so good as to answer—

1. Why did the pink colour change to a brown?
2. What is Condy's fluid, and what is its strength?
3. Given this Condy's fluid and some rain water caught in a large town, how should I set to work to purify it for photographic purposes?

—I am, yours, &c., SOCRATES.

London, August 24, 1869.

[1. The pink colour due to the permanganate of potash was changed to brown in consequence of the destruction of the permanganate by some organic impurity in the water. The brown tint was due to the presence in suspension of a finely-divided brown oxide of manganese.—2. Condy's fluid is a solution of commercial permanganate of potash, and is of variable strength.—3. Add sufficient of the Condy's fluid to produce a good pink colour in the water. Allow the mixture to stand in the sun for a day, then boil in a clean vessel and filter.—EDS.]

SPIRIT PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—I have seen Mr. Fowler's remarks on the statement of Mr. S. C. Hall, and as Mr. Hall only alleges that certain facts were witnessed, I cannot see anything "illogical" in such assertions. Either the statements are true or they are not true; and as Mr. Hall says that the spirit was seen by eight other persons, including an officer in the Guards (the Master of Lindsay), I think Mr. Fowler should have written to Mr. Hall for the names and addresses of the other witnesses, and made inquiries, before printing such grave charges against a gentleman of the age and eminence of Mr. Hall.

Not many weeks ago, the Countess de Pomare brought a friend, Miss Ann Bakewell, of Paris, to a meeting of the Dialectical Society, who are investigating the alleged spiritual phenomena; and Miss Bakewell testified that she and several other friends had at the same time seen the spirit of *her* sister at a French circle. The address of this lady can doubtless be had from the Secretary of the Dialectical Society. Therefore, what I suggest is, that Mr. Fowler should inquire into this matter, and gain admission to some French circle of spiritualists, and afterwards let us know whether *he* has been able to see spirits, or to find out scientific tricks.

It must be remembered, also, that Mr. C. F. Varley, C.E., F.R.G.S., who is, perhaps, the cleverest electrician in Europe, swore on oath, at the trial of Lyon *v.* Home, that the modern spiritual phenomena are facts and not imposture. Mr. Varley is now at Brest, so from him Mr. Fowler may, perhaps, be able to gain information. Mr. Wallace, of the British Museum, who was praised for his scientific attainments by Dr. Hooker, in his opening address as President of the British Association at Norwich, is also an avowed spiritualist. The editor of the *Athenæum*, Mr. Hepworth Dixon, again, estimates the number of spiritualists in the United States at 3,000,000, and this is about the lowest estimate given by anybody who knows the country.

I attach no importance to the fact that the occupants of the thrones of France, Russia, and Prussia are believers in spiritualism; but when so many London scientific men, literary men, and barristers testify, as they do, that the phenomena are *facts*, it is high time that abuse of the witnesses should cease. Men of Mr. Fowler's scientific attainments and materialistic proclivities should try to help them out of their delusion, and prove whether or no, under certain conditions, spirits appear now as they are alleged to have done in the days of old, and that, too, in a form sufficiently palpable to be photographed.

The reception hitherto given to those who have written anything else than abuse about spiritualism makes me for the present withhold my name from everybody but the Editors, for even my simple argument,

that "the weight of testimony is such that the phenomena ought to be investigated," is quite sufficient to raise the ire of those who would rather hang a man than examine obnoxious facts he may wish to have generally known.—I am, yours, &c., A. B. C.

London, August 30, 1869.

"SURFACE MARKINGS ON NEGATIVES"—EFFECTS OF TEMPERATURE.

To the EDITORS.

GENTLEMEN,—Many of your correspondents in their communications regarding "oyster-shell," "curtain marks," &c., on negatives seem to overlook or ignore the fact that these stains appear *more or less* during an increased rise of temperature. The experience of professional photographers will corroborate this statement. The question, therefore, simply arises, how to keep the nitrate bath cool in the dark room and the plate cool in the camera. Regarding the bath, immerse it in a vessel containing cold spring water, and, if not cold enough, place a lump of ice in the water. This has a wonderful effect, for during the hot days of summer the plates can be developed free from surface markings.

On excessively hot days, however, such as we were favoured with last week, when the thermometer registered 110° in the sun, I found it impossible to develope the plates *perfectly* clean. I therefore tried the experiment of placing a piece of *ice* in the *camera*. This had the desired effect; the negatives "came out" *perfectly* free from stains or marks. The plates even kept in the camera for fifteen minutes, and then developed clean and bright. The ice I placed on a *deep* tin plate, the plate beforehand having been black varnished inside and out to avoid reflection.—I am, yours, &c., S. PARRY.

Preston, August 31, 1869.

HONOUR TO WHOM HONOUR IS DUE.—*IN RE* GEOLOGICAL SPECIMENS.

To the EDITORS.

GENTLEMEN,—In your notice of the British Association Geological Section there seems to me to be just a little more honour and credit given to Mr. J. Thomson for the photographs of corals than is quite due to that gentleman. It there appears as if Mr. Thomson did the photographs, or at least conceived all the plans for carrying out the work. If I claim some credit in connection with these photographs, it is because I think I am a little like the bellows-blower who said to the organist, "*we* did it."

I believe it was entirely at my suggestion that Mr. Thomson had geological specimens photographed; and, when he brought the corals to me, he said I was to make whatever photographs I could with them. Mr. Thomson said he knew nothing about photography—had not time to learn anything about it—and did not want to learn anything about it.

I made transparencies for the magic lantern. I made negatives from transparencies and printed on albumenised paper. I also printed from the thin sections, using them as negatives, as well as made negatives from solid sections. At Mr. Thomson's request I made microscopic pictures of sections.

I exhibited a number of transparencies by the oxyhydrogen lantern some two years ago to the Glasgow Geological Society, in the Andersonian University, for Mr. Thomson.

When I was making those pictures Mr. Thomson was very much pleased with them, and oftener than once said that wherever these coral photographs were seen my name would be mentioned.

When, last year, I saw notices in the *London Journal* and the *Family Herald* of these pictures and no mention was made of my name, who had something to do with them, I took no notice; but now, when they have got such prominence in THE BRITISH JOURNAL OF PHOTOGRAPHY, I think it right to put in a small claim, knowing, at the same time, that any other photographer who knew a little about his business might have done similar work. So I again say "we did it"—Mr. Thomson got the stones and I photographed them.—I am, yours, &c.,

ARCHD. ROBERTSON.

37, *Glassford-street, Glasgow, August* 31, 1869.

Miscellanea.

IMITATION IVORY.—A patent has just been obtained, by a New York gentleman, for a kind of artificial or imitation ivory which may be rendered useful to photographers. The basis of the compound is bleached shellac, with which is mixed kaolin, or sulphate of lead, or other salt of lead, to give it the proper colour. If the articles require to be light, little lead ought to be used. Ivory or bone dust may also be mixed with the shellac and the other ingredients. The addition of a small quantity of camphor is recommended in order to favour the combining of the several articles. Any desired colours may also be combined with the mass. Suitable proportions for mixing the component parts are—one part of shellac and two of kaolin, or five parts of the lead salt.

DEATH OF M. LIEBER.—This gentleman died suddenly in Paris a few days since. He was the founder of the *Moniteur de la Photographie* and the *Encyclopédie Photographique*. The great fund of scientific knowledge possessed by M. Lieber caused him to be much consulted and esteemed by authors and literary men.

SOLUTIONS OF IODINE IN WATER AND AQUEOUS SOLUTION OF IODIDE OF POTASSIUM.—Messrs. Dossios and Weith prepared, in the first place, perfectly pure distilled water, and employed pure iodine, free from chlorine, which they dissolved in the water, and which they ascertained to be, by means of volumetrical estimation with hyposulphite of soda, 0·01519173 grm. of iodine in 1000 c.c. of water. They found this quantity of dissolved iodine increased already after two days, and gradually increasing more and more, so much so that, about three months after having been first made, the solution contained nearly twice as much iodine. They ascertained the presence of hydriodic acid, conclusively proving that decomposition of water takes place. The authors also instituted a series of experiments to ascertain whether solutions of iodine in aqueous solutions of iodide of potassium are chemical combinations, or simply mixtures. The result of their experiments is not favourable to the idea that these solutions should be chemical combinations, since it is readily possible to withdraw the iodine from these solutions, not only by simple solvents of iodine, but even by the passing through of a current of air. From some quantitative experiments made with perfectly pure materials, it appears that, at a temperature of 7·9°, and with solutions wherein the quantity of iodide of potassium varies from 1·802 to 12·643 per cent., the quantity of pure iodine thereby dissolved ranges from 1·173 to 12·060 per cent.—*Chemical News*.

THE END OF AN ARTIST.—A painful case of suicide is reported by the *Brighton News*. Mr. John Baldey, an artist, seventy years of age, who seems to have been in dread of poverty, hung himself in a most deliberate and determined manner. At the inquest letters were read. One letter was in the following terms:—"16 St. George's St Augt 23—1869. To the humane—Let my body be taken direct to the receiving house of the parochial cemetery. I wish to be placed in the earth at the least possible expense and inconvenience at the inquest this writing will show that I caused my own death, being at the same time quite serene and composed. I wish my remains to be placed in a dead coffin and when the darkness of night has closed in to be interred in the catholic burial ground the catholics are larger and warmer hearted than protestants. I trust and hope these my wishes may be conceded and fulfill'd.—John Baldey, aged 70 years 35 days."——Another letter was read, in which he said:—"I have long felt should I outlive my means and be reduced to want, I could not have the heart or know how to plead poverty, that state of things has come to pass, with my health and strength utterly prostrate, my heart sinks with despair, as I am unworthy and but little known. I feel I have no claim on society or to be supported by others, the thought of the future has heavily overcome me. I end my days rashly and sadly, do not censure me, but make allowance for the frailties of human nature, consider it to be an act of weakness and want of manly fortitude.—August 23, 1869." Mr. Wm. Hamilton Brown Ross, retired surgeon-major in the Indian army, who examined the body, said:—Although nothing could be more deliberate and determined than the act of suicide, I am of opinion that his mind was so overcharged and thrown off its balance by the dread of approaching inevitable poverty, that he was driven in a moment of despair to put an end to his existence; and therefore, taking all these circumstances into consideration, I am further of opinion that he committed the deed while labouring under an attack of suicidal monomania. I think that suicidal monomania is consistent with his having written the letters which have been read, for it is a peculiarity of that disease to be quite sane on all other points. The jury returned a verdict accordingly.

TONING BATH.—Finding that some are not successful in working our toning formula, we repeat it here more in detail:—

Calcio chloride of gold	1 drachm.
Acetate of soda	½ ,,
Water, pure	5 ounces.
Prepared chalk	5 grains.

To Prepare.—In the morning of the day you require a new toning bath put the gold, the acetate of soda, the chalk, and *only one ounce* of water, into a one-ounce measure, or other small glass dish, and allow it to stand for six hours, with frequent stirring (this is to allow the chalk to act on the gold properly, since, being insoluble in water, if it were not intimately mixed with the gold, and in a strong solution, it would not neutralise, and bleaching would result); at the end of the six hours pour on four ounces of boiling water. When cold, it will be fit for use, and may be used every day for a long period, adding only a small portion of gold, neutralised as directed above, with the chalk. Some operators prefer to mix cold water with the bath, and put into a porcelain evaporating dish *(kept for the purpose only)*, and bring quickly to the boiling point; the plan is excellent, but care must be taken that the boiling is not long continued, a quarter of a minute of boiling being quite sufficient; *be careful not to overheat it.* The secret of success, in our opinion, is to keep the gold solution nearly at its full strength until fully neutralised with the chalk; not to boil too much, and yet to be

sure that it has been heated to the boiling point; and last, never to use the bath until it has stood long enough to become clear, free from yellowness. Lest we should still be misunderstood, we may state that prepared chalk is just carbonate of lime, but, unlike carbonate of soda, is not soluble in water, consequently, it is very difficult to bring it in contact with the gold, if spread through a large quantity of water; hence the need of steeping, if we may so call it, the chalk in the strong gold solution to enable it to neutralise it. About the *yellowness* of a toning bath, it will have been observed that a newly-mixed toning bath is always more or less yellow from the gold solution; remember it is never ready to tone till the yellowness has disappeared. Mealiness in the prints is caused principally by not allowing the chalk to act on the gold long enough. Remedy: a few drops of a solution of carbonate of soda. We have been asked frequently about blisters lately. Double albumen paper blisters more readily than common albumen paper, since the outer film of albumen is not difficult to peel from the under one. Briefly, let us recapitulate the best remedies we know of:—A pure silver bath, of moderate strength, plenty of alcohol in the silver bath. When putting into the first washing water, before toning, place carefully, face down, on the top of the water for a few minutes, to allow the water to soak in from the face, and the air fly out of the back of the paper, then when sunk in the water there is less danger of the film being pushed off by the escaping air. Again, when taken out of the hyposulphate of soda solution put them into the smallest quantity of water that will cover them, even pour a small quantity of hypo. over them, or simply gradually dilute the hypo. bath for a few minutes, moving the prints all the time, till the solution is very weak; allow to lie for five minutes, pour off, and wash as usual. *Caution.*—Never use your silvering dish for anything but holding silver; use your toning bath dish for toning bath only. Use the first washing dish only for washing before toning, and the fixing bath only for hypo.; never use the last washing bath for anything before its time. The least trace of hypo. in any dish, prior to fixing, will ruin all your work—if not at the moment, certainly in a few days. *Stains after fixing.*—When the prints are not moved constantly in the hypo. bath, two prints frequently stick together, and bad fixing is the result; fading and stains succeed. Freedom from fading stains can always be attained by moving the prints frequently in the hypo., and well washing after they are taken out.—*Canadian Journal of Photography.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

A quarter-plate French lens and camera, and half-plate lens by Horne, Thornthwaithe, and Wood, of London, will be exchanged for a sewing machine, by Bartlett, or other good maker.—Address, Mr. Fisher's Assistant, Malton.

An excellent small half-plate or *carte* lens, by Burr, of London, seven-inch focus, is offered in exchange for a whole-plate folding or otherwise portable camera suitable for the waxed-paper process; also, several other lenses will be exchanged for useful photographic articles, and a quantity of miscellaneous but useful numbers, for reference, of The British Journal of Photography, from the years 1861 to 1869, and other useful photographic books.—Address, E. Lockyer, Photographer, &c., Ringwood, Hants.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photographs Registered During the Past Week.—

Lister Lodge, Bolton.—*Five Portraits of the Rev. Canon Powell.*

A. E. Lesage, Dublin.—*Two Portraits of the Lord Chancellor of Ireland.*

J. F. Sutcliff, Burton, Westmoreland.—*Group of H.R.H. the Prince of Wales and Party at Underley Hall.*

☞ *Correspondents should never write on both sides of the paper.*

A Regular Subscriber (Bampton).—By fogging, as applied to transparent positives, is meant the deposition of silver on the parts that ought to be denuded of such deposit.

A Provincial.—Yes; there is to be an exhibition this year at the same time and in the same place as it was last year. You may exhibit although you are not a member of the society.

Hector.—We have never inquired very particularly into the matter, but we believe that the stricter the inquiry that is instituted the more will the evidence establish the fact that Major Russell is the first discoverer.

H. S. L.—Your question is rather too indefinite, hence we only give you a general answer. Spirit of wine will hold in solution nitrate of silver; and oxide of silver dissolves in ammonia. This liquid also dissolves the bromide and other salts of silver.

Rifleman.—An ordinary double concave spectacle glass will answer quite as well as any other kind, and by this designation you may inquire for it.

Amateur (Devonport).—We do not at present remember having seen any of the portraits referred to, but there is no doubt whatever as to the name being printed in by a second operation. If we have an opportunity before next week of seeing any of these pictures, we shall report upon them in our next.

Janitor (Darlington).—We have never had occasion to modify the opinion we expressed on the occasion to which you have referred. There are several places in London where you can obtain methylated alcohol free from the lac with which it is usually mixed. Hughes, Thomas, Rouch, Solomon, Fallowfield, and many others keep it. But it is probable that on inquiry among your local chemists you may obtain all that you will require without having to send such a distance for it.

J. T., Jun. (Redruth).—The composition is not bad, and the expression on the faces is good; but, owing to the want of a "rest," the lady's face is not so sharp as it ought to have been. The print is sadly devoid of brilliance, the toning having been carried too far. The background, too, ought to have been at a greater distance from the figures. If it were better printed, and care were taken to keep certain parts in proper subordination to others, a charming little picture might have been made of it.

Geo. Franklands.—To clean the Daguerreotype, first of all wet the surface, then pour over it some solution of cyanide of potassium, and immediately wash it with water. This reads simple enough, but much care and dexterity is required, because, if the cyanide solution be too weak, it may fail to effect the desired cleaning, and if it be too strong and remain on a second or two longer than is absolutely necessary it will spoil the picture. It is necessary that the final washing be effected with distilled water, otherwise a veil or scum will be visible on the plate when it dries.

Henry B.—The milky appearance is owing to particles of carbonate of silver remaining in suspension in the bath solution. There was no formation of this carbonate at first, because the large amount of free acid in the bath combined with the soda of the carbonate which you added, and thus formed nitrate of soda, which is soluble in water; but, as soon as this excess of acid was placed in combination with the soda, carbonate of silver was formed, which occasioned the milkiness complained of. By continuing to add carbonate of soda all the silver would have been precipitated as a carbonate. In the meantime no harm has been done. Place the bottle containing the solution in the sun for a few hours, shake well up, and at night filter the solution, which will then lie in good working condition. If it show any indication of fogging, a minute portion of nitric acid will effect a cure.

G. B. Conder asks if is theoretically impossible to photograph the moon, enlarge it, and then examine it with a microscope, so that houses, if there are any on the surface of our satellite, may thus be easily seen. This was an old dream with some in the early days of the art-science, but we thought that they had now all wakened up from it. But to reply—it is not theoretically impossible, but, with our means, it is absolutely *practically* impossible To obtain such a photograph, it is necessary that it be taken instantaneously, to obviate the inconvenience that would arise from the librations; it would also have to be taken with a degree of sharpness so absolute as scarcely to be realisable by our imaginations, added to which, the atoms of which the picture is composed must be so very fine as to stand examination under the highest conceivable degree of magnifying power. When these conditions are satisfied, then may we hope to examine the visible structure of the moon in a photograph; but they *cannot* be satisfied, and hence the sooner this kind of dream is dismissed the better it will be for real progress.

Received.—*The Application of Photography to Military Purposes;* by H Baden Pritchard.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2 York street, Covent Garden, London, W.C.

METEOROLOGICAL REPORT,

For the Week ending September 1st, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Aug. 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
26	30·28	83	61	68	74	SE	—	Dull
27	30·34	82	62	68	73	ESE	—	Fine
28	30·19	85	62	68	73	ESE	—	Fine
30	30·25	65	51	55	59	NE	—	Fine
31	30·38	66·5	44	48	56	NE	—	Fine
Sept. 1	30·34	—	45	50	56	NE	—	Dull

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 488. Vol. XVI.—SEPTEMBER 10, 1869.

THE LIGHT EMITTED BY BURNING ZINC.

In the course of last winter some experimentalists turned their attention to the production of a cheap and useful light for photographic purposes, and endeavoured to substitute metallic zinc for the magnesium wire or ribbon previously employed in what are called "magnesium lamps." Zinc, when burning in air, is well known to emit a very beautiful and intense light, which has been long supposed to be very rich in chemically-active rays. It would appear that the combustion of metallic zinc failed to give the desired light; but it was then thought that, when alloyed with magnesium, the ribbon of the alloy which could be produced would not only be greatly cheaper than that of the magnesium, but that the chemical value of the light emitted in the combustion of a compound ribbon of this kind would be very nearly as great as of that afforded by the same weight of the more costly metal.

As the matter has not been yet definitely settled, we were glad to seize an opportunity we lately had, when visiting an extensive zinc-oxide manufactory, of determining the real value of the light emitted by large quantities of burning zinc.

In the works referred to the crude zinc ore — consisting of carbonate of zinc chiefly—is calcined or roasted, and the residue of this treatment is mixed with coal of a very hard anthracitic kind. The mixture is then placed in a furnace of suitable construction, and heated strongly. When the temperature is raised sufficiently, *i.e.*, to nearly a white heat, the zinc distils off, and at this point a blast of air is thrown into the furnace. The zinc immediately takes fire and burns in the stream of air, with the production of a most intense light and clouds of a fine white oxide of zinc. The zinc oxide is carried away through long tubes, on the sides of which the fine white oxide is deposited, and any portions which escape condensation in this way are caught by large flannel bags. This much, however, by the way, as we have really only to deal now with the light emitted during the combustion of the zinc vapour in the current of air.

We obtained a large beam of the zinc light by means of an opening six inches by four in the furnace door, and with this steady and brilliant light we made some experiments, the results of which we shall chiefly content ourselves with stating now.

After the eye had become accustomed to the glare of the furnace, it was easy to see that the colour of the zinc light, even under the most favourable circumstances, was of a distinct greenish-yellow colour and not pure white. On examining the light with the spectroscope it was found that the chief rays emitted by the burning metal were those occupying the red, yellow, and green portions of the spectrum; whereas the blue rays, though present, were of low refrangibility, and the blue light was feeble as compared with the other rays. The extent of the spectrum on the more refrangible side was limited to a point corresponding to about midway between the solar lines F and G.

The results of the spectroscopic examination of the flame led us to expect that the photographic power of the light would be very low, and this was confirmed when we tried the effect of the light on sensitive surfaces. It was found that the exposure required with the zinc light was nearly six times greater than that needed with a single magnesium ribbon, though in the latter case but a few grains of metal were burnt, whereas in the former instance the light employed was that produced in the combustion of several ounces of the metal in a full stream of air.

Though the results of our experiments have been all negative, they at least show that zinc is a metal from which little need be expected as a source of light possessing photographic power; for these experiments were conducted on a scale and under circumstances which can be but rarely secured by the experimentalist, as the working temperature of the furnaces was so high that the zinc oxide, so far from being cooled to any extent, was heated to a point just short of fusion; so that if it were possible for the white powder to emit rays of high refrangibility when intensely heated it would have done so.

The most convenient mode of producing a zinc light on a small scale is one which we suggested long ago. We pass a stream of hydrogen gas over a few drops of zinc-ethyl placed in a tube. The hydrogen takes up some of the vapour of the zinc-ethyl, and issues from a jet into the air. The gas immediately takes fire and burns with a beautiful greenish-white flame, depositing abundant flocks of oxide of zinc.

OXIDE OF ZINC CEMENT AND PLASTER.

The oxide or "zinc white," manufactured as described in the preceding article, is now largely used as a substitute for white lead in the production of the glazed card mounts for *cartes de visite*; but it is also capable of at least one other photographic application which may prove of some value.

It has been long known that oxide of zinc, when made into a paste with a strong solution of the chloride of the same metal, forms a cement which sets very rapidly, and yields a hard white concrete rivalling marble when prepared with care. A slab of this compound can be easily prepared, possessing a fine surface, by pouring the mixture before it sets upon a plate of glass and allowing it to harden. When perfectly set the layer can be removed from the glass, and it then constitutes an even slab of concrete. The material of which the slab is composed is essentially an oxychloride of zinc; therefore, when the surface of the plate is brushed over with a solution of nitrate of silver, chloride of silver and a basic nitrate of zinc are formed. When this operation has been carefully conducted a nearly pure white layer is obtained, which is then in a condition to receive a print in the usual way when exposed under a negative.

The print can be toned with chloride of gold and fixed with hyposulphite without any risk of discolouration, as sulphide of zinc is of a pure white colour. When washed, dried, and coated with a layer of collodion, and then a resinous film or varnish, a very respectable imitation "enamel photograph" can be obtained. The materials required are so very simple and so easily obtained that any of our readers can try the experiments if they purchase a little of the light zinc white used by painters. We need scarcely say that it is not the oxide which has been ground with oil that is intended, nor the carbonate used in medicine, but the white powder as sold by the manu-

facturer. A solution of coloride of zinc can be easily purchased from any druggist, as it is largely employed as a disinfectant; or it may be prepared by dissolving the oxide or metallic zinc in hydrochloric acid. The chloride of zinc solution should not be too concentrated, else it sets too rapidly when mixed with the oxide.

A French chemist, M. Sorel, not only employs the mixture of zinc oxide and chloride as a cement, but uses it as a very quick-drying paint. When employed for this purpose the solution of the chloride must be weak and mixed with oxide to a creamy consistence. When rapidly brushed over the work this "paint" sets and dries in a surprisingly short time.

THE IVORYTYPE.

A FEW weeks ago [*ante* page 406] there appeared a letter from one who signed himself "A Stupid Artist," in which he complained of the difficulty in getting the paper to adhere to the glass in the course of carrying out the manipulations in connection with the process known as the "ivorytype."

This process, we may premise, consists in so treating a paper print that it shall have a close resemblance to an ivory miniature; and we have seen some pictures of this description which, unless closely inspected, could scarcely be distinguished from a painting on ivory.

As we published it in our ALMANAC AND PHOTOGRAPHER'S DAILY COMPANION for 1868 the process stands as follows:—

Select a clear, vigorous print, and, after wetting it, paste it by the margin to a stretcher; it will dry quite tight. Now colour it upon the face with strong colours, as they will afterwards be reduced, especially if transparent colours be employed. Body colours, on the contrary, should be kept subdued. The coloured print is now mounted on a perfectly clean sheet of plate-glass, face downwards, as follows:—Melt bleached pure white wax, and, while hot, pour it upon the glass plate, which is also made and kept hot on a steel or iron plate, or a soapstone slab, under which one or two spirit-lamps are continually burning. While the wax is quite liquid take the print by the ends, spring it in the middle, and lower it gently into the heated wax, carefully pressing from the middle outwards both parts of it down into the wax, and then with a straight-edged paper-folder of ivory or bone, or some similar article suited to the purpose, press and work out all the air-bubbles and superfluous wax. This operation must, of course, be executed while the plate is quite warm. The paper-folder should be carefully rubbed from one extremity of the print to the other without lifting it therefrom or suspending the process, as a mark would thus be left on the picture, which will be thoroughly saturated with wax, and which, if properly handled, will be transparent, smooth, and beautiful. Some artists use a compound of one part gum dammar to eight parts wax, or Canada balsam and wax, or gum elemi and wax, in the proportion of one to eight parts of wax. Others use a larger proportion of the gum varnishes. Finally, the picture is finished by placing it upon its back and firmly sealing to the glass a clean sheet of white paper or cardboard, with a cardboard border or mat between the picture and the paper, and with small lumps of hard wax stuck upon the dark or opaque parts of the picture, so arranged as to keep them about one-sixteenth or one-twentieth of an inch asunder. This distance must be determined by the effect or appearance produced, and regulated by the judgment of the artist, when the picture is ready for the frame. Sometimes a duplicate *tinted* print of the face is placed behind, to give more colour vigour.

An artistic friend, of much experience, has called upon us in reference to the letter which has elicited these remarks, and has put his experience at our disposal for the benefit of all artists, whether "stupid" or not, who meet with any difficulty in practising this beautiful method of finishing photographs.

When using wax alone for effecting the cementation of the picture to the glass, the gentleman to whom we refer found, as in the case of our correspondent, that there *was* a disposition in the print not to adhere; but by adopting the following treatment he never encountered any difficulty whatever:—In a common gallipot he places his wax, adding to it pulverised gum dammar in the proportion of half-a-drachm of the dammar to an ounce of wax. These must be melted and thoroughly mixed, and afterwards be formed into sticks, cakes, or some other convenient shape.

The glass plate to which the picture is to be attached is warmed to a temperature sufficient to thoroughly melt the wax, which is then rubbed over the entire surface. The print is now applied, and a "squeegee" passed all over the back to remove air bubbles and ensure absolute contact. This is seen by inspecting the print through the glass. When cold the print will be found to adhere firmly to the glass.

It is undesirable to exceed to any great extent the proportion of dammar here given, because of the yellow colour it imparts. An effective instrument for pressing the print in contact with the glass is a round rod of wood covered tightly by a suitable piece of India-rubber tube.

By adopting the hints now given it is believed that no further inconvenience or uncertainty will be encountered when practising the "ivorytype process."

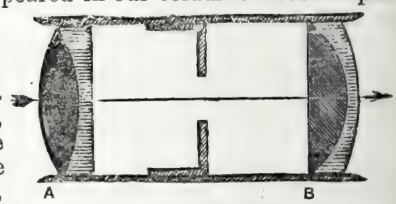
THE LENSES USED IN PHOTOGRAPHY.

CHAPTER VIII.—DOUBLETS AND RECTILINEARS.

IT did not require much prescience or acumen to realise the fact that by the introduction of cemented doublet objectives the downfall of the triple combination would sooner or later be accomplished. It is scarcely too much to say that no lenses have yet been made which, as a class, are capable of accomplishing so much as these cemented compounds. They give sharp definition; they produce pictures free from distortion; they work as "clean" as a single lens; they include either an almost absurdly wide angle of view with well-defined margins, or a very small angle with a very large amount of light. For copying purposes they cannot be surpassed.

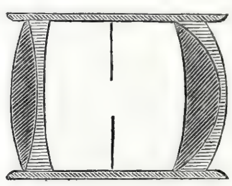
Compared with the triple combinations, as the same results are obtained at a less expenditure of optical means (there being only two lenses instead of three), the reflecting surfaces are fewer and the price lower in a corresponding degree.

The first cemented achromatic combination of which we have any mention was made by the late Mr. Andrew Ross in 1841, for Mr. Henry Collen, at that time a London miniature painter, now a retired gentleman residing at St. Alban's—a fact known to many of our readers, who can bear testimony to the various useful and suggestive communications which have appeared in our columns from his pen

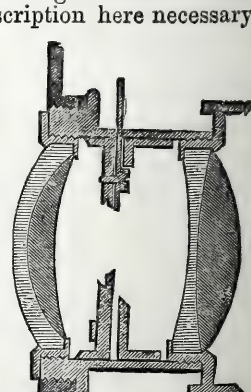


The annexed diagram represents the combination in question. A is the front lens, plano-convex achromatic, and B is a similar lens; but, as will be seen, they are differently corrected, the external convex surface of the back lens belonging to the flint, whereas in the front lens it belongs to the crown, element.

In, we believe, the beginning of 1864, Mr. Grubb, of Dublin, made and sold some double combinations of a character very similar to the one just described, the difference between the two being represented in the accompanying diagram. Mr. Grubb, it is proper to say, was unaware of the existence of Mr. Collen's lens.



About the same time the present Mr. Ross set to work to construct a doublet on the model of the original lens by his father, and his exertions culminated in the production of his celebrated wide-angle doublet—a lens which is too well known to render much description here necessary. It differs from the original doublet in being composed of deeply-curved menisci, and brings to a sharp focus rays of extreme obliquity. The annexed diagram represents the doublet of Mr. Ross. It is an instrument of great value in the hands of a competent artist, in consequence of its embracing an angle of nearly a hundred degrees; but an inexperienced photographer, by using it in season and out of season, will find that qualities which, when rightly used, are of immense value, are apt to be worse than useless, seeing that they may lead to an erroneous idea being entertained concerning a view taken by this lens.



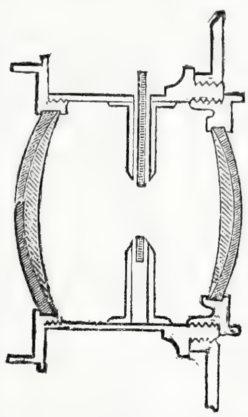
To render the doublet more generally useful, Mr. Ross constructed two other descriptions, viz., one which included a medium angle of view as compared with the "wide" angle, and a third form, still narrower than the preceding, which permits of the employment of an aperture of so much width that instantaneous views may easily be taken by this lens. This latter instrument Mr. Ross calls his "instantaneous doublet." When the smaller-sized stops are used, it includes an angle of the full pictorial width. It differs in

appearance from the combination previously figured, inasmuch as the lenses are farther apart, and are so constructed as to define sharply with a much larger stop.

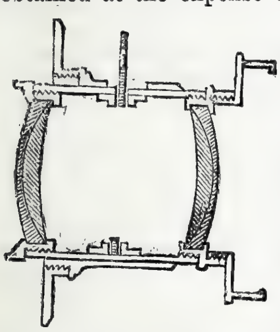
The "instantaneous" doublet is, in our opinion, the most generally valuable lens of the three, because of its rapidity of action when the photographer is satisfied with a normal angle of view; and, further, because, when stopped down, it then includes what every sound artist must consider quite enough of subject in a plate of a given size. The copies of engravings which we have seen executed by this lens conclusively prove that of the various "doublets" manufactured by Mr. Ross this, for the purpose in question, appears to be the best.

Mr. Dallmeyer, in his series of "rectilinear" lenses, has adopted a different kind of front from that employed by others, being similar to the back, which is corrected in the manner seen in the diagram; that is to say, a crown meniscus is cemented by its convex surface to a concavo-convex flint lens—the flint lenses thus occupy the external position in both combinations.

In the "wide-angle" rectilinear Mr. Dallmeyer has made his front lens of larger diameter and longer focus than the back, and hence, to prevent distortion, the stop is placed nearer to the back lens. This objective includes a very wide angle, *i.e.*, nearly a hundred degrees. As regards this great width of angle we have only to re-echo the remark we have already made on this subject: it is a most valuable quality, but only so in the the hands of an artist who has skill and taste to use it aright when surrounded by those circumstances by which its special powers may be evolved.



It is, however, in the construction of the "rapid" rectilinear that Mr. Dallmeyer has shown an appreciative knowledge of the requirements of the photographer; for this lens works without any stop whatever and in one-fourth of the time occupied by its wide-angle brother. This peculiarity is not obtained at the expense of definition, for even with full aperture it is aplanatic. When stopped down it covers an angle sufficiently wide for every purpose. It copies quite as well as the triple and with less exposure, hence we believe that, to the general photographer, especially when employed out-of-doors, it will prove to be the most useful lens that Mr. Dallmeyer has yet introduced, and is capable of doing everything hitherto accomplished by the triple lenses described in a previous chapter.



It has been said that single achromatic combinations give more brilliant landscapes than double combinations. After some careful experiments with both classes of objectives of the very best construction we do not think that there is any warrant in fact for making this statement. When a lens of this type, intended for including the exceedingly wide angle before mentioned (nearly 100°), is employed, with its comparatively almost "pinhole" stop, then it is not to be wondered at if the photograph so obtained be lacking in brilliancy when contrasted with the production of the single lens with its so much wider diaphragm; but when both are put upon an equal footing in this respect, the rapid-acting double combination is undoubtedly the better of the two.

It is fitting that in this chapter we should direct attention to the double-cemented combinations of other countries, although, so far as we can learn, none of them appear to have met with anything approaching the favour in this country that has been bestowed upon our home productions.

First of all we mention the American globe lens. It derived this name from the fact that the external surfaces of its components formed a portion of a sphere. The two lenses were deep menisci, but, from the method of their correction (similar to that in *fig.* 4, page 348), they occasionally produced a flare spot or "ghost" of distressing brightness in the centre of the picture. The angle of view included was greater than that possessed by any other lens at the time of its introduction, but it has since been considerably exceeded by the productions of the makers of our own country.

Darlot, of Paris, has made several very ingenious cemented doublets. His "hemispherical" lens has the deepest back lens that we ever remember to have seen. It is now a considerable period since we examined it, and hence we do not remember its construction sufficiently well to give a diagram of it.

Darlot's cabinet of lenses, which are adapted to one mount, afford some good examples of cemented lenses and the variety that may be obtained by combining, in various ways, the half-dozen lenses which form part of the "fit out" in the cabinet.

Steinheil's aplanatic lens is a doublet similar to Dallmeyer's rapid rectilinear, but, instead of composing it of flint and crown elements, Herr Steinheil has formed it altogether of flint glass, of which two kinds are employed, the dispersive ratio being different, in order to secure achromatism. We have not seen any of these lenses, and hence are unable to say anything concerning them from our own knowledge.

NEW TRANSPARENT PAPERS TO BE SENSITISED IN THE ORDINARY MANNER OF ALBUMENISED PAPERS, BUT WHICH DO NOT REQUIRE TONING.

IN TWO CHAPTERS.—CHAPTER II.

Although I obtained beautiful prints with all the papers that had been rendered transparent by the materials and means I have mentioned in the preceding chapter at page 420, I next tried whether ironing them previous to sensitising—in order to remove the superfluous transparency-producing materials by this means—would make any difference, and I must confess that I was much surprised to find it made a very marked difference.

For instance, the colouration in the pressure-frame of the ironed and non-ironed papers was not the same, and I found a difficulty, almost amounting to an impossibility, in obtaining black tones with the ironed transparent papers; but why it should be so I cannot tell. I only know, from practical experience, that there is a greater difficulty in obtaining any particular tone with the ironed transparent papers than with those that have not been ironed, excepting the brown tones, which the ironed papers more readily assume than the non-ironed papers do. It is rather singular that if the paper be at all singed in ironing it its capability of being sensitised is in a great degree lessened.

Upon taking these ironed transparent papers from the sensitising bath, I found that although the solution did not flow off freely it did not collect in prominent drops upon the surfaces as it did upon the un-ironed papers; but the sensitised surface presented an appearance that I cannot otherwise describe than by saying it looked like a mosaic of minute wet and dry spots. I therefore blotted off the moisture, and dried as before.

In the preparatory chapter, at page 409, I stated that I tried to make a transparent paper, because I thought that certain species of leaves would show well as transparencies. My experiments have therefore been chiefly with the leaves of the *Aucuba japonica* or variegated laurel, as they are easily obtained perfect, exhibiting much diversity in the form of their markings, and also in their size and shape.

These leaves are very thick, and are therefore impervious to feeble rays of light; consequently they require to be printed in bright sunlight. But even then, if the body of the leaves are dark green, they will require a long exposure, as it is absolutely necessary that these transparent papers be printed deeply in order to obtain good results.

I have always considered that the negative prints of most leaves were superior to their positives, in consequence of the strong contrast of their dark backgrounds. It is not so, however, with the transparent prints of the *Aucuba japonica*; for, when they are well printed, the dark positive prints are shown up well by the transparent white of their backgrounds.

To obtain these transparent positive prints in their greatest beauty it is imperatively necessary that they be printed very deep, indeed; in fact, they must be printed deep enough to almost obliterate any appearance of their variegated markings. To procure good purple or black tones in these transparent positives, they must be left in the solution of hyposulphite of soda a considerable time *after* they are perfectly fixed—sometimes for an hour or more. If there be, then, any failure in obtaining these tones, either in the negative or positive prints, the printing has not been deep enough, although, perhaps, carried almost to the verge of obliterating the variegation of the leaves.

I need scarcely say, perhaps, that when a transparent paper is used, a tone that will appear dark by reflected light will not appear so when viewed by transmitted light, viz., as a transparency. Thus it will sometimes happen that we may imagine we have obtained a beautiful print, and therefore be much disappointed to find that, when it is viewed as a transparency, it is a very poor one, being devoid of

vigour and depth of tone, which shows that it has not been printed deep enough.

In printing upon albumenised or other non-transparent paper it is desirable that the prints be on the surface. It is not so, however, with prints upon a transparent paper, for, in this case they should be in the body of the paper, and print *through* it; therefore, for the purpose of negatives—and, perhaps, also for positives—it is better that the paper, previous to its being rendered transparent, should be salted by a solution of any of the chlorides usually employed for that purpose. The paper should, however, be *immersed* in the solution, and remain so for at least five minutes, in order that the chloride may penetrate the texture of the paper.

The prints upon all these transparent papers can be readily gold toned by any of the toning baths in ordinary use. I have toned many of them as a matter of curiosity, but I cannot distinguish the gold-toned prints from those which were untoned, if both were properly done; I consider, therefore, that toning these transparent prints is *unnecessary*. If, however, the toning has been carried too far, so as to produce a cold, slaty blue, the toned print is easily distinguished as such, because this peculiar hue cannot be produced with these transparent prints without employing a gold toning bath; so, likewise, if a transparent print has been left too long in the solution of hyposulphite of soda, a peculiar hue is produced that is easily recognised as not being due to a toning bath, for it cannot be produced by any gold toning solution that I am acquainted with. But the prints which are thus easily distinguished as being toned or not, I consider are bad ones.

Perhaps it may be asked which of the substitutes for the mixture of castor oil and absolute alcohol that I have employed I consider will produce the best effects. This is a question, however, that is easier asked than answered. At one time I preferred the papers which had been rendered transparent by the means of *butter;* then I thought that those which had been rendered transparent by the means of *lard* were better, especially when I had added more chloride to it; then, again, those were both deposed in favour of the papers which had been rendered transparent by the aid of *the fat of uncooked ham;* but those which were rendered so by the aid of *melted chlorided suet* were never preferred, and yet good effects can be produced upon papers prepared by it—in fact, quite as good as those upon the papers prepared by the other materials.

I am still undecided as to which is best to employ, but am inclined to give the preference to *butter*, as the paper is easier rendered transparent by its aid than it is by that of the other materials.

Although these papers were originally only intended for producing transparent prints of leaves, they are admirably adapted for all subjects that are suitable for being viewed as transparencies.

It may, perhaps, be as well to state that all these transparent papers keep well; for, without any especial care being taken of them, they have remained sensitised for three weeks without the slightest discolouration. Beyond this time I have not yet kept them. The ironed papers, however, will often be much discoloured in two days.

It will sometimes be observed that, when the prints have been finally washed and dried, the transparency of the paper has been diminished by its immersion in the salt and water and fixing bath. When this is the case the paper should be rubbed over on both sides with a little of the same material by which it had originally been rendered transparent, or a little lard or butter may be used instead. The prints should then be ironed with a moderately hot iron, between folds of blotting-paper.

As this after-treatment not only restores the original transparency of the paper, but enhances it, perhaps it is as well always to have recourse to it, keeping in mind, however, that the prints must be vigorous ones in order to bear it, as this second application of the transparency-giving materials lowers the tone. GEORGE PRICE.

THE ALBERT PRINTING PROCESS.

THE August number of the *Photographische Correspondenz* contains a letter from Herr L. Schrank, in which he relates the substance of some conversations he had held with a highly intelligent photographer of the north, who stopped at Dresden on his journey homeward, after a lengthened stay at Munich, where he had acquired a practical knowledge of the Alberttype. As there is much related by Herr Schrank which may be interesting to our readers, we venture to transcribe such portions of his letter as appear to have a practical bearing upon this new process of printing by photography.

Observing (says Herr Schrank) that my friend made no reserve on the subject, I ventured to ask him in what consisted the peculiar original discovery of Herr Albert, as it was a matter of fact that the use of salts of chromium as well as gum and gelatine had been long known in photography?

"The advantage," my friend replied, "lies less in the discovery of a new principle or the finding out of any new material than in an improved and perfectly rational appropriation of agents already known. The discovery of Poitevin—that bichromate of potash with gum or gelatine layers, when exposed under a negative and then wetted, absorbed the water in the parts unchanged by the light—had remained so far unfruitful, as the highest effort achieved by it was linear reproduction, as in the processes of Osborne and Asser. The followers of Poitevin require to use the lithographic stone or metal plates as printing surfaces.

"Tessie du Mothay was the first who discarded stone and metal, and substituted gum, gelatine, and isinglass. He finished these layers on a copper plate, heated them, and then by soaking in cold water formed a relief similar to that which Paul Pretsch effected at one time with his galvano-plastic process.

"This method, however, possessed no great capabilities in itself. The whole of the proof sheets worthy of notice, and which the inventor brought before the public at the different exhibitions, were, undoubtedly, beautiful experiments, but Tessiè du Mothay and Marechal gave, in a treatise prepared for the jury of the Paris Exhibition, the number of impressions which one printing plate had delivered as sixty, and they were very frequently fewer. The whole process would have been forgotten ere this if Herr Albert, of Munich, had not enriched it with two important improvements. These are—first, the employment of glass instead of copper plates as a foundation for the printing surfaces; and, secondly, the double layer, without which it would have been impossible to print on glass. These modifications make the process a safe, cheap, and simple one.

"As in the negative process a plate is produced which, during exposure in the camera, registers the variations through more or less transparent tones, so Herr Albert executes a plate which afterwards prints on the paper which is laid upon it. The production of this plate is effected through the influence of light. An accurate judgment is also necessary, so that the plate, when finished, should receive neither too much nor too little exposure.

"Now, the employment of glass for holding the surface of the print allows the operator to watch perfectly the changing of the plate during the exposure, by which, in the first place, that certainty is obtained the want of which renders the dry-plate as well as the carbon process so difficult. This enormous advantage will be at once perceived when it is considered that the various gelatine layers show such different degrees of sensitiveness.

"The negative pictures of most photographers are at the present time executed on absolutely flat plates, and their transfer on to copper or stone presupposes such a polished surface of the latter that the negative and the surface of the print lie close together. There must nowhere be a space between them even the thickness of a sheet of paper, or else there will be a want of sharpness in the picture. But everybody knows the cost and difficulty of producing such surfaces on stone and metal as to do away with all uncertainty as to the exposure. The glass manufacturer, however, delivers these plates at no great cost, and all the work of the photographer, or Alberttypist, is to clean them sufficiently with water or spirits of wine.

"The construction of the printing-press is such that no plates are ever broken, although in Herr Albert's establishment from 120 to 150 prints are made from one plate daily.

"These plates hold with ease eight *cartes de visite* or four cabinet pictures, so that at each turn of the press eight pictures are executed, which require no further treatment. The production of the printing-plates is, however, unlimited, and the same negatives can be printed in twelve presses; it is, therefore, easy to reckon what quantity of pictures can be executed in a single day in such an institution.

"The number of proofs printed up to the present time and sent to all parts of the world is over one hundred thousand of all forms, from *cartes de visite* to *facsimile* plates of Goëthe's gallery at Kaulbach, &c. From negatives received in the morning, in the evening fifty prints can be delivered the same day."

After this description, Herr N. N. unfolded a portfolio of prints, and we considered them minutely, and so earnestly were we engaged that a drop of water, from a glass which I pushed aside, came accidentally on one of the pictures. Before my associate had time to prevent it I had seized a towel to dry the moisture, and unfortunately wiped out the drawing at that part. My perplexity at having injured the beautiful sheet was almost as great as the joy I felt at finding out the Achilles' heel of the new process. Fortunately, the owner had a second copy, printed on mat paper, and my offence was treated very amiably.

"You would be wrong," he said, "from this mishap to draw a conclusion unfavourable to the durability of the Albert prints, for all Alberttypes printed on the usual paper bear moisture exceedingly well; the injured sheet before us is printed on enamelled paper, and this kind is as vulnerable as prints on albumen paper, and should be protected in some manner against wet. Herr Albert has not undertaken to contrive a photograph which can withstand all attacks, but has concentrated his endeavours to check spontaneous bleaching and annihilation of photographs, and to render the multiplication of them easier, so that photography may take a larger share than it has hitherto done commercially amongst the works of art."

"Granted," I replied, "that this process in the future should predominate, do you believe that it will soon displace the present albumen printing in the hands of practical men?"

"That is a difficult question to answer," said my guest, "for there are many things for and many against it."

FORTHCOMING EXHIBITIONS.

It is now time that photographers were bestirring themselves in the preparation of pictures for the forthcoming exhibitions.

While there may be several local exhibitions looming, of which we have as yet no information, there is one in particular to which we invite attention—the exhibition of the London Photographic Society.

This Society, in bygone years, was wont to have a formal exhibition, which, although much spoken of, was but little patronised, and invariably was unremunerative—sometimes to a very serious extent. For the past two years the exhibition has assumed another and a more pleasing, though less formal, character—one of a free and easy kind—and which appears to give more satisfaction to all concerned. The winter session of the Society is now inaugurated, not by the usual business meeting, but by the display of a collection of pictures. Of such an improvised character is this annual exhibition, that the strokes of the hammer which drive the suspensory nails may almost be said to be re-echoing through the building when the members and their friends arrive; but the collection has hitherto been so good that it was wisely determined to prolong the public exhibition of the pictures for a week, in order that photographers and the public might examine at leisure, and free of all charge, the photographic art-treasures thus brought together.

The next exhibition of this kind will be open on the evening of the first meeting of the Photographic Society on the 9th of November next, and, as formerly, the pictures will remain on view for a week. The works exhibited are not confined to the productions of members, but the general photographic public is invited to co-operate, so as to constitute it a representative exhibition of photographic art as it exists at the time.

In addition to this there is also to be an exhibition in connection with the Bengal Photographic Society, but it differs in one respect from that of the London Photographic Society, inasmuch as a somewhat extensive medal award system is attached to it. Those readers who are desirous of being represented in the Bengal exhibition will find in the following all the information that they can desire:—

Programme of the Twelfth Annual Exhibition of the Photographic Society of Bengal. (1869.)

The Exhibition will be opened on Monday, the 13th December, 1869, and closed on Saturday, the 8th January, 1870.

All good photographs will be admitted, whether presented by members of the Society or by any other persons. Photographs taken within the two preceding years will alone be allowed to compete for the undermentioned prizes. Photographs can only be admitted to compete at one exhibition, and prizes will not be accorded to exhibitors who have not made the proofs they exhibit.

The following will be the prizes awarded:—

1. By the Society.
   For the best series of at least six landscapes taken and printed in India—*a gold medal.*
   For the best series of at least six portraits taken and printed in India—*a silver medal.*
   For the second best series of at least six landscapes taken and printed in India—*a silver medal.*
   For the best series of at least six photographs representing scenes of Indian life—*a silver medal.*
   For the best series of at least six proofs made in India by a member of the Society not being a photographer by profession and not having received any other prize at the present Exhibition—*a silver medal.*
   For the best series of at least twelve photographic proofs representing antiquities of India—*a bronze medal.*
   All the above prizes will be reserved exclusively for members of the Society.
2. By his Excellency the Viceroy:—
   For the best photograph in the Exhibition, portrait or landscape, whoever the exhibitor may be—*a gold medal.*
3. By the Lieutenant-Governor of Bengal:—
   For the best series of at least six photographs taken either in India or elsewhere by a member of the Society not being a photographer by profession—*a gold medal.*
4. By the Chairman:—
   For the best series of at least six proofs of young children, whoever the exhibitor may be—*a silver medal.*
5. By the honorary Secretary:—
   For the best series of six landscapes or portraits, taken and printed out of India, for which no other prize shall have been awarded at the present exhibition—*a silver medal.*

The prizes will be given before the opening of the Exhibition according to the decision of three judges nominated by the Society. Such decision to be without appeal.

The proofs intended for exhibition will have to be suitably mounted, and delivered to the Secretary not later than the 26th November, accompanied by a note indicating the subject and the date at which the photograph was made.

Exhibitors must arrange for the removal of their proofs the day after the closing of the Exhibition.

The judges will make choice of two of the photographs for which prizes shall have been awarded to be distributed amongst the members of the Society, and the exhibitors must engage to give the negatives of these proofs to the Society, or to print the number of proofs required for the Committee on reasonable serms.

"PHOTOGRAPHIC WONDERS."

In our number for January 29th of the present year, and as our contribution to a discussion to which we listened, in which was involved the principle of what we shall, as formerly, designate "spiritual photography," we stated certain things which had both a philosophical and a historical bearing upon the subject. From time to time it has been our fate to see the leading ideas of the article in question presented to the public through many other channels, generally the penny weekly and even daily press; but, as one journalist appeared to quote from the other, the farther it wandered from the fountain head the greater became the divergence from the primary statement, on the well-known principle embodied in the story of the "three black crows."

It has been reserved for a writer in *Chambers's Journal* to present the story in a manner so peculiarly wide of the original form, that but for certain unmistakable characteristics it would scarcely have been recognised. We regret the looseness of statement in *Chambers's Journal,* because of the weight which has hitherto been attached to the statements in its articles devoted to the popularising of science.

Previous to quoting the article to which allusion has been made, let us do the writer the justice to say that in his description of Mr. Woodbury's process of printing, which he rightly estimates as a "photographic wonder," he has given its leading features in the fewest possible words consistent with presenting it in a popular guise; and *apropos* of the subject we are glad to find, from a visit paid to the establishment of Mr. Woodbury a few days ago, that the company for carrying out the process is now fairly "afloat," and is already exceedingly busy in the commercial as well as in the technical details incident to working the process.

Annexed is the article from our northern contemporary:—

Surely light never will have revealed all its marvels! Every year, if not every day, it is telling us something which we had not known before, something calculated to excite our surprise and admiration.

Plates can now be engraved, and *are* engraved, for printing without any draughtsman and without any engraver. The thing has been done in more ways than one in past years, by a combination of photography with electrotyping—photography to produce the drawing, electrotype to produce the engraving; but now a method has been devised without any electric or galvanic agency whatever. Chemistry is the engraver, and chemistry in the very simple form of solution or dissolving. The process is not for producing a *sunk* engraving, such as the engraved lines of a steel plate, but a *raised* or *relief* engraving, such as a wood-cut block. Light, dissolution, and pressure: let us see how they respectively do their work.

The photographic picture is taken upon sensitised glass, just as in the ordinary *carte de visite,* producing a negative from which any number of positives may be taken. The picture may be a portrait, a landscape, a group of sculpture, an architectural façade, or what not—anything, provided it assumes the form of a glass negative. The positives obtained from this are not upon sensitised paper, but upon a thin film of gelatine, combined with bichromate of ammonia. When light has been allowed to pass for a sufficient length of time through the negative to the positive, it shows its action in a peculiar way on the film; wherever

the light is the strongest (as in the high lights of the picture), the film is rendered insoluble; wherever it is the weakest (as in the shadows), the film remains easily soluble; wherever it is intermediate (as in the half-tints), the gelatine becomes partially soluble. It is the bichromate of ammonia that renders the gelatine susceptible to these peculiar varieties of effect. We may add that the electric light now furnishes a wonderful aid in taking the positives, rendering the photographer independent of times and seasons, day and night, bright days and dull days.

We have, then, a positive picture, taken upon a film of gelatine containing bichromate of ammonia. This film being next placed in warm water, the substance dissolves away in the unequal degree just intimated; it becomes thinner in the parts least acted on by the light; the parts most acted on are scarcely dissolved at all; while the medium degrees of action produce medium degrees of dissolving or thinning. What is the result? The film has become a sort of *bas-relief;* there is a picture of raised parts and depressed parts, owing to variations in the thickness of the film; and these variations are so beautifully graduated as to produce all the tints and half-tints from high lights to deep shadows.

The pressure, which next ensues, is not the least curious part of the operation. It seems scarcely conceivable that a thin film of gelatine will act as a mould to impress its inequalities upon a plate of metal; yet such it certainly does. A beautifully smooth metal sheet is prepared, consisting of lead alloyed with a little antimony; the alloy is nearly (but not quite) the same as stereotype metal; it has a nicely determined degree of hardness (or softness, whichever we like to call it), settled after a number of experimental trials. The gelatine film is placed upon the lead plate, and the two between two steel plates; the group is placed in a hydraulic press, where an intense pressure is brought to bear upon it. This pressure amounts to as much as forty tons, even for a small picture, and rises to 200 tons (nearly half-a-million pounds) when the dimensions are large. We might suppose that this overwhelming force would crush the delicate film into undistinguishable fragments. Nothing of the kind. The protuberances or raised parts press themselves bodily into the surface of the lead, producing a sunken or *intaglio* effect in all the places where the film presents a raised or *cameo* effect, and *vice versâ*. It is wonderful to see how perfect is this action upon the plate, the picture appearing almost as if the graver had produced it. And it is scarcely less wonderful that the thin film of gelatine will bear twenty or thirty of these pressures, transferring its picture to twenty or thirty plates, before being worn out.

Lastly, comes the printing. If the lead plate were inked in the ordinary way with inking rollers, and passed through an ordinary printing press, the print obtained would consist simply of masses of black and white, without any gradations or half-tints whatever; this would result naturally from the peculiar mode in which the plate is prepared. An ink or colour is, however, got ready, consisting of water and gelatine mixed with some kind of pigment or paint. This ink, instead of being lightly applied by means of a roller, is poured as a liquid all over the plate; a sheet of paper is placed upon it; a light pressure is applied, sufficient to squeeze out all the superfluous ink; and the paper is allowed thus to remain until the gelatine in the ink has "set," or slightly solidified. The print, when removed, is dipped in a fixing bath, which renders the ink permanent.

Such is Mr. Woodbury's photo-relief process. We have seen it all in operation, and have seen the resulting prints; and certainly the prints present a remarkable resemblance to photographs in their beautiful gradations of tone; the pictures can be produced in any shade of any colour, and all the copies of the same film correspond in tone. The commercial capabilities of the system we do not touch upon; they involve considerations to which only printers and publishers can do justice.

Another curiosity in recent photographic art is an accident, not a design—a peculiarity in the camera-lens, not a purposed mode of producing negatives and positives. A photographer, taking a photograph with a particular lens, detected in it not only the usual portrait of the sitter, but, at some little distance, a copy, phantom, ghost, or double of it—producing what was certainly a startling effect, and one not likely to be very pleasant to the sitter, especially if of a superstitious turn of mind. Fortunately, science came in, and left no room for the creations of marvel-mongers. At a meeting of the Photographic Society, it was shown that these phantoms (if we may so call them) present two different varieties, and spring from two different causes. 1. A photographic image is sometimes so deeply impressed in the glass of the negative by the action of light that the subsequent cleaning of the glass plate, even with strong acids, will not completely remove the picture. When such a plate is used for receiving another picture, the original image faintly makes its reappearance. In this case the phantom is not the "double" or "fetch" of the sitter in the second picture; it is a very faint photograph of one person on the same plate which contains a fully-developed photograph of some other person; and the juxtaposition may, perchance or designedly, produce very startling Pepper-like ghost effects. 2. When a lens has inequalities in its substance, due to an imperfect process of annealing, or when it is subjected to unequal pressure in different parts, it acquires the property called double refraction—two images of the same object being produced by it at the same instant. This explains the production of the double or fetch phantom. An English photographer found out this matter accidentally. When he took a *carte-de-visite* portrait with a particular lens, there could be seen not only the portrait of the sitter in the usual way, but, at some little distance, another and a fainter image—a second portrait of the same person,

In both these cases the Photographic Society set the matter right by showing that, in the first instance, the negative glass retained a faint image of a former picture; and that, in the second instance, the lens glass was subject to the influence of double refraction. Thus, two ghosts have been "laid," and rational explanations given of seeming mysteries. It was not always so. The reader will probably recollect a little incident some half-dozen years ago, in which a photographic curiosity, instead of being honestly explained on scientific data, was made instrumental to a trading dodge. An announcement appeared in some of the American journals to the effect that a photographer took his own portrait, no one else being present in the room; that, besides his own form, there appeared on the picture the image of a young girl twelve or thirteen years old; and that this image was the portrait of a cousin of his, who had been dead several years. The young lady appeared to be sitting in the same chair as the photographer himself, as a sort of "dissolving view." The outline of the upper part of her body was well defined, though dim and shadowy; the chair was distinctly seen through the body and arms, as also was the table, upon which one arm rested; below the waist (which was apparently attired in a dress with low neck and short sleeves), the image faded away in a dim mist, which simply clouded the lower part of the picture. Now, it has been clearly ascertained that all this would really occur under certain conditions. If the glass negative had been already used for a portrait of the young lady, and if it had been insufficiently cleaned before the second application in the camera, precisely such a double picture might result—the fully-developed portrait of the photographer being superposed, as it were, on a faint portrait of the young girl. All this is curious and instructive; but it led at the time to a traffic in "spirit photographs." Wonderful pictures appeared in great variety in the United States, each presenting a faint portrait in addition to one more fully developed; and there was usually some one ready to declare that the phantom was a portrait of a deceased relative of the sitter. The various journals devoted to spiritual literature were in great excitement on the subject. Certain tricky dealers got up packets for the London market, consisting of three of these spiritual couplets; the purchaser was not allowed to see them until he had paid three-and-sixpence for the packet; and when he *did* see them, the fraud was at once detected by any experienced photographer as an example of a negative plate used twice over. One photographer, we are told, had a negative glass which would persist in showing a faint portrait of the Prince Consort, let him rub and wash as much as he might. Another found that the portrait of a lady contained a faint impression or ghost of the print on a piece of newspaper, in which the glass negative had been wrapped. We may add that the Stereoscopic Company produce very striking examples of phantom or ghost photographs, but this is quite fair; the pictures are sold for what they really are, optical curiosities, and not as (so-called) spirit manifestations.

PHOTOGRAPHIC SOCIETIES: THEIR OFFICERS.

That a large amount of the success and usefulness of photographic societies is dependent upon the fitness and willingness of the officers for the performance of the duties imposed upon them is a fact of which there can be but little doubt. The duties devolving upon such officers are not, as sometimes seems to be imagined, of a merely nominal nature. A meeting, to be conducted in an orderly manner, must have some one to preside over it. Call that some one by what name you will—and "president" is surely as much to the point as any—he has something to do, which something requires ability of its kind. Whether that ability be usual or unusual in character, small or large in extent, like every other variety of ability, it is not possessed in an equally available degree by all, and, for the occupation of the post in which it is required, some are, therefore, on the score of ability alone, much to be preferred to others. Apart from the possession of the necessary ability, the willingness to utilise it for the special purpose in view is certainly quite as necessary also.

Limited liability companies, desirous of procuring an advance of money from the public, generally make use of a number of high-sounding names in the prospectus, in order to attract to themselves those whose proximity they desire, it having been found that names of "length and thundering sound" act upon the average human mind much as the "gaudy candle's flame" acts upon that of the "giddy insect." In many of these instances the names are little more than an empty breath, and the beauty discovered in them is but too often like the *Fata Morgana*—"a phantom which distance creates and contiguity destroys."

"The tinkling of a name" is frequently used to augment the numbers of a photographic society. That the "tinkling" does attract members is, no doubt, a fact; that a society is permanently benefited thereby is a question. True enough, when we read in connection with a photographic society that its president is a member of the Royal Family, or my Lord Such-an-one, or his Grace the Duke of So-and-so, there is at least a momentary and instinctive feeling that we should

like to attend its meetings, and see with what dignity the proceedings are conducted under such an august presidency. When, however, we read in the photographic journals that my lord the president has never been in the society's rooms, or that his grace of the chair has been unavoidably absent from all their meetings for the last nine years, those of us who are of anything like a practical turn of mind are apt to forget ourselves so far as to wonder why on earth his lordship was ever made president, or his grace invited to "fill the chair." In cases of the kind mentioned—and for them the writer has not entirely drawn upon his imagination—the presidency over any individual meeting devolves upon one or other of those to whom have been allotted the vice-chairs.

If a movable or circulating presidency be found more useful than a fixed one by all means let it be movable, but for the sake of consistency abandon the merely nominal title which would make it appear otherwise. If, on the other hand, as the writer believes, an individual presidency is more to be desired, for the sake of usefulness, let a man be chosen for the chair who takes an interest in the proceedings of the society, and would be careful to preside when he has a convenient opportunity; and let his opportunity for doing so upon at all events one-half of the in-door meetings be a *sine quâ non* to his occupation of the chair. When he is unavoidably absent, as the best and most willing of men at times may be, it is undoubtedly necessary to be provided with a more or less efficient substitute, and for this purpose the election of a sufficient number of "vices," is to be desired; but each of these should be chosen not because he is considered "a very jolly fellow," but because, compared with other members of the society, he possesses in some conspicuous degree the qualifications necessary to be found in the occupant of the presidential chair. These, the writer takes it, are—a physique which commands attention, a bearing which inspires respect, a voice which will reach his audience, an order of mind which will enable him to systematise the proceedings, a vigour of intellect which will enable him to appreciate them, and an ease of manner which inspires the conviction that he is thoroughly at home in his position, together with as great an absence of personal feeling as it is possible to obtain.

Such a man is not easily or everywhere to be found, but to the credit of the clerical part of the community, be it said, they have furnished several such men as presidents of photographic societies; and though, as a rule, the writer considers discussion upon individuals, whether to their praise or blame, to be an eminently undesirable procedure, he thinks he may venture to observe, without injustice and without offence, that the Manchester Photographic Society is fortunate in the possession of a president possessing to a considerable extent the qualifications enumerated as desirable in a society's leading man.

Of the council of a photographic society, whose official duties, the writer takes it, are to discuss and arrange amongst themselves the financial, the useful, and the entertaining proceedings of the general body, the members should be chosen rather for the possession, as evidenced, of business tact, of sound judgment, or scientific culture, than for a merely genial disposition. Of these genuine qualifications the writer has but a very indifferent share; and the honour which was conferred upon him by a seat in the council of the society of which he was once a member was probably owing to the possession at the time of a characteristic agreeably differing from the "incompatibility of disposition" suddenly discovered in him upon his venturing to criticise the proceedings which he failed to appreciate and could not amend. In saying that members of the council should be chosen for their fitness he does not wish to intimate that the Manchester or any other society is in the habit of blundering in the election of its officers. He merely wishes to call attention to the fact, easily overlooked, that the election of a member of a council for the possession of an agreeable disposition does not ensure the possession of deliberative ability, which, in this particular instance, is eminently "the one thing needful."

The position of secretary is one which, though mentioned last, is obviously one by no means deficient in importance. A bold and elegant style of handwriting, together with a knowledge of the stereotyped forms of business letters, though very useful in one having numerous business communications to make, are qualifications of a very different order from those required of the reporter for a journal. The writer is of opinion that the two sets of qualifications are so different as to scarcely run hand in hand, and should hardly be looked for in the same individual; moreover, if his own experiences are anything to judge by, he would think the double duties of reporter and correspondent are rather more numerous than can reasonably be expected one unpaid man should perform satisfactorily. Secretaries ambitious to please the society which they serve may imagine themselves in possession of more ability than they really have, and may protest that they can very easily do everything which is required of them. It does not follow, however, that their double duties are any the better performed on that account, and when any portion of them is neglected, however willing the official may be, it is a matter to be met with regret for the deficiency as well as satisfaction for the willingness.

The duty of a society's reporter is, in the writer's estimation, one of too much importance to be left to the peradventure qualifications of an untried though, perhaps, willing amateur, and should, he thinks, in every society aspiring to real usefulness, be performed by a paid and competent individual. Some of his own amateur attempts, though they have met with the approval of a small circle of individual acquaintances, (and whose would not?), are far too faulty to be tolerated for a regular thing by any steady-going scientific body, as he neither possesses nor professes the whole of the abilities which should be found in the reporter of the proceedings of a scientific meeting. The cost of efficient services in this line is not so great as to form any expense to a society to be compared with the lassitude induced when the duty is improperly done. There are many amongst photographers who will, doubtless, laugh at the idea that there is anything in reporting which a schoolboy could not perform, and there may be secretaries who would boast of their ability to perform with ease the duties of a reporter, but who could not, if called upon to substantiate their claims, point to a single satisfactory report they have ever produced, or a single printed specimen of respectable composition. Just as vituperation is not argument, so complacency is not efficiency, and, though the post of secretary may be voted to, or accepted by, anyone who writes an elegant hand, it does not follow that any schoolboy is, therefore, in a position to perform effectively the functions of so important an office amongst those of photographic societies.

D. Winstanley.

Contemporary Press.

THE "PRETTY" PHOTOGRAPH OF ARCHDEACON DENISON.

[Daily Telegraph.]

"Dear mamma, how pretty he is!" By whom were these words spoken?—of whom?—and to whom? You might guess the country round before you would hit upon the true answers. Each of us knows, of course, one individual of whom such words might be spoken with truth and propriety. Children are so intelligent! They see straight into things, and are not, like grown people, prevented by a thousand considerations from speaking their thoughts out plainly. There are too many instances on record in which "terrible" children have been known to utter terrible truths; *teste* the astonished Tomkins who, on entering, heard the little girl exclaim, "La! dear mamma, you always *have* said that Mr. Tomkins is very ugly!" How, then, can the intelligence or sincerity of the child be doubted when, struck all of a heap, as one may say, with the beauty of a photograph, she bursts out with the flattering words, "Dear mamma, how pretty he is!" Have not all men's photographs been taken with a sentimental expression for their sweethearts, with a devoted expression for their mothers, with a jovial expression for their friends? Have they not been represented in boating costume?—in military, naval, clerical, legal, academical costumes?—with different expressions of loveliness, to meet what is called the "exigencies of the situation?" Let any honest man who has been photographed put his hand upon his heart, and ask himself if he has ever been thoroughly satisfied with the result. "Why, of course it's like, you know; but it is a disagreeable likeness—that is all the sun *can* do!" We speak of the photograph as it is drawn from the dark little box, not such as it appears when it has been glorified by the intelligent lady who occupies the two pair back in the establishment—she and her little box of paints. Then we are satisfied; then the lips relax into a smile which would have been very telling could it have been summoned up at the right moment, when we were smirking or glaring at the photographer's bull's-eye.

"Dear mamma, how pretty he is!" We might, of course, keep the public dancing down half-a-column with guesses at who the pretty man could be; but we scorn the rhetorical artifice. The pretty man is the Venerable Archdeacon Denison. We have his own word for it. He told his audience, at the harvest home at East Brent, all about it the other day. He had been asked, and no wonder, for his photograph; and, accordingly, he had caused two to be "done." They say the sun can tell no lies; but certainly it tells two very different stories. In one of the photographs the Archdeacon was made to look like a man of sixty-three winters, as he really was; in the other he came out a good-looking, youthful Archdeacon of thirty-five summers. The two photographs were taken in the same hour; so that, probably, there was no great difference of atmospheric conditions. When the Archdeacon's family saw the first, they said, "How could you suffer such a face as this to come out?" They were veracious people.

The second photograph—that one of the glorified Churchman—he sent to a little girl, the daughter of a former curate. Mr. Archdeacon, this was very sly of you! No sooner had little Miss Fowler—the young lady in question—glanced at the magnificent work of art, than she enthusiastically cried out, "Dear mamma, how pretty he is!" Remember, it was a child who spoke. She saw only the lovliness; she—curate's daughter as she was—did not take time to reflect that she had in her hands the likeness of a man equal on occasion to archdiaconal functions. No doubt, the Archdeacon was dressed in archdiaconal costume, ready, as one may say, to enter on his duties at a moment's notice. The photograph should have inspired in the child something of awe; her recognition of beauty should have been tempered with veneration. Miss Fowler, however, did so express herself, and the heart of the Archdeacon was lifted up within him. There was for the moment, in his heart, what

theologians call "a naughty superfluity" of vain emotion. It was not, however, destined to be long-lived. In the elation of his spirit the venerable gentleman posted off to a lady of his acquaintance in order that he might unburden his mind of the little story of Miss Fowler and the archdiaconal photograph No. 2. The lady "with that kindly sarcasm which the sex know so well how to employ, and for which they could not be called to account"—was the Archdeacon thinking of excommunicating her?—said, "It was a very long time since she saw you." How disagreeable some people can be! Miss Fowler never said the photograph was like. If the Archdeacon had taken the photograph to her, that would have been quite another matter. Surely, in fair construction, what the young lady meant was that the original of that entrancing photograph before her was "pretty." It was not for Miss Fowler to judge whether the sun had done his work well or not. She, indeed, was bound to suppose that the likeness was correct. Was it for a young lady of her age and inexperience to throw doubts, or even to cast a shade, upon the sun? That photograph is a correct likeness of a man—we ask pardon—of an Archdeacon. That photograph is pretty, therefore the Archdeacon is pretty. Such, no doubt, was Miss Fowler's reasoning; and she was justified in her conclusion. Mrs. Three Stars treated the case as though Miss Fowler had spoken of the Archdeacon actually present. Miss Fowler was speaking of the photograph. To tell the simple truth, if Mrs. Three Stars made a mistake, we suspect it was a wilful one. She was "taking a rise" out of the Archdeacon—that such words should ever appear in print! She saw that her venerable friend was unduly puffed up. The sweet poison of Miss Fowler's praise had told upon his heart. It was her duty to bring him down a peg or two. She did her duty.

Our Editorial Table.

Abolition of Patents. London: Longmans & Co.

We have already expressed our opinion about patents, and the impolicy of entirely doing away with them. It affords us pleasure to allow the opposite view to be fairly and fully stated, so that our readers, having heard both sides, may be in a position to judge between them.

Mr. Macfie, as we have previously stated, defends with great ability the total abolition of patent laws, and, from the work before us, which embodies his own and other speeches before Parliament, and papers on the same subject, we proceed to select the most powerful arguments in favour of the abolition which we can find. We firmly believe, however, in the numerous advantages arising from our patent system, but we are by no means blind to the defects of that system as it exists at the present time.

It is well known that in order to procure a patent for almost *anything* at the present day in this country a certain amount of impudence, a little ready cash, and a smattering of that particular kind of knowledge which we shall designate "analogue-ing" are all that is required.

We know of several patents which differ from each other—not in matters of principle, but only in such trivial details as the particular kind of metal of which the instrument is to be formed. A special instrument is invented, and is made in brass. No sooner is the specification published than one of the numerous persons who are on the watch for something new immediately takes out a patent for the same instrument made in German silver, and a third follows suit with some other metal.

It is very sad that such disgraceful proceedings or abuses are allowed to take place or exist in connection with the Patent-office; but so it is. They cannot, however, be held as objections to the system, but only to the manner in which the system is carried out. Reform is much wanted in our patent system—not revolution.

The method proposed for reimbursing inventors is by reward, by donation, or by *honorarium*. The following is the scheme proposed by Mr. Macfie to supersede that at present in use:—

"*New System of Rewarding Inventors and Promoting the Publication of Inventions.*

"1. The Patent-office to be turned into an office for recording inventions.

"2. (Forms for specifications to be furnished gratuitously).

"All specifications to contain a certificate that the inventions promise to be useful, and are believed to be new, from three persons familiar with the trade chiefly concerned; one of whom, if the inventor is an *employé*, to be his employer.

"3. These specifications to be registered.

"4. Any time after an invention has been tried and proved practically useful—a fact to be duly certified—the inventor to be allowed to claim that the invention shall be reported on.

"5. A Chief Commissioner for Inventions shall appoint one or more examiners for this purpose, whose duty it shall be (after, if needful, first visiting the scene of operations, and conferring with practical manufacturers) to recommend, if they think it worthy, classification for a reward, prize, or certificate of merit.

"6. Once a-year the head of the Invention-office, with the help of an adjudicatory committee, who shall form an invention commission, shall classify the several inventions that have been in the previous twelve months certified as having been for the first time brought into beneficial use.

"7. In this classification the first rank shall entitle to a reward of £10,000; 2nd, £5,000; 3rd, £1,000; 4th, £500; 5th, £100; 6th, £50; 7th, gold medal, or value in money; 8th, silver medal, or ditto; 9th, bronze medal, or ditto; 10th, certificate of merit.

"8. Parliament shall annually place at the disposal of the invention commission £200,000, from which shall be defrayed the expenses of the staff, and fees to 'reporters,' as well as of the several publications showing the progress of invention that shall (as now, but on an improved system) be issued; the balance to be distributed in rewards and prizes, with an understanding, however, that the amount must be reduced if the total awards of the commission shall exceed the money at its disposal.

"9. In appointing commissioners Government shall consult the various trading interests of the nation in order to select the most acceptable persons. Inventors collectively might have a veto or the initiative.

"10. The prizes may be divided between the originator of the idea of any invention and the successful introducer into practical use.

"11. Where there are rival claiments, the expense of deciding priority in respect of time and merit to be borne by themselves.

"12. The commission to be at liberty to correspond with foreign nations, and act in concert with any that shall establish instead of patents a system of rewards.

"13. In cases in which pre-eminent merit, especially if there has been a course of costly experiments antecedent, appears to entitle to a reward greater than the largest in the schedule, Government may propose to Parliament special augmentations. I do not presume to recommend Royal decorations and titles, though such honours would be much valued.

"A writer on *Patents* has judiciously said:—

"'It would seem very desirable that a system of registration for all improvements or ideas which an inventor may think of minor importance should be instituted, whereby anyone could, at a moderate cost to defray expenses, deposit at the Patent-office a description of any new idea, improvement, or invention.'

"My scheme is calculated to answer this good end."

On the subject of invention and copyright Sir Roundell Palmer makes some observations, from which we extract the following:—

"Invention and discovery were essentially unlike copyright. Copyright applied to a creation. A man wrote a book; he thus brought into existence something which had no existence in the nature of things before. The rest of the world were not in the race with him to write that particular book. But in the case of inventions and discoveries, the facts with which they were concerned lay in nature itself, and all mankind who were engaged in pursuits which gave them an interest in the investigation for practical purposes of the laws of nature had an equal right of access to the knowledge of those laws, and might be equally in the track for obtaining it. All who were engaged in particular arts and manufactures were actually upon the track which led to the discovery of the useful application of those laws; and the knowledge of them was the common stock and property of all mankind who were equally in pursuit of it. He could not allow that the man who was first in the race of discovery could claim for fourteen years, or any other term, an exclusive property in a portion of the common stock of knowledge which was accessible to all who used the proper means of discovering it. It could not be said that on any considerations except those of public advantage and expediency the man who made the first discovery of a law of nature, or the right mode of applying it, had an exclusive right to apply that discovery for a certain period. It was said, however, that patents were useful to the public, either as stimulating invention, or as insuring the publication of useful discoveries; and he did not venture to say that the time might not have been when they answered both of those purposes. Bounties and premiums might be adapted to a rude state of the arts, and an early stage in the progress of commerce; but when a nation had reached so high a degree of progress in all ingenious arts and discoveries and in trade and commerce as we had, he thought that in this department, as well as in others, the system of bounties and premiums was much more likely to be mischievous than useful."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 15th......	Edinburgh....................	Hall, 5, St. Andrew-square.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual meeting of the Association was held on Tuesday evening, the 31st ult., at the Free Public Library,—the President, Mr. O. R. Greene, in the chair.

The minutes of the previous meeting, and also the resignation of Mr. C. S. Dean, were read and confirmed.

Messrs. Roberts and Dod gave an account of the late excursion to Llangollen. Mr. Dod showed some 10 × 8 views taken on the occasion. They were on collodio-bromide plates, mostly with a tannin preservative; two of the best, however, were collodio-bromide, without any subsequent preservative, but containing two grains of resin to one and a-half ounce of collodion.

The President remarked that several years ago he had recommended the adoption of this plan, but had not been able to experiment.

In the discussion which ensued, Mr. Wilson recommended the addition of a few drops of glycerine also to the collodion, as tending to keep the film more open and non-repellent to the developer. It was afterwards elicited that the resin plates could not be depended upon for keeping, and it was decided that further experiments should be made.

The presentation print, and also the one offered by Messrs. Robinson and Cherrill for the best instantaneous picture, were exhibited, and were much admired.

The paper promised for the evening was not forthcoming, and this led Mr. Wilson to remark upon the laxity of members in the matter of papers.

The subject of another excursion was also mooted, but no decision being arrived at, the matter was left to a sub-committee.

The question-box contained an inquiry as to whether a large proportion of cotton in the collodion tended to produce density, and, in the discussion which followed, the general opinion was that the haloid salts and age of the collodion had chiefly to do with the density of the resulting picture.

Mr. Mawdsley thought that with a large proportion of pyroxyline less density resulted, unless the proportion of salts were increased.

Mr. Wilson complained that, lately, all his plates prepared with an albumen substratum had been subject to blistering, and he suggested gelatine, with or without albumen previously applied.

Mr. Phipps spoke in the same strain. He found that gum in the tannin increased the evil.

Mr. Henderson, though using an albumen substratum and gum with the tannin, said that he never met with blisters, and considered the difference in temperature and hygrometrical conditions under which the preparation and development of the plates took place might influence their formation.

Mr. Wilson explained that the albumen was thoroughly dried by heat before the collodion was applied. It was thought that subsequent dampness might be the cause, but no solution of the difficulty was propounded.

Mr. Murray exhibited views taken at Kendal and Hawarden during excursions of the Liverpool Field Naturalists' Society. Some charming stereo. transparencies were shown by Mr. Roberts, as were also prints by Messrs. Greene, Wilson, Hayes, and Dod.

Mr. Watling exhibited some excellent prints on "Durand's sensitised paper," but complained of the time taken in toning.

Mr. Greene said the latter fault did not now exist. He liked the paper, found it to keep, and to render the half-tones well.

The meeting was shortly afterwards adjourned.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A meeting of this Society was held on the 8th ult.,—M. Davanne in the chair.

Mr. Thomas Sutton presented to the Society a pamphlet which he had just published, entitled *Description of a New Instantaneous Wet Collodion Process.*

The Society thanked Mr. Sutton.

M. Borlinetto presented to the Society a copy of his *General Treatise on Photography.* This work, edited in Italian, formed part of the publications of the Society for the Encouragement of the Sciences at Padua.

M. Montagna forwarded to the Society a pamphlet which he had just published on his carbon process; he also announced that he had offered a silver medal to competitors for the best carbon proof by his process. According to the programme, positive proofs of 10m. × 12m. were to be addressed to M. Montagna, at Mesagne (Lecce), *via* Borgo-Nuova, accompanied by the negative used for printing them. These proofs are to be placed under cover without giving the name of the owner, but with a motto corresponding with that on a sealed envelope containing the name of the competitor.

The Society thanked MM. Borlinetto and Montagna.

The following letter was read from the Secretary of the Bengal Photographic Society:—"I have the honour to forward you the Journal of our Society, at page 44 of which you will find the instructions for our next Exhibition. I shall be much obliged if you will inform your members of our intentions, and beg them to be good enough to send us photographs, and to state, at the same time, whether or not they wish the photographs to be sold after the Exhibition.—I have the honour to be," &c.

The meeting passed a vote of thanks to the Photographic Society of Bengal for its Journal, and agreed to exchange their monthly *Bulletin* for the same, and to insert in the *Bulletin* the programme of the Photographic Exhibition at Calcutta.

M. Marion presented to the Society M. Leon Vidal's photometer for the printing of carbon proofs. M. Marion's presentation included a detailed description of the instrument and necessary instructions for using it, which formed part of a pamphlet he has published under the title of *Initiatory Catalogue.*

The Society thanked M. Marion.

M. Mauvillin exhibited an apparatus which allows photographic images to be seen while changing their aspect. This apparatus is a kind of box similar to a stereoscope; a special lens turned by clockwork action diminishes or increases each part of the image in succession, forming the most strange metamorphoses. When applied to portraits this instrument produces caricatures, while at the same time it retains a perfect resemblance of the physiognomy; but under certain circumstances, particularly in sea views, these successive deformations sensibly reproduce the movement of waves. The lens is worked in the following manner:—The first surface of this glass is cut into three curves or segments of a cylinder (convexo-concave). The segment of the centre is convex, and accords with two other segments which are parallel to it, but concave, and of the same focus. The second surface has the same curves, only placed in opposition to the axis—that is to say, crossing those of the first surface. By this rectilinear crossing of cylindrical segments upon two surfaces opposed to each other, a glass or lens is obtained which has nine different convexo-concave centres, one in accordance with the other—each centre increasing or diminishing the parts of the image which are observed, and thus producing the most remarkable effects.

M. Mauvillin presented two other pieces of apparatus—one called a "stereorama," consisting of a stereoscopic box smaller than the ordinary stereoscope, in which, by means of a button movement, a whole series of proofs can be unrolled. The other, to which he gave the name of "muriatrope," was formed of a circular glass plate bearing several concentric ranges of microscopic proofs. This plate, by a clockwork movement, presented the proofs in succession before a strong magnifying glass. The whole of the apparatus may be easily made in the shape of a medallion. The specimen presented by M. Mauvillin contained about one hundred and fifty different proofs. One of the greatest difficulties in the construction of this photographic plaything is certainly that of obtaining on the same flat surface a series of proofs so very numerous and with all the desired perfection.

The Society having examined M. Mauvillin's apparatus thanked him for his presentations.

M. Davanne read the following observations upon the numerous applications of an aqueous solution of iodine in photography:—This reacting agent, which I have already frequently mentioned as being adapted to replace either the cyanide of potassium or the alcoholic tincture of iodine, can be applied to such various uses in photography that I have thought it might be desirable to call the attention of the Society again to its employment. The solution of iodine in alcohol (tincture of iodine) has, in its application, many inconveniences which are attributable to the dissolvent alcohol, which is very high in price, and which does not readily serve all the purposes required of it. An aqueous solution of iodine would be preferable; but this body is so little soluble that seven litres of water are required to dissolve a single gramme of it, and in this diluted state it would have no appreciable effect. This defect is remedied by adding to the water, in the first instance, iodide of potassium, which singularly facilitates the solution of iodine. The following is the composition of the liquid I employ:—

Water	1 litre.
Iodide of potassium	20 grammes.
Iodine	15 ,,

When thus concentrated it is frequently necessary to add water, more or less in quantity according to circumstances. If we were to take one by one all the operations of photography, we could easily show that this solution ought to be considered one of the most valuable reacting agents of the laboratory. It will serve us for cleaning the plates, preparing the silver bath, cleaning the vessels, strengthening too weak negatives, clearing obscure negatives, softening positives that are too hard, and removing silver spots from the tissue. First, with regard to the cleaning of plates, we remember being advised to mix whiting or rotten stone with water acidulated with nitric acid, and with old or acidified collodion, or collodion with the addition of iodine. These collodions owe their action to the free iodine they contain. I employ in preference, for diluting the rotten stone, half iodised water and half ordinary water. The mixture is spread on both sides of the plate, and left to dry completely before it is wiped off. The iodine then acts by attacking the smallest traces of silver. The thin layer of rotten stone, in drying, absorbs the fatty matters, and it is sufficient to wipe it well, in order to secure a faultless plate. All traces of old proofs and of almost invisible deposits of silver entirely disappear. When a new silver bath is prepared, a little iodide of some kind, or iodised collodion, is generally added, in order that the nitrate of silver of the solution may be saturated with iodide of silver, without taking it to the detriment of the first plates immersed. Besides, it is very frequently necessary to have recourse to a slight acidulation, in order to prevent the proofs being fogged and smoked. To obtain these results a few drops of iodised water should be poured into this new bath. It is then made as well of iodide of potassium with iodine as of the iodide of silver which makes the saturation of the bath; but beyond this the free iodine liberates a small quantity of nitric acid, which frequently gives a sufficient acidulation. When the sensitising basin has been long used, particles of reduced silver are produced in the angles, and, becoming detached, are the unceasing cause of faults. By passing the iodised water plentifully into the basin the metallic silver will be transformed into iodide, and thus the cause of faults will be eliminated. When the proof is taken, developed, and fixed, it is frequently perceived that it has not all the desired strength. M. Cassan, and afterwards M. Piard, advised the employment of tincture of iodine until the layer should be completely transformed into iodide of silver; and after that the action of bichloride of mercury, in order to give much greater intensity. By repeating these trials—the efficacy of which was denied, and not without reason, by General Mongin—I believe I demonstrated that the employment of iodised water was preferable to the tincture of iodine, and above all that it was not necessary to push the reaction so far as that the whole of the image should be transformed

into iodide of silver. The effect obtained without bichloride of mercury was then better. It is sufficient to pour the solution of iodised water as before given, with the addition of about two-thirds of ordinary water, evenly over the proof, allowing it to act slowly by passing the liquid to and fro upon the plate. The general tone is seen to change, the maximum being obtained when the proof appears rather brownish in transparency. By pushing the action further there would be loss instead of gain. Now, the surface of the proof seen by reflection has taken a slight yellowish tone, due to the formation of iodide of silver. The proof is well washed without fixing it. The action exercised by the iodine is the transformation of a quantity, more or less considerable, of the iodide of silver, the yellow colour of which, added to the general colour of the negative, modifies its tint and renders it less permeable to the chemical rays. I should add that the proofs remounted in this manner, as well as those made up by the bichloride of mercury, are slowly changed under the influence of the light, and become more and more opaque. The cause of this modification has yet to be discovered. It may be due to the traces of the reacting agent which have not been removed by the washing, or to a modification formed by the iodide. I must add, however, that this modification is produced slowly; it need not be feared except for the negatives intended to remain exposed and to furnish a great number of prints. It is probable that in making further researches a great improvement in the fixing may be attained. This fixing cannot be obtained by hyposulphite of soda, for this agent, dissolving the iodide of silver formed, would not only destroy all the effect produced, but would bring the negative again below the intensity that it had in the beginning. But this consequence of fixing with hyposulphite of soda, injurious in the case we have named, becomes, on the contrary, indispensable in the case of a fogged negative. It has frequently happened to me that proofs obtained by the Taupenôt process were heavy and pasty, in consequence of bad development, and nevertheless I have made of them very passable proofs by operating in the following manner:—The negatives, if fixed and varnished (I use the gum lac varnish), are first deprived of their varnish in a full bath of alcohol, then well washed in new alcohol and water; the proof is afterwards covered with iodised water, rather weak, which is placed evenly on the whole surface, when that which has become yellowish in consequence of the iodide of silver formed, is washed with water, and fixed with hyposulphite, which removes the iodide of silver, and, consequently, equally unveils the proof, which is washed again carefully and examined. If the negative be not sufficiently clear, the action of the iodised water, the fixings, and the washings are recommenced, until the image is everwhere transparent. Frequently it becomes too clear; but with a solution of gallic or pyrogallic acid, or of the two mixed, with the addition of a sufficiently strong proportion of acetic acid and a little nitrate of silver, the desired tone is easily made up. All these manipulations require care, but they generally succeed very well.

M. Audra (on being requested to do so) gave the Society a practical demonstration of the transfer of carbon proofs on transparent or enamelled plates. Proofs prepared with carbon and bichromate of potash, after having been exposed, were immersed in cold water, then raised again upon the plate, care having been taken that a thick layer of water interposed to prevent all access of the air. The water having run slowly away, by means of a roller the two surfaces were brought into close contact, and the proof thus prepared was put to dry for a subsequent development, whilst other proofs, having been subjected to the above preparations, including their complete desiccation, were developed in a few minutes under the influence of boiling water, and adhered to the surfaces against which they were applied. He (M. Audra) also presented some galvano-plastic moulds intended for printing with printers' and other inks.

The members present having thanked M. Audra, the meeting terminated.

Correspondence.

Foreign.

Paris, September 6, 1869.

Many years ago Messrs. Barreswill and Davanne suggested a solution of iodine in iodide of potassium as a preparation for strengthening negatives; and I have some recollection of calling the attention of photographers to the practical use of the method. Since then, I believe, the use of the aqueous solution of iodine has been pretty general for intensifying with the assistance of the repeated action of a developer. In 1863, M. Blanquart-Evrard read a paper upon the *Intervention of Art in Photography* before the Imperial Society of Science and Art, at Lille, in which he proposed the use of iodine in vapour for the modification of negatives for producing more artistic effects than were obtained in the camera. The reason why the use of this metalloid has been recommended is that it converts the metallic silver of which the photographic image is composed into iodide of silver, and this can be either reacted upon by light, and a thicker deposit produced by redevelopment, or the new iodide of silver film can be redissolved, and so the thickness of the original film be reduced. In the one case the "lights" of the picture are increased, and in the latter the shadows are deepened. So useful, indeed, is the aqueous solution of iodine and iodide of potassium, that M. Davanne has thought it worth while to call the attention of photographers to its various uses by means of a paper read before the last meeting of the French Photographic Society. The paper, in full, will probably be found in another place in your columns.* I will, therefore, confine myself to a few running observations upon it. The solution employed by M. Davanne is composed of—

Iodine	60 grains.
Iodide of potassium	96 ,,
Water	10 ounces.

This he considers as a *concentrated* solution, and for many purposes it should be diluted with water. To prepare it, the iodide of potassium should be dissolved in a portion of the water, and the solution poured upon the iodine in a mortar in which it has been previously crushed. The remainder of the water to be used for rinsing out the mortar, and adding to the solution of iodine. Besides the applications of this solution to which I have already alluded, M. Davanne uses it for cleaning the glass plates, dishes, &c., in preference to acidulated water, old collodions, &c. He mixes up rotten stone with the iodine solution diluted with an equal bulk of water, and spreads the paste over the glass plates. The iodine attacks all the bits of reduced silver, and the rotten stone absorbs all greasy matters, and so, with rubbing, the glass plate is readily cleaned from all old images, dirt marks, &c. Another use of the iodine water is to "start" a new silver bath for collodion plates. This is generally accomplished by adding a few drops of iodised collodion and a slight addition of nitric acid, so that the prepared plates may escape the action of the new and still uniodised solution of nitrate of silver on the one hand and the foggy tendencies of a neutral or alkaline bath on the other. A few drops of the iodine solution are added to the new bath. Iodide of silver is produced both by the combination of the iodine of the iodide of potassium—as well as that in a free state—with the nitrate of silver, and is dissolved therein; and the *free iodine* of the solution liberates a little nitric acid from the nitrate, which is ready to do its special work in the new bath. Not only can this solution be used to reduce over-exposed pictures upon glass, but paper photographs which have been too much printed can be brought back by its use. The solution is in this case used very diluted, and the picture is plunged into it *either before* or *after* it has been fixed and washed. For a few seconds this paper generally takes a blue tone from the formation of iodide of starch, but this disappears when it is again fixed in the solution of hyposulphite of soda. M. Davanne, again, recommends the use of iodine water for removing the silver stains from the hands instead of employing cyanide of potassium, and undoubtedly the former is to be preferred.

I have had my attention called to a paper by M. Monnier, upon the existence of a soluble albumen which cannot be coagulated by heat, and I find in it facts which *may* have an important bearing upon the manufacture and use of albumenised paper, and which are, at any rate, of sufficient importance to record in your pages. M. Monnier has been employed in the examination of albumens in an industrial point of view, and hence I think we may take his facts as those of a practical man. There are great quantities of egg albumen employed in the printing of stuffs, and those who use it know how difficult it is to obtain a product which coagulates "abundantly" by heat. This albumen is prepared by drying the liquid albumen on hot plates, when it is broken up and sold at so much per hundredweight. The experience of the calico printers with respect to the difficulty of coagulating this albumen by heat may be a hint to those who would use it in the preparation of albumenised papers. The experiments of M. Monnier show that this difference in the coagulating properties of dried egg albumen does not arise from adulteration or fraud in manufacturing, but from quite other causes. I will give these experiments in detail, and those interested may draw their own conclusions from them.

A number of whites of egg were beaten up with equal volume of distilled water passed through fine linen, and divided into three portions.

No. 1. Evaporated to dryness in a flat dish *in sunshine.*

No. 2. Evaporated to dryness in a flat dish in a stove in diffused light.

No. 3. Left during the month of March in an open bottle to diffused light for six days, and then evaporated to dryness in a stove.

The three samples of dried albumen thus produced were redissolved in cold water.

No. 1 albumen did not re-coagulate by heat.

No. 2 albumen coagulated.

No. 3 albumen would not recoagulate.

These experiments were made several times at long intervals, with fresh eggs and eggs which had been kept, in winter and in summer, and always with the same result.

It will be observed that the albumen formed from the white of eggs which has been exposed to light, will not re-coagulate by heat. This shows that light has the property of acting upon albumen by modifying its molecular condition. This property of light, doubtless, plays some

* M Davanne's remarks are given *in extenso* in our report of the meeting of the Photographic Society of France in another page.

part in the production of photographs upon albumenised paper, and also in the preparation of the paper itself; and it may be a question worth investigating whether there be any difference in the quality of albumenised paper prepared and dried in the shade and that made in strongly-lighted rooms. It may be that albumenisers have found it desirable to prepare their papers in as dark a place as possible. M. Monnier has found a remedy for this non-recoagulation which is of importance to the industries employing the dried albumen. The addition of a very small quantity of diluted solution of acetic, formic, tartaric, or citric acid to the incoagulable albumen restores it to its former condition of being easily coagulated by heat. The theoretical conclusions respecting the composition of albumen which M. Monnier arrives at are that in the white of eggs there exists an incoagulable albumen which plays the *rôle* of a weak base united to a still undetermined acid, and that the coagulation of albumen by heat will only be one of the properties of these bodies in which albumen acts the part of a base.

I have a few words to say upon the letters addressed to me respecting my remarks upon the communication of Mr. S. C. Hall. I reserve them for my next. I wish your correspondents would give their true names, and not fight *incog.* R. J. Fowler.

Home.

SURFACE MARKINGS *VERSUS* ACETIC ACID.

To the Editors.

Gentlemen,—Two or three weeks back I was very much troubled with surface markings, and all I have read up to the present time in your most excellent Journal upon these stains has not proved of any benefit to me.

In one week I made up three fifty-six-ounce silver baths from different samples of silver, as well as different distilled water, but without any relief. These stains did not trouble me when working *carte* or cabinet plates, unless I had to push the development; there would then be a slight veil or fog, which I could remove with the finger, but not the slightest sign of a stain. When I tried to develope a 10 × 8 or 12 + 10 plate, the effect was quite different; the plate was not only at the corners but completely covered all over, like a piece of marble.

Having five oil paintings come in without any notice (some being Royal Academy pictures), to be taken on 12 × 10 and 8½ × 6½ plates—and they could only allow me two days in which to copy them, being sold, and must be sent off, whether I could get good negatives or not—I at once filtered a new bath which I had had out sunning for several days. I tried a small plate, and all seemed right, being nice and clear.

I got up the next morning at five o'clock, and set to work in good spirits and in hopes that all would go on all right, but I was sadly disappointed. The first 12 × 10 plate was completely covered with marble stains, some of which I could rub off, and some not; and the film was so tender it would scarcely bear touching. Well, what to do I did not know, for I had tried different baths, and also iron solutions from fifteen to thirty grains, with various proportions of acetic acid, but without a cure.

In this dilemma I sat down, wondering what I was to do, and how to act, to get clear of these stains. Was there anything that I had not tried? Yes! there was one thing—the acetic acid. So I determined, as soon as the shops were opened, to get a fresh sample from a different place. As soon as I got it, I made up a twenty-grain iron developer, with fifteen minims of acetic acid, and tried again, when, to my delight, *all went on well*, the 12 × 10 negative being clear and bright, and the prints from them have given the greatest satisfaction to the artist.—I am, yours, &c., J. H.

1, *Oxford-street, London, Sept.* 16, 1869.

ARTIFICIAL IVORY.

To the Editors.

Gentlemen,—I observe in your journal of yesterday that an American gentleman has obtained a patent for the production of artificial ivory composed of bleached lac, kaolin, and other ingredients, which it is vaguely said may be useful to photographers.

Well, if by being made "useful" the patentee or paragraphist means to say that photographs may be taken on a thin slab of this material instead of ivory he is mistaken. It is true that you might be able to take a photograph, and, for the matter of that, one sufficiently good, too, on a slab of this material; but what then? Who does not know that a thin piece of shellac would be as brittle as glass—nay more brittle than that substance?

Now what I propose as a substitute is one of which every sensible photographer, on reading this American patent, will at once have had a conception, viz., the substitution of gelatine, isinglass, or glue for the shellac in question. Within the last twelve months I made some very excellent sheets of artificial ivory, by means of a mixture of white pigment and ordinary gelatine, which I purchased at one of the Italian warehouses at the rate of half-a-crown per pound. I smeared over the surface of a plate of glass, on which, when it was levelled, I poured a quantity of gelatine, which contained a rather large admixture of a white pigment. I may here state that, although I have tried for this purpose the insoluble white salts of lead, zinc, barytes, &c., as well as the more commonly used kaolin, or silicate of alumina, up to the present time I have not been able to arrive at a decision as to which of them is the best. When the layer of coloured gelatine is dry I remove it from the glass, which, in order to facilitate this, has been previously moistened with oxgall. The surfaces are now spunged over with a solution of tannin or alum, and, when washed and dried, the plate is ready for being printed on.

I have not entered into the details of printing, because if they were honestly stated they would occupy a page or two of your valuable space. Each photographer has, doubtless, his own favourite salting and sensitising bath; but I may state that *I* have found an ammonio-nitrate silver solution the best for sensitising. I make a sixty-grain solution of nitrate of silver, and add sufficient strong ammonia to precipitate the oxide, continuing this addition (although very carefully) until the precipitate is nearly all redissolved, when I filter it, and it is then ready for use, either for sensitising the imitation ivory just mentioned, or ordinary printing paper.

As I only execute such work to order, and am not one of those who keep a stock of these things on hand, I cannot send you a proof in illustration of what I have said, but I shall have much pleasure in sending you one in a week or two.—I am, yours, &c.,

London, Sept. 4, 1869. An Old Photo.

LENS QUERIES.

To the Editors.

Gentlemen,—I have been deeply interested in the perusal of the various articles in the Journal upon the construction of lenses, and I should esteem it a favour if you would be kind enough to give me your advice upon the following questions:—

I have a good portrait lens whose chemical and visual foci do not coincide. Would you inform me if it can be corrected by altering the distance between the front and back combination, placing them nearer or farther apart? Or by a difference in the separation of the crown and flint glasses in the cell of the back combination? Or should the curves of the back lens be altered to produce the desired effect?

If the difference should be made in the alteration of the curves, which way would you make the alteration? For instance: if the inside radius of the back lens be three inches for the flint, and three and a-half for the crown, would you advise an increase or a decrease in either of these to correct the error? This I could have done by a good hand-grinder at a slight alteration of the combined focus.

If you will kindly reply in next Friday's Journal you will oblige—Yours, &c., Thos. Attwood.

105, *Great Hampton-street, Birmingham, Sept.* 7, 1869.

[The correction required in the above-mentioned lens will not be obtained, we suspect, by the separation of the two lenses. There is, however, not sufficient data given in the letter to enable us to offer an opinion calculated to be of much value. If the lens be of foreign make, it is probable—for reasons which we have given on a former occasion—that the front combination is over-corrected for colour, owing to the too great dispersive ratio of the flint. When errors of over-correction occur, they are found for the most part to reside in the front lens. The alteration proposed by our correspondent—that of decreasing the radius of the inner surface of the crown—would doubtless cure a certain amount of over-correction for colour; but, while it would shorten the combined focus, it would also seriously interfere with the flatness of field. The separation of the components of the back combination will not remedy the evil.—Eds.]

Miscellanea.

A Photographic Fountain.—In a small *carte* picture which a correspondent in Redruth has sent to us we have a very praiseworthy display of ingenuity. The picture represents a youth sitting with a jug in his hand, having it filled from a small stream of water which is trickling down from the spout of a very rustic fountain, apparently oozing out from a mass of rocks. It appears that both the fountain and the rocky wall are all artificial, the former being supplied with water from a tin canister placed at the back. The effect is exceedingly good and natural, and shows what may be effected by the display of a little mechanical ingenuity.

The Keeping Qualities of Collodio-Bromide Plates.—A couple of sterescopic pictures of Harleck Castle, by Mr. W. Atkins, of Liverpool, are worthy of notice for this reason: the plates (colodio-bromide) were exposed in August, 1868, but the development was delayed until May of the present year. This fact speaks most favourably for the collodio-bromide plates. Mr. Atkins says that when it is intended to keep these plates for any length of time after exposure and previous to

development much over-exposure is necessary. We have known some plates of this kind to keep well previous to exposure; the interesting pair of pictures now before us attest the fact that they will keep well for at least nine months *after* exposure.

The Extensive Seizure of Indecent Prints.—On Tuesday last, at the Middlesex sessions, before Mr. Serjeant Cox, Richard Groves, Michael Saunders, and Paul de Paris, were indicted for selling and uttering certain lewd and obscene photographic pictures. Groves and Saunders pleaded guilty, and Paul de Paris not guilty. On the 19th of August a person went there and asked for some pictures, and some were shown to him, but not of such a character as to bear out this prosecution. Other pictures were afterwards obtained by Paul de Paris from Saunders, the other prisoner, and they were of a very indecent character. These were handed over to the police, and, on their being produced before Sir Thomas Henry, the magistrate, he granted a warrant for a search of the premises, and, on going there, a large stock of books and pictures were found, and upon this the prisoners were given into custody. The jury found Paul de Paris guilty. Mr. Lockyer, sessions officer, proved previous convictions against Paris and Saunders. Inspector Brennan said he knew Paul de Paris for many years, and all he did was to sell indecent books and prints, and Saunders had been engaged in similar transactions. The boy Groves was engaged in keeping watch at the end of the street to watch the approach of the police, and then to give notice of their coming to those who kept these shops, and warn them to keep things out of the way. He knew that Paul de Paris had for some time past been dealing in these things, and, although he had tried, in consequence of his artfulness he had failed to get a detection against him. The judge said that, as regarded Paul de Paris and Saunders, the court looked upon them as moral poison almost as bad as that to the body, and they should receive no mercy. The sentence upon each of them was imprisonment and hard labour for eighteen months; but, as regarded Groves, taking into account his youth and the promise of his master to take him back into his own house, and thus sever him from all his former connections, the court would merely call upon him to enter into his own recognisances in the sum of £20 to come up for judgment if called upon.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Lot Dixon, photographer, Colne, will exchange about a hundred lantern transparencies of Egypt and Italy for the same number of other subjects.

A side slip as good as new, two printing-frames, a half-plate bath, a quarter-plate tripod stand, and a head-rest, will be exchanged for a *carte-de-visite* lens.—Address, Geo. Ward, Photographer, High-street, Ringwood.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photographs Registered During the Past Week.—

P. P. Skeolan, Harrogate.—*Two Portraits of the Marquis of Westmeath.*

A. E. Lesage, Dublin.—*Three Portraits of the Right Hon. T. O'Hagan, Lord Chancellor of Ireland.—Portrait of the Most Rev. Dr. O'Brien, Bishop of Waterford, &c.*

☞ *Correspondents should never write on both sides of the paper.*

P. Greenhalgh.—You have omitted to state *what* you wish to offer in exchange.

W. Haverdon.—As a general rule the Rive paper yields warmer tones than the Saxe.

M. Row.—We thank you for your attention. It is probable that in addition to our notice of the Exhibition in our last number, we shall soon have more to say on the subject.

J. T., (Junior).—The whole "get-up" of the picture displays ingenuity and good taste. The weakest point in the photograph is the expression in the face of the sitter, whose aspect is too much that of a person sitting for his portrait. See also remarks elsewhere.

Robert Ewing.—Allow the collodion to stand for a day or two longer, and it will probably work all right. Many samples which give foggy pictures when newly iodised work clean in the course of a few days. In reply to your other question, we say—not at present.

F. M. D.—We believe the coffee process to be very useful and capable of producing excellent results. If by the term "sensitive dry collodion plates" you mean those prepared by the Liverpool Dry Plate Company, we *have* tried them, and like them very much.

A.—In reply to your queries:—1. The cost of registration is fifteen pence for each picture.—2. *Each* picture must be registered.—3. The intimation in our Journal is merely a record of the fact that such pictures have been entered at Stationers' Hall.—4. Send the pictures addressed to the Editor, with the requisite amount in stamps, or, preferably, send a post-office order.

A. Verre.—Very considerable latitude in the angle of the roof may be indulged in without affecting the picture in an appreciable degree. The five-foot floor which you propose putting overhead may be made with perfect safety, so far as its influence on the lighting is concerned. See the suggestions enclosed with the plan, which has been returned as requested.

John Simpson.—After communicating with one or two publishers we shall let you know the result. We remember the artist named very well. In our next number we expect to have a short notice of his views in Canton. The views of Temples, referred to as having been taken in Cambodia, possessed great interest, but this interest was limited to a comparatively small number of persons.

N. L. P. A. writes thus:—"Can any of your correspondents give a good formula for the preparation of paper for enlargements other than Mr. Davies's French polish method?" Also—"Is it possible to make a solution containing water 500, iodide of cadmium fifteen, bromide of potassium five, and albumen 100, without precipitating the latter? or what is the largest quantity of albumen it will hold without precipitation?"

A Country Surgeon.—You do not correctly apprehend the difference between the two prisms. The one intended for inverting an image must have three sides, all of them having true surfaces; whereas in the one intended for spectrum analysis only two sides are utilised. Therefore your proposal to grind out two sides of a small glass bottle at the proper angle and cement in two small plates of glass, afterwards filling the bottle with bisulphide of carbon, is a very excellent way of making a prism for spectrum analysis, but it will not do at all for inverting an image. For the latter purpose you must build up your prism with *three* plates of glass. It may be filled with any liquid of as nearly as possible the same refractive power as the glass.

"One in a Fix" (Tottenham).—The physical condition of your collodion is evidently unsuited for the keeping of the plate; and, when you operate under such circumstances as require a lengthened interval to elapse between the exciting and the development, it will be to your advantage to employ a rather older and more "rotten" collodion. The addition of a small portion of old collodion will probably induce, in the new sample, the change that is desired. You may mitigate the evil by rinsing the plate in a bath of distilled water before placing it in your dark slide; but a still better plan than this would be to coat the plate with the preparation of glycerine which has frequently been recommended in these pages. The plate would then keep for four or six hours.

Unreasonable Demands—We frequently hear of the most unreasonable demands made upon the photographic artist by his patron the public, but a communication we have received from Mr. Warner puts us in possession of an instance of this kind which we do not think can be readily equalled. It is a letter just received by that gentleman from a former customer, and which is so refreshing in its simplicity that we print it (merely suppressing the name), together with Mr. Warner's reply:—"Malvern, August 31, 1869. Mr. Warner,—Sir, I have a claim against you of 15s. for portraits which you took, and which were not satisfactory, and which you promised to retake in your note of 10th July, 1863. As you have given up portraiture, I will be equally satisfied if you will send me per return of post fourteen stereoscopic views of Ross, Tintern, Monmouth, and Chepstow; these I shall be glad if you will send me at once. I have been staying in Ross during the past week, and would have called on you, but was unexpectedly called away by the illness of my little girl. Your attention and reply to my request will oblige, A.B." Mr. Warner's reply was as follows:—"Ross, 3rd September, 1869. Mr. W. H. Warner's compliments to A. B., and begs to inform him that the statute of limitations will prevent his complying with his extraordinary request, which he thinks A. B. might have found time to make previous to the 10th July, 1869, or between the years 1863 and 1869."

LONDON GAZETTE, *Friday, Sep.* 3.

Bankrupt.

Bonehill, William, 2, Sardon-place, Vincent-street, Ladywood, photographer.—County Court, Birmingham, Sept. 17, at 10.

Notice of Sitting for Last Examination.

Olden, Edwin, Bilston and West Bromwich, tobacconist and photographic artist.—Court of Bankruptcy, Birmingham, October 8, at 11.

METEOROLOGICAL REPORT,

For the Week ending September 8th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Sept. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
2	30·40	61	48	50	57	NE	—	Dull
3	30·26	65	50	49	53	NNW	—	Dull
4	29·97	—	48	56	65	NE	—	Fine
6	29·69	75	50	62	64	SSW	0·09	Raining
7	29·90	72	48	62	68	WNW	—	Cloudy
8	29·90	—	60	63	68	WSW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 489. Vol. XVI.—SEPTEMBER 17, 1869.

ACIDITY OF THE NEGATIVE BATH.

It was the custom, some years ago, to work with negative baths containing a comparatively large excess of free acid; gradually, photographers found that, though they easily obtained their pictures free from fog, the prints from their negatives were often hard and wanting in that delicate gradation of tone which should characterise goods prints from a well-balanced negative. The proportion of acid was then greatly reduced, and the amount employed only such as would render blue litmus paper red after contact with the solution for a few minutes. Now the tendency is to use a strictly neutral nitrate of silver bath for sensitising the collodion film, and, in addition, what Mr. Sutton calls a "neutral" collodion, so that the sensitive layer shall have had nothing to do with free acid up to the time of exposure in the camera.

Under these circumstances we may briefly touch upon some few points connected with the whole subject of acidity in the negative bath, as the present appears to be what geologists would call a "transition period" in the matter of acidity, and a few general remarks may help us to understand how great may be our gain or loss by leaning too much either to the acid or the alkaline view of the question.

Referring, for the present, solely to the ordinary process in which bromo-iodised collodion and an iron developer is employed, we may say that a very faintly acid bath and a nearly colourless collodion give excellent results if the proportion of restraining acid in the developer be suitably adjusted; but with a *perfectly* neutral bath, and a *perfectly* neutral or colourless collodion, it is extremely difficult, according to our experience, to obtain plates free from fog.

Again: with an accurately neutral bath and a yellow collodion brilliant negatives can be obtained. With a large proportion of bromide in the collodion we can approach much nearer to neutrality without the same risk of fog, at the same time the negatives are, with iron development, deficient in contrast and feeble in character. To go a step further still: let us use a colourless, bromised collodion, a perfectly neutral nitrate of silver bath, and an alkaline organic developer, and we obtain plates free from fog, and well-balanced, brilliant negatives. Thus, with a colourless iodised or bromo-iodised collodion we get harsh negatives with ordinary exposure and iron developer if the nitrate of silver bath contain too much free acid, and fogged plates if the latter be perfectly neutral or alkaline. On the other hand, with a neutral bromised collodion and neutral bath, we have to change our developer before good results can be obtained.

If now we start with a solution of perfectly neutral nitrate of silver of suitable strength, let us see how it may be rendered acid. This may be done in, at least, two ways: first and most simply by direct addition of a small proportion of any acid; and, secondly, by the use of a collodion containing free iodine or bromine. Of course we need not dwell much upon the first case, but shall confine our attention chiefly to the second.

It must be confessed that our knowledge of the action of free iodine in solution of nitrate of silver is not very accurate, the general explanation being that the iodine combines with the silver, forming iodide of silver, and liberating a proportional quantity of nitric acid according to the following equation:—

$$AgO, NO_5 + I = AgI + HO, NO_5.$$

If this were really so, it would be much more simple to add a small proportion of nitric acid directly to the bath, but in practice it is not by any means unusual to meet with a case of apparently inveterate fogging which is not removed by the direct addition of acid to a bath; and yet, if we add a little iodine to the collodion, the fog clears away, and the shadows of our negatives are free from the slightest veil. It is evident, then, that theory and practice do not go quite hand-in-hand in this matter; for, if the sole function of free iodine in a collodion was to liberate nitric acid in a bath, the same end ought to be gained by adding the acid at once, instead of going through the roundabout process of treating the collodion instead.

It has been long known that the amount of nitric acid liberated when a solution of nitrate of silver is treated with iodine does not exactly correspond with the quantity which ought to be set free, if the above equation were quite accurate; and some recent researches of M. Weltzein appear to give a key to the determination of the probable change which takes place under the above-mentioned conditions. We know that when chlorine in the gaseous state is passed over solid and dry nitrate of silver, chloride of silver, nitric anhydride, or anhydrous nitric acid, and free oxygen gas are the products. M. Weltzein finds that when dry nitrate of silver is treated in the same way with iodine, the products now are—peroxide of nitrogen, iodide and iodate of silver, according to the following equation:—

$$3\ (AgO, NO_5) + 3\ I = 3\ NO_4 + AgO, IO_5 + 2\ AgI.$$

Now, anything we know about the photographic effect of *iodate* of silver is not very much in favour of that salt, but as the above reaction is one which might take place when free iodine was added through collodion to a nitrate of silver bath, we may then fairly inquire whether the remaining products of the reaction may not have much to do with the beneficial effects well known to result from the iodine treatment. Obviously, the iodide of silver formed need not occupy our attention, nor the iodate of silver, but the other body produced—the peroxide of nitrogen—is, we suspect, the chief agent for good. In contact with water peroxide of nitrogen is capable of splitting up into two acids, viz., nitrous and nitric acids, according to the following equation:—

$$2\ NO_4 + 2\ HO = HO, NO_3 + HO, NO_5.$$

Nitric acid, we have already seen, will not always cure a bath of fogging, whereas we have long known that the addition of a small quantity of *nitrite* of silver to the solution is an excellent remedy for the evil. Our readers well know that nitrous acid when united with silver produces *nitrite* of silver; therefore, if our theory be correct, the value of the presence of a little free iodine in the collodion is, that it not only liberates a little nitric acid in the nitrate of silver bath, but also sets free a trace of nitrous acid likewise. Bearing in mind the beneficial effects of the presence of traces of a nitrite, we can now easily understand the marked difference sometimes observed between the action of nitric acid and free iodine in curing a negative bath which gives only fogged plates.

The practical result of all this is that, when we find a bath slightly acid to test paper and the plates inclined to fog, instead of adding more acid it is usually better to add a very minute proportion of iodine previously dissolved in alcohol to the collodion, unless it is of a full sherry colour already. The plates are rendered less sensitive by this treatment; but the exposure does not appear to be quite so prolonged as when a corresponding amount of free acid is added directly to the bath. The nearer the latter approaches to complete neutrality, and the collodion likewise, the more exalted is the sensitiveness of the plates, but the greater is their tendency to fog.

STREAKS IN THE DIRECTION OF THE DIP.*

At first sight it would appear to be almost an impossibility to advance anything new upon the subject proposed for this evening's communication. The various complaints and suggested remedies, the improvements in manipulation, the doctorings of the bath, the quality of the collodion, &c., &c.—too numerous to give here without tiring you out—may be found by going through the pages of The British Journal of Photography for the last seven years or so—an infliction you will not thank me for suggesting, I dare say, but nevertheless I mean to say it would not be leisure time badly spent, and would afford a considerable amount of amusement and instruction.

I think it will be quite sufficient if we go back so far only as the 20th January, 1865, because there we have a paper by Mr. Davis, on *Lines in the Direction of the Dip of the Plate, and their Avoidance.* We have also an article by Major Russell after the paper, and in the following number of The British Journal of Photography a leader by the Editor, doubting the efficacy of the mechanical theory of Mr. Davis.

One would have thought that if the avoidance of these streaks were now easy, that that matter was now settled; but that it was not completely so you will find in another elaborate article in The British Journal of Photography for the 7th of December following, in which the writer of that article is not by any means satisfied with the completeness of the explanation then offered.

So far all the arguments and suggestions heretofore have had reference, I believe, solely to wet or dry collodion plates; and if there had been no other material on which we could obtain a photographic impression I should have been silent, for I expect to be able to show that nearly all that has been written about "streaks in the direction of the dip" does not apply to albumen.

We have here a process in which absolutely there is no pyroxyline, alcohol, or ether to trouble us, as with collodion; but there is a material in both the collodion and albumen processes which has never been mentioned that I know of in connection with these streaks; and, as I believe this to be new, I have taken it as a question fit to be discussed by the members of the Manchester Photographic Society.

You know very well that there is a time when a newly-made sensitising nitrate of silver solution arrives at its best condition, and that afterwards it begins to give results not so good as it did, and that it is getting worse and worse, till you are fairly "in" for "streaks in the direction of the dip."

When the bath is first made you partially satisfy its appetite for iodide of silver by directly giving it some. Now, every time a collodionised plate is immersed in the bath it gets a little more, till at last its best condition is passed, and, by continued use, a complete surfeit is established. You may filter and get the liquid as beautifully clear and brilliant as possible, but you do not get a clean negative from it.

To save time I will leave out all speculations about "organic matter," "acidity," or "alkalinity," or any "impurities" in the alcohol, ether, cotton, or collodion, except one, as I consider *that* one quite competent to do all the mischief; and I expect to make out a very strong case against the delinquent, without abusing the other side. The chief cause of the "streaks in the direction of the dip," I contend, is water.

I think no amateur has been pestered with these streaks more than I have in the albumen process, in which I can now trace all those defects to water alone, as I shall prove in the end.

The surfeited sensitising bath, supposed as above, may be fancied to be a liquid atomic balance where the slightest application of water will liberate its equivalent of iodide of silver. This being so, where do you get your water from? and how are the streaks made? There is water in your collodion; the iodides and bromides have possession of it, and there may be a surplus sometimes besides, I think you will allow, when "crapiness" or "reticulation" is to be seen on the collodionised plate. Then there is another source for water. You have a clean plate on which you pour the collodion, then off, giving some time for what is left on the plate to solidify. The evaporation of the most volatile portions of the remaining ether and alcohol reduces the temperature of the plate probably below the dew point of the room you are in, or the dark room where you both coat, sensitise, and develope. The salts in the film will hold to the water to the last, so that you have that quantity certain and the hygrometric water in addition.

Turn the collodionised plate face downwards, and try by the wash leather if the back is as dry as at the commencement. If the friction has increased you may depend upon it the surface is damp, and if you dip the plate into the streaky bath you will have a liberation of iodide.

I should like some of the members to try the following easy experiment—I mean those who are in the enjoyment (?) of a very streaky bath:—Dip a very clean plate (cooled a few degrees below the temperature of the dark room) into the bath just filtered, then, upon withdrawing it, see if it be as clean as when it went in, or if there be a slight deposit. Do so with another plate slightly warmed, and see if there be any difference.

Now we will turn to the collodionised side of the plate. If the temperature of the plate has been reduced below the dew point of the room, causing the back to be damp, the front cannot have become much drier. This cannot be seen, but the bath will find it out; some of the salts in the film being deliquescent, they will retain the water till decomposed by the nitrate of silver.

If the collodionised plate could be at once uniformly covered over with the bath solution without any disturbing currents, an uniform deposit of iodide due to the water might be had.

Upon dipping the plate in the usual way two operations are going on—iodide of silver is being formed in the film by the decomposition of the salts, and free iodide is being liberated by the water on the surface.

The eddy caused by the edge of the plate and the ledge of the dipper, aided by the thinness of the bulk of the solution, drives the nascent iodide against the porous surface of the film unequally, causing banks of deposited iodide which adhere more or less, notwithstanding the attempts to shake them off by moving the plate sideways—just the same as a flood in the river, or the ripples of fine sand on the sea shore, or the banks of ditto on a large scale at the estuary of the Mersey, to be seen when the tide is out—and you are there.

If the evil went no farther than this it would be well, but unfortunately the weak and nearly imperceptible mark forms a good concrete foundation, as it were, for building upon by development, to your sorrow and the spoiling of the negative.

I have so far gone on the supposition that the groundwork of the finished streak originates in the presence of water, and I will now give you a reason why I have adopted that theory. For a good many years I have worked the albumen process, and since I began to use a double film I have been liable to have streaks, and have had scores of plates spoiled by them. The cause was so extremely simple that it was only at the commencement of the spring this year that I was satisfied about it.

The streaks are between the two films and cannot be removed. If I had been content to use one film only, the greater bulk of the nucleus of the streak might have been shifted by a force of water and a fine camel's-hair brush, or a pad of cotton under the tap, and that was one remedy I used, but I found the film was liable to be scratched, and greater insensitiveness resulted.

I also dipped slowly into the aceto-nitrate bath—sometimes too slowly. A negative of the large vase in the Earl of Ellesmere's grounds at Worsley, taken at an outdoor meeting of this Society, on the 6th July, 1867, has lines upon it as if there had been frequent stoppages during the descent of the plate into the bath. I must tell you that an albumenised plate is dried and dipped while slightly warm, so that there is no chance of water being present, as with collodion.

It was only after a series of exhaustive trials that I discovered, by dipping the plate in the washing bath of water at right angles to the line of the sensitising dip, and subsequently using a new solution of nitrate of silver, that the cause was there, in conjunction with a bath overcharged with iodide by use.

You see, in the case of the albumen process, the bath is in fault; but in the collodion process not only the bath but the state of the film as to moisture has to be considered, supposing in both cases there is not an excess of iodising salts. M. Noton.

* Read at a meeting of the Manchester Photographic Society, September 9, 1869.

ON DEFERRING THE INTENSIFICATION OF DEVELOPED NEGATIVES.

It is now several years since Mr. Rodger, of St. Andrew's, communicated to the Photographic Society of Scotland a method which he adopted in his practice, by which he was enabled to develope the picture with iron in the usual manner and then place it aside till the evening, when, the hurry and business of the day being over, he could intensify it at his leisure. The method by which he effected this was to pour over the developed, but as yet unintensified, picture a solution of glycerine, and then place it away in the plate-box, the glycerine preventing desiccation of the surface, which could, after the lapse of a few hours, be rinsed with water and then be in precisely the same condition as it was when the iron developer was washed off. At the time the paper was read it was suggested that a solution of treacle or syrup would answer a similar purpose and at a much less cost than glycerine, which, at that time, was much more expensive than it is at present.

The suggestion has since lain in a semi-dormant state. We are glad to find, however, that it is now being revived, and, indeed, it would be a pity were this not the case, seeing that it may prove very advantageous to the photographer who is either away from home, working in a tent, or with a limited supply of water—in short, to the nomadic artist who may be placed in any circumstances in which it is not expedient to complete the intensification immediately after the development. Among those who have adopted this deferring treatment with much success is Mr. Robinson, of Tunbridge Wells.

To convey some idea of the way in which this preservative may be utilised, we may here relate a circumstance of recent occurrence. A few weeks ago we accompanied a friend a few miles into the country, where he had erected a house which he was desirous of photographing. A cellar proved to be a suitable place for preparing the plate. No pyrogallic acid intensifier had been taken, but, instead of it, a bottle containing about equal parts of golden syrup and water formed part of the chemical outfit. Owing to a temporary derangement of the force-pump by which the water was conveyed from an adjacent well to the pipes in the house, no water could be obtained, and the *wet* process had thus to be practised without the element on which it so essentially depends. Several plates were exposed and developed. Now we had intended to, at least, rinse, if not thoroughly wash, the iron developer from the surface of the picture previous to applying the syrup; but, owing to the want of water, that intention could not be carried ont. Accordingly, as soon as the details were well out, a small measure-full of the saccharine solution was poured over the plate in such a manner as to carry before it as much as possible of the spent developer. In this state the plates were reared up against the wall until we were ready to return home, when they were transferred to the plate-box, *some of them having, in the meanwhile, been freely exposed to light.* At a late hour the same evening the plates were washed and the intensification effected by means of pyrogallic acid in the usual way.

What is specially worthy of notice here is that although some of the plates had been exposed to a strong light after the application of the syrup, it had produced no apparent effect, for the pictures were all clean and free from any indication of fog. Light, therefore, does not, at least within reasonable bounds, damage a plate that has been developed and protected in the manner described; and, when this fact is more generally recognised, it will be the means of saving the outdoor photographer much trouble, and all the annoyance arising from an imperfect supply or a bad quality of water.

We bespeak for this subject the early attention of some of the societies during the forthcoming session. It is one of those apparently small matters in photographic practice which exercise much more influence upon the comfort and even the successful results of the artist than would at first sight be apparent.

From the fact that the communication of Mr. Rodger to which we have made allusion appeared only in the organ of the Society to which it was commuuicated and not in our pages, we here reproduce that portion which has a direct bearing on the subject. When golden syrup is substituted for the glycerine, the precaution of Mr. Rodger as to the necessity for preventing the light from gaining access to the plate is not required, because, as we have stated, light does not exercise any apparent ill effect upon the developed picture:—

On a Useful Application of Glycerine in the Collodion Process.

I have much pleasure in adding to the stock of practical knowledge in our art a few remarks upon the substance glycerine, which I find to be of much value as an application to the collodion film, after partial or entire development of the negative image, to keep it for an indefinite time in so damp a state as to be suitable for subsequent treatment.

The photographer is often placed in circumstances when it is necessary for him to economise the best part of the day in the actual taking of pictures. Or he may be supplied with a limited quantity of water (supposing him to have completed the development) for the thorough finishing of the plate. Or, what is of more consequence, he may spend valuable time and material in finishing off-hand what he has great doubts of proving only a very unsatisfactory result. Moreover, he is very likely, in his anxiety to save time, to hurry the development incautiously, and so destroy, to all intents and purposes, what otherwise might have been very fine pictures.

These are a few of the ordinary everyday disadvantages of the wet collodion process, as it has commonly to be conducted. Now, these, with others of a similar character, by the use of glycerine in the manner presently to be described, can be easily overcome.

Before, however, giving the short detail of how glycerine should be used for this purpose, it may be as well to say (for the benefit of those who have not followed the collodion process much) that the operations of intensifying and fixing can only be very unsatisfactorily accomplished after the plate has once been allowed to become dry; and, at the same time, that these operations will be attended with considerable risk to the safety of the film bearing the image, as very often it will burst off the glass in drying, or dry irregularly the second time.

The picture having been taken, and developed, we will suppose, with the sulphate of iron developer, it will, in nine times out of ten, require to be intensified to the pitch requisite for giving a good copy, by any one of the methods which have been often proposed.

The operation of giving intensity is, as you will easily suppose, one of importance, and requiring to be done with great caution and care. Now, by the method which I have to bring under your notice, should time or convenience not permit the immediate finishing of the picture, it will only be necessary to give the surface of the plate a slight drain, and then a coating of glycerine and water, of the same consistency as ordinary collodion, and applied in like manner; and after this coating with glycerine, the film will be found to remain in a perfect state for any kind of further treatment, even for weeks or months.

Should the operator intend to give intensity to his iron-developed picture at his leisure, by the use of pyrogallic acid and nitrate of silver, it will be necessary to keep it from getting light; and before proceeding to darken it, it will also be necessary to wash off the glycerine from the surface.

If, however, intensity is meant to be obtained by employing sulphate of iron and nitrate of silver, after the iodide of silver has been removed from the film, there will be no necessity to keep the picture from light after applying the glycerine.

Glycerine is equally efficacious in keeping the film in a thoroughly damp state *after* the picture is fixed as *before* it has been fixed. Indeed, I have found it advisable, when plenty of water was at hand, and when I wished to obtain intensity by the last-mentioned method, to fix *before* applying it, as, besides the propriety of doing so, the success or non-success of the picture is, by this method, more apparent, especially if it is a portrait.

I am confident that in landscape photography with the wet collodion process, and with a tent or other contrivance, the use of this substance will be found of great advantage for obviating the necessity of immediate fixing after development, or for deferring the development for a short time. Half an hour often would be of great service; and, by the use of an arrangement of frames or slips for holding fresh plates, so as to avoid their being ruffled or torn, this can be easily managed.

I am quite aware of glycerine having been recommended and employed long ago for keeping the fresh plate from drying, and so losing its sensitiveness. No great reliance, however, is to be placed upon it for this purpose—not on account of its permitting the plate to become dry, but because it has the tendency under certain conditions to reduce spontaneously the salts of silver.

I am not aware, however, of this substance having been applied for the purposes I have described, or that the necessity for it has ever been urged for such; but I can bear testimony to the comfort and ease of mind I have received from its extensive use for more than a year past.

The want of glycerine may be supplied, though not altogether satisfactorily, by a solution of honey in water, or by solutions of the nitrates of magnesia or zinc. Thomas Rodger.

Since the foregoing was in type we have been informed that not even to Mr. Rodger is the first idea of this useful application of glycerine due. In the same year, and some months prior to the reading of Mr. Rodger's paper, Messrs. Murray and Heath had issued a pamphlet in which occurs the following passage:—"After the application of any of the ordinary developers and the usual washing—a small quantity of water being sufficient for this—coat the negative with glycerine and water mixed in equal proportions, and put it carefully into the plate-box. It can then be fixed after returning home, the next day. * * Nor is it necessary to obtain, by the development in the field, the whole intensity the negative is capable of giving," &c., &c. Even previous to this time the same idea had been successfully carried into practice by other investigators, although, so far as we can see, Mr. Rodger was the first to definitely direct public attention to the use of glycerine as an advantageous means of obtaining a certain and precise end.

THE VALUE OF DISTILLED WATER.

Between the oft-repeated statement on the one hand that common water will answer as well as distilled for that most delicate of all purposes—the preparation of the nitrate bath, and the counter statement that success in photography is dependent upon the most absolute purity in the water employed, *what is* one to do?

During the past summer I have employed some of my leisure hours in an endeavour to ascertain, with some degree of exactness, the various departments of practical photography in which distilled water is absolutely necessary, and those in which common rain water will answer as well. To one who resides in the country this is important, seeing that distilled water cannot be obtained at a moment's notice; but to one who lives in a manufacturing town it may be even more so, for it is well known that in by far too many instances the distilled water obtained in such localities is got through the greasy medium of a steam engine, and often entails annoyances difficult, if not impossible, to prevent. It is, therefore, well to ascertain under what circumstances distilled water is required, and when common rain or well water may be used instead, without any sacrifice of quality in the result sought.

Concerning the formation of the negative nitrate bath, I have as yet failed to discover any advantage arising from using distilled water as a solvent of the nitrate of silver. When common water, containing chlorides and carbonates, is employed, there is a deposit of chloride and carbonate of silver with the addition of the nitrates of the base which is left in solution. Now as to the pecuniary loss from this deposit—as it does not cost one penny for each five shillings' worth of material—it may be dismissed as unworthy of notice. The pecuniary loss is, therefore, so trifling as to be practically nothing, especially when the interests involved are considered.

The question next arises, do the liberated soluble nitrates affect the silver solution? Some years ago, when residing on the sea coast, I used rain water for making my bath. Now, strictly speaking, rain water should be free from chlorides, carbonates, and other salts; but in this locality I found, on analysing it, that it contained about 0.035 parts of chloride of sodium—a very small proportion indeed when it is considered that the sea water, which was not two hundred yards distant from my residence, contained, between the chlorides of sodium and magnesium, about three grains to the hundred parts of water, and that the atmosphere was often loaded with spray from the breaking of the waves upon an adjacent rocky shore. When making a nitrate bath of this water, and another of the same water carefully distilled, I could discover no difference whatever. One doubtless was weaker than the other, for when the nitrate of silver was dissolved in the rain water the milkiness which ensued indicated, in the most unmistakable manner, the formation of the insoluble chloride, at the expense, of course, of the nitrate; but the loss from this cause was so small that the ordinary argento-hydrometer failed entirely to indicate the value even in appreciable portions of a grain. When both solutions were filtered and wrought with, there was no apparent difference between them. With the very same sample of nitrate of silver I made a bath with some distilled water which I had obtained from a chemist, and could not secure a clean picture until I had wasted a great portion of my time, extending over nearly a week, in doctoring it.

To save the reader the trouble of drawing a conclusion from the foregoing I shall do so for him:—The commonest of water, if it be free from organic impurities, is better than *some* kinds of distilled water for making a negative bath. Observe, I am very far indeed from decrying purity of water for that purpose; only some kinds of distilled (and supposed *pure)* water are worse than the commonest rain water, if due precautions be not taken to ensure freedom from organic matter. Inorganic matter is, without doubt, eliminated by the process of distillation; but it is organic matter which proves the deadly foe in the negative bath. The appropriate remedy I shall indicate in due time.

Major Russell is evidently a close observer of the varied phenomena of photography, more especially those connected with the tannin process, and he insists upon the necessity of washing the plate in *distilled* water when the greatest sensitiveness is desired. Mr. Russell Manners Gordon, too, in his process, lays it down as a condition of success that distilled water be employed for the first washing of the sensitive film. At first sight I thought this was an unnecessary complication of the process; for, as common water answered as well as distilled for making a silver bath, why should it not do so for merely washing a plate?

To test the value of the suggestion, plates were washed, previous to their being preserved, with the common rain water already described, the pure distilled water made by myself, and the distilled water obtained from the chemist, as also before described. The results of the varied trials made show that even a bad quality of distilled water is much better than common rain water for this purpose. Organic matter in the water does not, in my hands at least, appear to influence the result. Plates possessing the greatest possible sensitiveness, and yielding the most desirable negatives, may be obtained when the bath has been made of common, not distilled, water, and when the water employed for subsequent washing is distilled water of a quality so bad, from organic matter, as to be quite unsuited for making a bath. In the foregoing few lines is given the experience acquired during several months' experiments. For making a bath, common water is better than distilled water containing organic matter; for the washing of plates, so as to get the highest amount of sensitiveness and perfection, the commonest kind of distilled water is better than rain or other kind of water containing inorganic matter.

I know your sentiments concerning long articles, therefore I shall not give the description I intended to add of the simple means employed by me to make distilled water at literally no expense beyond the few pence of original outlay, and no more trouble than any aged woman would expect to encounter in the preparation of a cup of tea. This I shall reserve for your next.

Geo. Markham, M.D.

LEON VIDAL'S PHOTOMETER FOR PRINTING IN CARBON.*

The impossibility we find in realising the depth of an image produced by the carbon process (whatever the colouring matter mixed with the gelatine may be) necessitates the employment of a special photometer.

If the light of the sun preserved at all times and in all weathers an equal intensity, we might be able to classify negatives according to the number of seconds required for each to furnish its counterpart in the best possible condition; but that is not the case. The intensity of the solar light varies every hour; it is changed if the sky be cloudy, or if the atmosphere be more or less foggy. We cannot, therefore, have recourse to an observation based upon such or such a duration as best for the impression, and hence an instrument of comparison for measuring the action of the light has become absolutely necessary.

The "Leon Vidal" photometer constructed for this purpose is composed—

1. Of a small pressure-frame, the size of which is reduced as much as possible, the upper surface being provided with ground glass.
2. Of a transparent scale on the inner surface of the glass, and formed of ten screens possessing a graduated opacity.
3. Of a fixed scale of ten graduated tints, called tints of comparison.
4. Of a small photometric sheet of bands of sensitive paper placed in such a manner that it is easy to suppress in succession all the bands which have been used. This latter is covered with a small wooden lid furnished with a spring, and is fitted exactly by pressure upon the transparent scale as soon as the frame is closed.
5. Of a small regulator bearing a fixed scale similar to that contained in the photometer.
6. Of a means of stopping the exposure, which consists of a slide placed at the extremity of the instrument, and which shuts one of the sides at the time of exposure.

Before the normal printing of the negative is proceeded with its photometric number must be fixed upon, for which purpose are exposed—1. The negative, against which a band of sensitive carbon paper has been placed in the positive frame. 2. The photometer, furnished with a photometric band not yet printed.

By the aid of a screen three or four parts of the negative are exposed in succession, care being taken to note, at each removal of the screen, the photometric number corresponding with the duration of each impression. A band is thus obtained, after development, on which a portion of the image is reproduced, but with different degrees of intensity. Selecting that which appears to suit best, its photometric number is noted in a corner of the negative. It then suffices for the printing of this negative to expose it at the same time with the photometer, and to remove it as soon as the latter marks the number indicated.

A pressure-frame specially adapted to these trials is better than the ordinary frames on which a piece of cardboard has been arranged, as the observation in such cases is generally wanting in precision.

The special frame is in all respects in conformity with the ordinary positive frames, only that it has a lid which covers entirely the upper part of the plate. This lid can be moved by means of a hinge, so as

* *Bulletin of the French Photographic Society.*

to uncover by turns all the surface of the plate. A graduation by centimetres engraved upon one side of the frame enables the operator to regulate precisely the intervals of the observations.

The reading of the photometric degree is the important point; nothing, however, is easier. The photometer being opened in the diffused light (the positive frame must be turned and covered with the opaque screen), it is seen that different tints are printed on the sensitive band.

Two cases may present themselves:—1. The last of the tints proceeding from the weakest solar impression, and that which is the highest number, coincides as regards its value with the corresponding number of the fixed scale of comparisons, say 8, for example. No. 8 represents the photometric degree of the negative or of the observation. 2. The last of the tints, the weakest visible, does not coincide in value with that which corresponds with it on the fixed scale in the photometer. In this case, with the regulator bearing the same scale, it is easy, by comparing them, to find which is the corresponding tint or the nearest to it. For example, 5 is the weakest tint obtained on the photometric band. A comparison with the fixed scale shows that this tint 5 coincides with No. 9 of the fixed scale. The indication $\frac{5}{9}$ will be borne upon the negative. That will signify that it is necessary to obtain the tint 5 on the photometer, whatever that tint may be, as nearly as possible equal to the tint of comparison 9 on the fixed scale.

With a little practice it is easy to pass from the detached scale to the corresponding tint on the fixed scale, the eye being able to make the comparison even at a distance; but it is well to practice at first with the regulator, which allows them to be brought close together.

The two cases above mentioned are those which present themselves in the normal condition; but it might be that a strongly-fogged negative would require a time of exposure sufficiently long for No. 10 of the sensitive band to be so printed that the tint would correspond with No. 4 of the fixed scale.

The photometric number of the negative would then be $\frac{10}{4}$, just as we had above $\frac{5}{9}$—the first number, 10, indicating that the last tint visible should be equal, or nearly equal, in value to tint 4 of the fixed scale.

It may be easily conceived that a single indication of the last visible tint would not be sufficient. The tint might be visible at different degrees of value; when, therefore, should we stop if it were not fixed by comparison? That is the utility of the fixed scale.

The least practice with this small instrument will enable the operator to use it without any difficulty, and a single glance will suffice to ascertain the degree.

The examination of exposed photometers can best be made without displacing them, provided care be taken not to open them in full direct light. The interposition of a hat, or a piece of folded card-paper, is a sufficient obstacle to the the action of the light, provided the observation be made quickly.

It is unnecessary to say that a single photometer can be used for printing several negatives, whether these negatives have the same photometric number, or form a scale from less to more; so that the weakest numbers can be raised, whilst the highest continue, with the photometer, to attain to their proper degree of impression.

It is important to remark here that the sensitiveness of papers treated with bichromate of potash or ammonia is so great that there is very little margin, when operating in the sun, for observing the photometer when the frames are left exposed. It is better to suppress the action of the light upon them in proportion as the photometer is withdrawn, and expose them again with the photometer.

In fact, the average of good portrait negatives do not require to be exposed to the sun more than two or three minutes; in many cases about one minute is sufficient. An over-exposure of half-a-minute to a minute would be exceedingly detrimental to the image. It is, therefore, necessary, in order to obtain a good impression, to observe rigidly the length of exposure required, and not to go beyond it. An under-exposure is still more to be avoided; for if the development allow any reduction of the intensity, and the proof become at all feeble, it can never be intensified. The best plan is to print the proofs in the diffused light when not pressed for time. The exposure must then be about six times as long as that in the sun; but there is less risk of being taken unawares, whilst the results obtained are much softer.

The sensitiveness of papers covered with certain mixtures varies, particularly by reason—first, of the quality of the bath of alkaline bichromate; secondly, of the length of time of immersion in this bath; and, thirdly, of the time that has elapsed since the sensitising.

There are many other reasons for variation, arising from the temperature, the hygrometric state of the medium by which the sensitive papers were preserved, the composition of the mixture, &c., &c.

For operating in a normal manner it is necessary—1. To choose by preference a paper containing about 300 grammes of the mixture to the sheet. 2. To sensitise it by immersing it in a bath of bichromate at one and a-half per cent., and leaving it there precisely four minutes, avoiding as much as possible all air-bubbles. 3. To employ it, according to the photometric indications upon the negatives, only during the three or four days after the sensitising.

The development should follow within a day after the printing; but, in case this should be impossible, it may be deferred by simply washing the printed sheets in plenty of water, so as to free them of all the soluble bichromate they contain. They are afterwards left to dry spontaneously.

This method of preserving them may also be applied to sheets which are not printed, and which cannot be exposed for some time; only they must not be used for printing until after they have been sensitised afresh.

When images are to be printed the outer borders of which are very transparent, it is well to cover the paper with tinfoil, or to paint these transparent parts so as to stop the luminous rays. Thus every difficulty is avoided at the time of the separation of the mixture from the paper; they would otherwise adhere unequally, and could not be separated without tearing fragments of the undissolved mixture in all its thickness at these very transparent parts of the negative.

As a general rule it is best to operate with soft negatives—that is, they should be without marked hardness, and without too striking contrasts. Every operator of any experience will soon know how to execute negatives such as they ought to be in order to furnish good carbon pictures. That is a simple question of practice, about which there is little difficulty.

There are cases which necessitate that the printing should be longer or shorter for the same negative; but for each only a little care is required. The preliminary trials being made according to the process to be applied, the indications furnished will be suited to such process.

The process must not be varied without previously submitting each image to a trial, and to the photometric notation. We may remark, *en passant*, that when the sheet of sensitive bands is exhausted it is easy to replace it by pasting a new sheet lightly where the first has been. Whilst in use it happens that the three bands which retain the sensitive paper on their borders become rigid after several successive bands have been removed, and a space is formed between the sensitive paper and the lower surface of the transparent scale. The printing of the tints is then done less freely; it is, therefore, necessary to lower these borders to the surface of the band to be printed.

The application of the photometer to enlargements is effected by exposing this instrument directly upon the borders of the image projected upon the sensitive sheet, and placing it so that the surface of the sensitive band coincides with the plane of the sheet to be printed. A preliminary trial, as before stated, is necessary to measure the photometric degree proper for the focal distance. This trial should be made by varying the times of exposure on three or four different portions of the image.

When once the photometric degree is known for the distance to which it is necessary to operate, the work is proceeded with in the usual way, and the photometer is verified from one time to another in order to stop the action of the light at the moment when the degree previously noted has been attained.

In the apparatus for enlarging, similar to M. Liebert's, there is space for practising on the board to which the sensitive sheet is applied, where there is an opening intended for the passage of the photometer, and for its being adjusted as desired.

With apparatus like those of M. Monckhoven, when the operator finds himself in the dark chamber, it is easy for him to place the photometer exactly as he wishes, and to follow the image after it makes its appearance without displacing the photometer. It must not be forgotten that the photometric number of the negative of an enlargement is only of value for a determined focal distance, and that, if it is desired to print images of different dimensions from the same negative, as many trials must be made as there are different sizes.

The indication should be written on the negative in the way already described, but adding the index of the focal distance, measured either after the printing in the chamber for enlarging if it is all in one piece, or according to the distance which separates the objective from the plane of the image, if the operation is in the camera. Thus $\frac{\frac{5}{9}}{2^{m},\ 23}$ would be the indication to be inscribed upon a negative for enlargement, which registers a printed tint 5 in the photometer equal to No. 9 of the fixed scale for giving a proper image at a distance from the objective of 2^{m}, 23.

The bichromate of potash papers, being much more sensitive than the chloride of silver papers, offer great facilities for the practice of enlarging, not to speak of the immense advantage which results from obtaining an image of indefinite stability and of a value as to tone which proofs obtained by the old processes could never attain.

A. Marion.

IN QUEST OF PHOTOGRAPHIC SUBJECTS.

There are numerous delightful localities in the vicinity of London suitable for a day's "run" with the camera, and we have sometimes conceived the idea of briefly drawing attention to these charming spots. And *apropos* of this subject, an extension or revivification of the idea embodied in some articles we published some years ago, entitled *Where to Go With the Camera*, would, we think, prove useful; for which purpose we shall be glad if those of our readers who are aware of suitable localities where a photographer may spend a day pleasantly and profitably will point them out, and add such details as may prove useful, *no matter in what part of the kingdom these photographic hunting-grounds may be situated.*

Hampton Court.

On the present occasion, and in furtherance of the design alluded to, Hampton Court and its surroundings will furnish us with a theme for this week. Going there by rail from Waterloo Station return tickets are obtainable at from one shilling to two shillings and ninepence, according to the class of carriage, the lower of these fares being only charged on Saturdays. It is said by *connoisseurs* that there is more discomfort and less accommodation when travelling by the South Western Railway than is to be met with on any other line. With the exception that the third class carriages of some other lines—for instance, those of the Great Northern or the London, Chatham, and Dover—are decidedly superior to the second class of the line in question, and that the platforms at some of the stations are so much below the level of the carriage steps as to necessitate a kind of lowering process being adopted immensely pleasant to schoolboys, but naturally not much in favour with the fair sex and aged people generally—with these exceptions no serious fault appears to be justly due to the service. The ride to Hampton Court, which is fifteen miles from Waterloo Station, usually occupies about forty minutes.

There are both landscape and architectural subjects to be met with at Hampton Court, and hence lenses to suit their special requirements should be taken.

The Palace itself is exceedingly rich in its pictorial attractions, both architecturally to the photographer and internally to the sightseer. It was erected by Cardinal Wolsey in 1515, but, in consequence of the evident jealousy of Henry VIII., who expressed some chagrin that such a magnificent structure should be occupied by a subject, the politic cardinal presented it to the monarch in 1526. The palace, having been enlarged by Sir Christopher Wren in the reign of William III., now covers eight acres of ground. A portion of it is occupied by members of the aristocracy, but the greater and more attractive portion is devoted to picture galleries, to which the public is admitted (free of charge) on every day of the week except Friday, which is set apart for the purposes of cleaning. Special permission must be obtained before a photographer is allowed to take his camera inside the building, but that permission is not difficult to obtain.

Many excellent views of the building may be secured, but in all cases a wide-angle lens should be used. With an instrument of this description excellent representations of the building may be obtained, chief among which are the east view of the entrance-court and the west view of the clock-court. The picture galleries are numerous and the collection of the highest importance, both from a numerical point of view (there being about a thousand paintings) and from the eminence of the artists. Raphael's cartoons have now been removed to South Kensington Museum; but there are still to be found works by Caravaggio, Poussin, Cuyp, Domenichino, Murillo, Rembrandt, Salvator Rosa, Rubens, Teniers, Vandyke, Paul Veronese, Lawrence, Reynolds, West, Gainsborough, and many others. Indeed, there are in these galleries works from no fewer than two hundred and seventy masters of greater or less renown.

An artistic photographer whose organ of veneration is imperfectly developed will find much to amuse him in the stiff and almost unnatural composition of many of these world-famed paintings. Take, for instance, the otherwise truly magnificent portrait of *Villiers, Duke of Buckingham, and Family*, by Honthurst. Were any photographer—even the proprietor of a travelling van—to pose a family group in the same stiff and formal manner, being a sad example of the absence of grace and ease, he would be held up to reprobation. Of the much-bepraised *Family of Pordenone* the same might be said, although, perhaps, in a modified degree. Photographs of groups posed in similar manner to these and suspended on the walls of the next photographic exhibition at Conduit-street would prove an admirable foil to the many good pictures we expect to see there in November next. *The Expulsion of Heresy*, by Paul Veronese, also forces itself upon the attention of the common-sense spectator from the fact that, while one figure is in the act of stabbing another, three other figures, who are in the immediate vicinity, are so absorbed in "standing for their portraits" as to be unobservant of the tragedy presumed to be taking place within a few feet of them.

The room containing the beauties of the court of Charles II. attracts much attention. The ceiling, representing *Night* and *Morning*, painted by Verrio, is very beautiful, and will interest the visitor from the excellence of the figures—although some liberties are taken with possibilities, such, for example, as a group of happy children being represented as playing hide-and-seek around and behind the horns of the crescent moon.

In one room is suspended a barometer of by no means modern date, in which the upper portion of the tube is bent away at an angle from the vertical line. In this way an inch of rise or fall in the mercury is extended over a length of several inches, rendering small variations much more easily appreciated.

A highly-finished painting of *Adam and Eve (in puris naturalibus)* by Jan de Mabuse, will arrest the attention of the matter-of-fact spectator, who, when examining the fountains and beautiful sculptures in the Garden of Eden, will naturally wonder by what artist they were executed.

There are numerous fine views to be obtained in the grounds connected with the Palace, and, if the day be still, beautiful reflections in the water may be obtained. If possible, a stereoscopic camera ought to form part of the photographer's *impedimenta* when he visits Hampton Court.

Bushey Park, which is within a few hundred yards of the Palace, abounds in rich food for the camera. When photographing here, by all means let the wet process be employed; for there are so many tame deer which feed within a short distance, and which form such a very beautiful feature in a landscape, no trouble should be considered too great in order to their being properly represented.

The long avenue of horse chesnut trees is a striking object, and some effective views of it may be taken, especially at the end, near Hampton Court, where the straight mile-long road is broken by a circular basin of water, the lines of the avenue being here bent into curves concentric with the basin.

From the boat-house above the bridge over the Thames (a few minutes' walk from the Palace) boats may be hired for a shilling an hour. One of these will convey a party consisting of five or six persons up the river, and, if a landing be effected here and there, it is possible to secure several fine pictures. There are some little well-timbered islands, of which may be obtained stereoscopic views of no ordinary kind. The grass and banks of the island form a foreground, overhanging trees form the sides and top, closing in as with a framework the view of the church, the villas, or any other objects on the mainland, which, if the day be fine, are also all reflected in the intervening river.

There are several days' work for the photographer in the interesting locality here indicated, and the scenery and subjects are of the most diversified character.

PHOTOGRAPHIC SOCIETIES: THEIR PROCEEDINGS.

After gentlemen are admitted as members of a photographic society—before there is any likelihood of them withdrawing or being ejected, before there is anything to report, and before the adaptability of the officers to their various functions has been demonstrated—the society must have held a meeting at which proceedings of some kind take place. Such proceedings may, as a rule, be readily classed under one of two heads, viz., those of a satisfactory and those of an unsatisfactory nature. If of the former variety they will probably have afforded opportunities for a dignified presidency and an interesting discussion, and may have given rise to a good and readable report, and to pleasure amongst the members likely to result in an increase of numbers. If, however, the proceedings are of an unsatisfactory nature, they may furnish an opportunity for ejecting (or proposing to eject) some member, or may give rise to a brief and stale report, or to a general impression that the clock has stopped, and to a half resolution to go no more. In reference, however, to the proceedings of a society, the useful part of the question to consider is rather how we may induce them to *be* of a satisfactory nature, than *how much* pleasure it is possible to obtain at a society's meeting on the one hand, or *how much ennui* it is possible to endure on the other.

The writer's experience of photographic societies, though not very extensive, comprises within it the remembrance of meetings which

have been attended by only about a dozen members and which have broken up after a single and tedious hour, and also of others where the rooms have been crowded and some two hours and a-half were found too short a time to finish the interesting business on hand. Sometimes he has heard members remark that "if it were not for the tea you would not catch them there," and, at others, that "they would not mind coming twenty miles to spend such an evening." When there is a small attendance and a short meeting the society's circular preceding it has generally contained no announcement more interesting than that a meeting would be held on a certain day, and that Mr. Somebody would be balloted for as a member. With such a bill of fare a sumptuous mental repast does not seem probable and is seldom obtained; yet those who maintain that the meetings of a photographic society are useful only for social purposes should flock in abundance when there is nothing on the programme, as then the opportunities for "diminutive conversation" are most extensive. From the fact, however, that the want of a programme generally results in a very scanty attendance, one of two things is to be concluded—either that the mere talkers, or gentlemen of a purely social disposition (as they will, doubtless, call themselves), constitute a very small minority of the members, or that the pleasures to be derived from "small talk" are increased with the number of those who reluctantly give it a hearing. Either view of the case does not say much for the purely social section of a photographic society.

On the other hand, when a paper is announced in the circular it is, as a rule, likely that there will be a very fair attendance; but there will certainly be one if the paper is to be upon some subject of general interest, and by some intelligent member. A paper on sidereal or lunar photography would be sure to attract a large attendance, whilst the "moral influence of photography upon its devotees" would probably find but few listeners. In short, papers which appeal to the intellect will draw well, whilst those which appeal merely to credulity, or an abnormal love of verbosity, will not do so. Appeals to the eye, however, especially when coupled with others to the understanding, are by far the most effective. Announce some experiments, and there will not merely be a good but a large attendance. If they are of a striking nature, and are followed by the announcement of others to be performed by the same person, and succeeded by further experiments by some one else, you may depend upon it there will not only be a large but a crowded meeting. The largest attendance ever known in connection with a meeting of the Manchester Photographic Society took place under circumstances of this nature. To be sure even experiments are not to everybody's liking. If there were a local heaven, and people were sent there promiscuously, some, doubtless, would feel that they had been ill-used by such treatment. At the Manchester Society, during the performance of experiments by older and more respected members, as well as by the writer, *some* have been known to ask—"How long are these beastly experiments going to last?" Others have been heard to say that the attraction shown was "pretty good" in its way but "was at least a century old," or that "it wouldn't work," or "was not half so good as something *they* had introduced" (but unfortunately never shown). Disparaging remarks of this nature, when made systematically—and they are not unfrequently so made—only tend to make the meetings dull by discouraging those who attempt to enliven them, and utterly fail in the production of any good result, for which reasons they should be avoided.

Seeing that papers and experiments increase the attendance and intensify the interest of the members they should be encouraged—by what means, is a question for further consideration.

"Order," says Pope, "is heaven's first law." Whether the laws of heaven have differing degrees of value, or, if they have, whether order stands at their head, are questions about which it is of little moment to concern ourselves. Of the immense value of order, however, in everything the writer is very fully persuaded, and is of opinion that an indifferent appreciation of it by members of a photographic society is one great cause of unsatisfactory proceedings and of staleness in its meetings. A disregard for the amenities of debate, and a total want of system in the conduct of discussion, have, in the writer's experience, detracted sadly from the interest of the photographic meetings at which he has known them to be largely indulged in. Upon one occasion, when about a dozen gentlemen were speaking at the same time, and when, though everybody was heard, it was impossible to catch any remark, the writer moved a resolution to the effect that "the meeting should be conducted in an orderly manner." The motion appeared to stagger about one-half the members in the room, and, though many gentlemen seemed glad that it had been proposed, yet no one took the opportunity of seconding it, and the dozen gentlemen who had combined to produce the momentary disorder, upon finding the motion lost, continued their avocation with increasing industry and apparent satisfaction.

What the amenities of debate are it is surely unnecessary to detail here. For the satisfaction, however, of the few who may not be acquainted with them, it may be as well to state that, unlike the Parisian fashions, they have a rational origin, and are dictated purely by common sense. The requirement that a speaker should stand is evidently a wise one, as it makes a very proper distinction for the time between the person who has remarks to offer and those who listen to them. When two gentlemen rise to speak, that the preference should be given to the first who rises is obviously the easiest way of maintaining order without introducing unfairness; and so on. Any gentleman who wishes to act in accordance with the amenities of debate need only act upon a well-formed resolution to conduct himself towards each member of the meeting as he would wish each member of the meeting to conduct himself towards him.

The proceedings of societies have their interest occasionally interfered with by the reading of some paper which, in the general estimation, is a mere accumulation of erroneous or ill-founded ideas. Men of considerable intelligence at times do things which make them appear ridiculous; and, when they produce papers which would, on being read, merely waste the time of their hearers, and place themselves in this unfortunate light, the council of a society should intimate to them that their paper will be better unread. To be in a position to do this, however, the paper must needs be submitted to the council before the meeting is called—a plan at times very useful, though scarcely ever adopted now.

Personal discussion is so abominable and obvious a failing, and is evidently so calculated to be prejudicial to a society's proceedings, that the only wonder in connection with it is that anybody should be found who is prepared to indulge in it; and yet it is to be regretted that there are numbers who attend photographic meetings who avail themselves of every opportunity to distract the attention of the general body from scientific to mere personal matters. The Editors of this Journal have frequently stated in their correspondence columns that, *as editors*, they entertain no religious or political sentiments whatever. That they do entertain sentiments on both religious and political matters is beyond a doubt. That they have eyes and ears of some colour and shape is immensely probable; but of what particular variety their eyes and ears may be, or whether in politics they are liberal or conservative, or in religion orthodox or heterodox, is a matter of absolutely no moment whatever when they are regarded simply as the Editors of The British Journal of Photography. When the writer of the present article directs attention to what he conceives to be some fact of interest in connection with physical science, what does it matter to the reader whether he is enrolled on the books of some little community in his own town or not? and when he goes to a meeting of some little community on whose books he is enrolled, how can it matter to them if he has previously dined at home on beef steaks, or spent his leisure time in writing for The British Journal of Photography? As a writer he is, of course, regarded with appreciation by some and without appreciation by others; but, as a member of a photographic society, he certainly claims what every member of a photographic society is entitled to—the right to hold his own opinions on scientific and religious matters, and also to exercise the privilege of contributing to any photographic journal he pleases—a right which has, in more than one instance, been publicly disputed by those who, whether from good, bad, or indifferent taste, failed to appreciate his writing.

Before closing the present article he would like to direct attention to one more source of disorder and unpleasantness in connection with the proceedings of photographic societies, and that is—the perpetration of jokes and the relation of anecdotes which are considered "funny" by those who inflict or bestow them, as the case may be, on the whole assembly. Amusing as these interruptions at times undoubtedly are, their chief effect is to raise a laugh where laughter is out of place, to destroy the order, to lessen the real interest, and to mitigate, if not to destroy, the usefulness of the meeting. The habit of interrupting a meeting or destroying a discussion merely to "poke fun" or raise a laugh is unworthy of a scientific assembly. Shakspeare expresses his low estimation of the class of persons who do this in Hamlet's advice to the players, where he says:—"There be them that would of themselves laugh to set on a quantity of barren spectators to laugh too, although, in the meantime, some important passage of the play be then to be considered."

D. Winstanley.

ON THE CONSTRUCTION OF OBJECT-GLASSES FOR THE MICROSCOPE.*

For the brass setting of object-glasses it is necessary that the worker should possess a good foot lathe; if provided with a self-acting arrangement for chasing up the short screwed parts of the cells, this will ensure greater accuracy of workmanship. The setting or metal work of an object-glass must always be made before the lenses are commenced. Three steel gauges are to be first formed, of a width exactly corresponding to the diameter of the intended lenses; this gauge I make out of a piece of sheet steel, with three arms of the three diameters required. A chuck should be fitted to the lathe, and cut out to the standard thread now generally adopted for object-glasses; into this the brass setting is fitted, and each cell screwed on and turned out in succession to the proper size. I leave no shoulders at the back of the cells, but bore them clear through.

Triblet tubing is not sufficiently accurate for the outer shell of the highest powers; it is better, therefore, to make this of one casting, and bore it out of the solid, from its own chuck, and finish to the size with a fluted rimer. I have always made the inner tube, containing the back lenses, to traverse to and fro, in preference to the front lens, as

* *Monthly Microscopical Journal.*

the object is not thereby lost sight of during the adjustment, which is performed in one-third of a revolution of the outer ring, which has an inclined groove cut in it, acting on a screwed pin connected with the inner tube. This plan is more simple in construction and less liable to derangement than the one commonly employed.

On Reducing and Dividing Masses of Glass for Optical Purposes.

For this the lapidary slicer and diamond dust are generally employed. Discs of glass are split into slices by the working lapidaries at such a trifling cost that it is scarcely worth while for the amateur to attempt it. Should, however, a small and rare sample be immediately required for experiment, it may be readily sliced with a circular disc of soft iron, running in the foot lathe, and fed with flour emery and water; the edge of the slicer must be frequently notched with the sharp angle of an old file. The sample of glass or mineral is cemented to the end of a staff, and held preferably in the slide-rest. If the screw of the rest is taken out and the slide made slack, the work can be thrust up to the slicer with the pressure of the fingers, and there is less risk of fracture from undue violence. The sliced glass is cut into squares, a little exceeding the diameter of the intended lenses, by means of a glazier's diamond, and the corners rounded off with a pair of optician's "shanks" or nibblers, which are a species of pliers, made, in preference, of soft iron, as this grips the glass without slipping, as hard steel would do. This instrument, of a larger size, is capable of removing slivers of glass from the edges of a plate upwards of one inch in thickness.

All glass is much softer than hardened steel; but if this is set to cut in a dry state the heat generated at the working or abrading point softens the cutting edge, and speedily destroys its action; but if some turpentine is applied, this quite prevents the softening of the tool. In the lathe, or with a common Archimedian drill, holes may be drilled through thick plate glass with surprising rapidity if kept well bathed in turpentine. Masses of glass may also be turned in the lathe with a steel tool, if plentifully supplied with turps, and run at a moderate speed.

The first experimental parabolic condensers were made from plate-glass one and a-half inch thick; pieces of this, nibbled rudely to form, were cemented on to a chuck. The T-rest was next placed nearly on a level with the top of the work, and an old triangular saw-file, kept sharp *on one side only* by repeated applications to the grindstone, was then held on the rest, so as to attack the revolving glass slantways, or spokeshave fashion, with plenty of turpentine. By these means the glass was quickly reduced to form, so as to fit the template; and the ridges left by the file were swept away by means of small leaden laps, fed with emery and water of decreasing fineness. The polish was obtained by a rubber of willow-wood, cut crossways of the grain, used with crocus and water, and at last a lump of beeswax with very fine crocus was employed for the final polish.

For working small concave lenses as nearly as possible to their final form, a great deal of accurate and skilful turning is required. For this delicate work steel tools are quite unsuited, and diamond points are invariably used. The common practice of mounting these has been to solder them with brass and borax, by means of the blowpipe, into the end of a steel tube about the size of a watchkey, leaving a hole behind to prevent the diamond from being blown out during the fusion; but I have never found this method secure for small splinters. The brass has really no affinity for the diamond, but rather tends to avoid it; and this is frequently only held in by the glaze or flux. The loss of several diamonds induced me to abandon this practice, and since adopting the following mode I have never lost one:—I take a piece of copper wire about one-twelfth of an inch thick and drill a shallow hole in the end, of the size and depth required to contain the diamond; a piece of steel is turned out with a bell mouth and hardened. This is spun rapidly in the lathe, a drop of oil is applied, and the end of the copper rod containing the diamond is pressed hard in, at the same time giving it a slight rolling motion. Speedily the copper is compressed tightly round the diamond, which becomes very firmly imbedded in the soft metal; and if the operation is carried too far the copper rises over the point and completely buries the splinter.

By mutual abrasion diamonds rapidly grind each other away, and two mounted in wires in this way may be kept mutually to a sharp point by chucking one in the lathe and using another as a turning-tool. In employing these diamonds for turning glass, no particular directions are needed; they seem to cut rather better if the work is kept slightly moist.

The most convenient way for the amateur of reducing the substance, or giving the rough rounded form to small lenses, is a large plate of zinc and coarse emery and water; iron is too hard, lead too soft, and copper poisonous.

Of the Powders Employed for Grinding and Polishing Glass.

For lenses, emery is almost invariably employed for rough grinding and smoothing. For the latter operation it must be washed to various degrees of fineness; as it is seldom sold in this state, the sizes in commerce are merely sifted. Emery differs much in hardness and quality, according to the locality from which the ore is obtained. If it is full of reddish particles of a dull, slaty appearance, it is soft and deficient in the grinding property. The Guernsey emery is of this character, and very inferior to the Naxos, the particles of which have a steely appearance of uniform colour; but this latter is difficult to obtain, as it is monopolised by some of the large plate-glass manufacturers. Three or four sizes are sufficient for the glass worker for roughing down and fine grinding; but for smoothing, washed emery of several degrees of fineness is required. A portion of the flour of emery of commerce is placed in a bowl or a common washhand basin, and well stirred up. At the end of ten seconds the water is poured into another bowl. This is repeated several times, till no more can be withheld from the original quantity. This washed quantity is again separated into several other degrees of fineness, as at the end of one minute, five, twenty, and sixty minutes; but after one hour a very small quantity is obtained from one pound of the flour of commerce. This being of value for the perfection of the final smoothing, or obtaining a semi-polish on the metal lap or mould itself, I have preferred procuring it from the "optician's mud," or refuse of the previous grinding operations. Taken in an unprepared state this contains a large percentage of impurities, consisting of ground glass and metal particles from the laps; it is, therefore, necessary to remove them—the first by boiling the mud with caustic potash, and, after washing away all trace of the alkali, finally treating with dilute sulphuric acid. The finest portion only of one hour's suspension may then be separated and obtained in a satisfactory quantity.

The polishing powders used by the workers of minute lenses are putty powder, or oxide of tin, and crocus, or oxide of iron. The first may be obtained sufficiently good without any difficulty; but after many trials, both by roasting the alkaline precipitate from sulphate of iron, and also carefully washing the crocus of commerce, I have given the preference to jeweller's rouge, sold by Acton, of Farringdon-street. In this form it is far too soft for glass polishing. It must therefore be heated in an iron pot, and diligently stirred till the mass acquires a purple colour; it is then of the requisite degree of hardness. Both this and the putty powder must be washed to separate gritty particles; about five minutes will be sufficient. After obtaining all that can be suspended in this time, the residue may be levigated on an iron plate with a soft iron spatula, and the washing continued at pleasure; but the result of all the washings is sure to contain some gritty particles, which must be separated by repeated washings, till nothing whatever will settle at the end of five minutes. Two sizes of crocus only are needed; the last is obtained from the washed mass after one hour's suspension, and is very small in quantity, but of much value for obtaining the finest polish on prism work, either in glass or calc spar. The ordinary washed crocus, used alone, I have found too keen, and apt to cling to and raise streaks on the polishing laps; I therefore always mix it with an equal part of the putty powder, which quite remedies the evil. An uniform mixture is best obtained by stirring them together with water. F. H. Wenham.

Contemporary Press.

ON THE WANT OF SENSITIVENESS IN DRY PLATES.

[Humphrey's Journal.]

Among the causes which tend to diminish the sensitiveness of dry plates may be enumerated exhaustion of the nitrate of silver, the contraction of the film, which, once dry, is incapable of again returning to its former spongy condition (thus preventing the formation of the picture within the film), and, finally, the greater transparency exhibited by the dry-plate films. It is with this latter subject that we have at present to do.

By way of investigation, I prepared two plates with the same collodion and the same silver bath, and placed both, one upon the other, in a dark slide, inserting a few strips of paper at the corners to prevent any damage to the films.

In this manner both films were, one behind the other, exposed in a strongly-lighted apparatus for five seconds. On development, the first plate afforded a picture in the ordinary way, while the other produced but a faint outline. The collodion employed was strongly iodised, and the film was, on that account, fairly opaque.

The experiment was repeated, with this difference, that the collodion for the first plate was only half as strongly iodised as that previously used, and capable, therefore, of giving a picture only half as opaque. The second or back plate was prepared with the same collodion as that used in the first instance. This time there were developed after exposure, upon the first plate, a weak image without sufficient detail, and upon the back plate another picture of almost like vigour.

In the third experiment a dry plate was placed in the dark slide, and upon this was imposed a strongly-iodised wet plate. The dry plate furnished a very weak image, whereas upon the wet plate a perfect picture was developed, which had, of course, been produced wholly and solely by the light rays unabsorbed by the dry plate in front.

From this we may conclude that, in order to bestow upon the dry-plate process more sensitiveness, it is necessary that less transparent films should be employed, whose opacity must, however, be produced by means of photogenic substances. It is possible that opal glass might be employed in this relation to advantage; the rays would, by these

means, be reflected by the white backing, and their direct action would thus be strengthened. In using glass of this description for negatives, it would, of course, be necessary to transfer the collodion film.

The results of my experiments I have communicated, as I feel they may not be uninteresting in reference to the study of absorption of luminous rays and its transformation into other forces.

When science has made further progress, it may not be impossible to ascertain exactly what becomes of the whole amount of light absorbed by a sensive plate during a given period. C. Ommeganck.

TROUBLE IN THE STUDIO.

[Photographic Mosaics.]

The studio, or skylight, is daily the scene of many a conflict. In the other departments we have only things inanimate—yet how depraved and fickle!—to battle with, but in the studio we have both the inanimate and animate to try and worry us. Of the latter class of troubles we propose to say but little. If they are troublesome, and self-conceited, and officious, and hateful, and ugly, and stubborn, and obtuse, and wilful, and artistic in their tastes (?), and meddling, and fussy, and particular, and always suggesting, and overbearing, and disagreeable, and think they they know all about it, and you know nothing, why just never mind. Be amiable. Bargain with such that, if you allow them to have *their* way once, you are to have a chance at the same privilege. True, it puts you to the expense of making an extra negative; but then it saves you much time, and *time* is money. Moreover, if you make this your rule, it will save your temper; and your reputation for amiability, that will follow, will bring you many a customer.

There are many other troubles in the operating-room, however, that do not come with ugly men, simpering misses, crying babies, vain mammas, gruff papas, rollicksome boys, or sweet, nervous little girls, although they are the direct cause of them all.

The difficulty of contriving positions for the many who visit his rooms daily is no trifling one to the photographer, yet it is one he must learn to overcome. There are those who can, at the first glance at the subject, see enough to guide them in making a proper and pleasing pose. None of you are so ignorant as to be told that it is not well to choose a stereotype set of positions, and make your sitters assume one or the other; or that it is necessary to study the figure somewhat, and to do it quickly. Not only must you study the subject, but you must study it with a discriminating eye. Having made up your mind as to choice of pose, and partly arranged the figure, next observe how the light plays upon it. Wherever you desire light you must illuminate, and wherever shadows are needed shadows must be produced. If you or your subject admire brilliant pictures, with strongly-marked lights and shades, so arrange the light as to allow it to fall on the sitter in that way. If soft, delicate, half-tones be desired in the face, so let the light fall upon it as to produce them, and then by carefully exercising your *photographic* skill, secure the effect upon the plate that you see upon your subject. "All very well said," you remark, "and *so* easy to do!"

It is just as easy, after you have drilled yourself into it, as it is to work without a purpose or an intent, and having no care as to the quality of the work you produce. We know of the troubles met in the operating-room. Many a trial, and many a conflict, and much abuse, have we met there. Much hard study, too. We learned there that every pretty face was not the index of an angelic spirit; and since then, becoming more familiar with them, have learned that, every man who made Daguerreotypes twenty years ago or more, is not a skilful photographic artist now. We have seen with pleasure, however, that photography is improving. There are more photographers now making good average work than we hardly dared expect there would ever be two years ago—we mean more particularly so far as *chemical* effects are concerned. What is wanted now is a more careful and earnest study of light and shade and composition. This is one of the troubles of the operating-room—a want of artistic taste and skill in lighting and arranging the subject, and in its treatment generally.

The small space allowed here would not enable us to give even a brief chapter on that subject. The English journals, and our own *Philadelphia Photographer*, have published during the whole of the past year several chapters of instructions on these important topics, which all would do well to read and study if they can.

A few more remarks upon the troubles which may occur to us in operating, as we rehearse the necessary movements in taking a picture, will be all that we shall now make.

Do not forget to give attention to your background, where it is possible. Have both a dark and a light one at hand, so as to meet the variety of dress worn by your sitters—a dark background for light drapery, to relieve the monotony, and *vice versâ*. Remember, light *and* shade are what make up the picture, but not absolutely white and black. *Gradation* is to be sought after in both.

This much said, let us make a picture together, mentally. We seat our subject. We observe the effect of light upon his face, for that is the main object. The light appears to shine almost too vertically upon his head, making heavy shadows under the nose, eyes, &c., and the hair snowy-white. The face is too evenly lighted, and will appear flat unless we change the light somewhat, to secure more contrast and half-tone. This done we step back, our eyes about where the centre of the lens would be, and study the picture. A slight turn of the head improves the shape of the nose considerably. We move it gradually, a slight change in the figure making a considerable one in the camera.

We now go to the camera and focus with the largest aperture. The eyes being sharp, the head, hands, &c., all being in proper focus, we proceed to examine the accessories and get them in focus. Now fix the head-rest; put the plate in the camera, and watching for a proper expression—expose. All the while chat cheerfully with the subject, to keep him as amiable as you can, and you get a good picture.

If we see a dozen pictures, by any photographer, we can tell pretty well what his disposition is by the expressions on the faces of his subjects. A pleasant photographer can usually secure a pleasant expression. To do this, however, it is not best to stand staring at your subject during exposure.

There are innumerable little dodges which one must learn, by experience, to complete his education for proper working in the studio, a few of which only can we mention here.

One common blunder is, in posing a gentleman, to place the leg *from* the camera, over the one *to* the camera, throwing the latter in shadow, and giving the whole figure a top-heavy look—like a statue with part of the base broken off.

In the portraits of children the head often appears unnaturally large in comparison with the rest of the figure. This is caused by having the lens so high that the child is *under* it, as it were, and too near it. A lower camera-stand should be used, or the child elevated in some way.

Again: we occasionally see portraits of ladies, having very broad shoulders, placed sitting square to the front, and the fact of their having broad, square masculine shoulders, rendered to the full extent. Now turn the figure, so as to present more of a three-quarter view, and that objectionable peculiarity will be lessened considerably. The same treatment may be given to a full, round face, much to the advantage of the sitter. A crooked mouth, or one drooping at the corners, may be improved in the picture, by selecting a pose that calls for inclining the front of the head slightly forward, as in reading.

Learn to give not only as much grace to the figure as you can, but a carriage to the head that will be appropriate and graceful also. A turn of the head at variance with the carriage of the body is usually the best and most pleasing.

The majority of portraits are best taken with three-quarter face. A full face is generally flat, and very few persons have a good profile. A profile view should never be taken of one with a high, round head, a pug nose, or a very long nose. The light should, of course, be on the near side, and the shadow on the retiring side of the face. The sitter should also look away from the light, as a general thing.

Thousands of other things could be told—perhaps well known to you, but so often forgotten—to ease the worry of the studio. The exposure has been commented upon elsewhere, and is a most important subject for consideration. Be careful in every manipulation, and, with an earnest determination to make good work and to never wrangle with your customers, you will be on a fair way to photographic success.

Edward. L. Wilson.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 23rd	Bristol........................	Philosophical Institution, Park-st

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the Memorial Hall, on Thursday, the 9th instant,—the Rev. Canon Beechey, M.A., President, in the chair.

The minutes of the May meeting were read and passed.

The President said a copy of the *Journal of the Bengal Photographic Society* had been received, accompanied by a letter soliciting contributions to the exhibition of that Society.

Messrs. Coote and Hooper were elected auditors for the ensuing year.

Mr. Noton read a paper on *Streaks in the Direction of the Dip*. [See page 444.]

A spirited discussion followed. Many questions were put to Mr. Noton, who said he thought the members interested in the subject would do well to read his remarks when they appeared in the Journal, and resume the discussion at the next meeting.

Mr. Wardley was of opinion that stains or streaks generally resulted from the employment of an impure silver bath, and he and others had found it an advantage to shake up the bath with a quantity of kaolin every time it had been used. The moment an albumenised plate was put into a solution of nitrate of silver, that solution became impure. He thought the peculiar marks on the plates shown by Mr. Noton might be traced to impurity in the silver bath.

The President asked what state a bath would be in when it gave a dirty negative.

Mr. Hebert said such a bath would probably be too poor in silver.

Mr. Mabley remarked that, although it might ultimately appear that Mr. Noton had not hit upon a correct theory in regard to streaks of the kind shown, he had certainly propounded something new, and the members had to thank him for a very interesting paper.

Mr. Atherton wished to state that a member of the Society, who was unavoidably absent, had recently been sorely troubled with pinholes in collodio-albumen plates, and had discovered an antidote for them. The gentleman alluded to, he said, following the usual mode of development for such plates, found that his negatives were full of pinholes; he therefore, after a little consideration, decided to try the effect of rubbing them gently with cotton wool before proceeding to develope, when, to his great satisfaction, the pinholes no longer troubled him.

The meeting closed with the usual complimentary votes.

SOCIETY FOR THE ADVANCEMENT OF PHOTOGRAPHY, BERLIN.

A meeting of this Society was held on the 13th ult.,—Herr Prümm in the chair.

The Chairman informed the meeting that Dr. Vogel's absence was attributable to the state of his health requiring him to take sea bathing, and that during the months of August and September meetings would only be held that were summoned for particular objects. The present meeting was called by the wish of Professor Husnik, who had intended to lay before the Society some practical proofs of his new printing process, but unfortunately he had been prevented from coming to Berlin for the present.

The letter written by Professor Husnik was read, and the meeting expressed the hope that he would make good his promise on a future occasion.

After some private business and presentations only interesting to the Society, an artistic supplement to the *Mittheilungen* was laid before the meeting, which consisted of 1300 copies of a *carte-de-visite* portrait sent by Herr Albert, and which were produced by his new printing process. The statement of Herr Albert that he had printed several thousand copies from the same plate created considerable sensation as a circumstance of the utmost importance, being evidence both of the extraordinary capability of his process and the adaptability of the photographic art. Some large prints received at the same time from Herr Albert, and which were exquisitely finished, were examined with the greatest interest.

Herr Burckhardt drew particular attention to the prints on surface paper, which were full of effect in the deep parts.

Herr Prümm read a letter from Herr Paul Schimpke, of Frankfort, in which he gave some receipts for executing burnt-in photographs on enamel. These were interesting as forming a valuable supplement to Herr Oidtmann's manuscript received by the Society a few weeks since.

Herr Schimpke gave some information respecting positive baths with the addition of nitrate of soda and ether, and said he calculated the consumption of silver to be about eighteen grains per sheet.

Herr Saro mentioned that he had obtained some very good results from these baths.

Herr Grasshoff laid before the meeting a tableau of *cartes-de-visite* portraits, being studies in lighting of the so-called "Rembrandt effect," which were favourably received.

The meeting was then adjourned.

Correspondence.

Foreign.

Paris, September 14, 1869.

I did not quite expect, when I penned a paragraph on "spiritualism" as described by Mr. S. C. Hall, that so much notice would have been taken of it, nor did I intend to trouble your readers again, but it is only fair that I reply to "An Old M.D." and to "A.B.C." Let me first emphatically protest against any materialistic tendencies, and against any imputation of being a materialist. Those who know me best will bear me out in this. These same friends will also be equally sure that I am no "spiritualist," taking both terms as generally accepted. I hold that there is a natural body and that there is a spiritual body, each with distinct capacities, and that between the two there is a great gulf placed, arising from the incapacity of the natural body to *see* the spiritual. I believe in the resurrection of the natural body, transformed into a glorious spiritual body, but have no reason to believe that inanimate objects with which that body was adorned or sustained can arise also. I do not hold the privilege of immortality and the resurrection so cheaply. So much for the theological part of the argument, which I allude to only because materialistic zeal and tendencies have been imputed to me.

Now for what I consider is illogical in Mr. S. C. Hall's statement. He states he saw a figure—a female with a healthy face, closed eyes, plaited hair, and a "mutch cap." As "An Old M.D." observes, this is a matter of observation. Let us grant that this figure was seen. I hold that it is illogical for Mr. Hall to pronounce that it was the spirit of his sister. Mr. Hall believed she had left the earth, and had undergone the change in which "this mortal has put on immortality." How can such a stupendous change take place, and yet the spirit be imperfect, showing symptoms of a former infirmity—blindness—and wearing a symbol of former imperfection—a "mutch cap?" That Mr. Hall saw something I do not contest, but that what he saw was his sister's spirit I do protest against. I advance here, subject to correction, the opinion that everything that is *seen*—or that, in other words, produces an effect —upon the retina which is called vision, must be *material*. If material, it is not spiritual; if spiritual, it is not *seen*. I think that an iodised collodion plate would assist this question: it would be impartial if conscientiously prepared. Let one of these appearances be *produced*, or evoked, or waited for in the dark or in the light. Let a camera and extra-sensitive plate be ready for action. When "it" is seen, let the observer focus quickly—for I suppose "they" are not visible to all eyes —and then let the photographer "take it." I fancy an iodised plate would not take anything but the figure of a material substance. Try it.

I do not deduce from the narrative of Mr. Hall that a physical body can *reappear*, as writes "An Old M.D." I do not think it can; hence my doubts of the success of the photographic experiment I have just suggested. That a physical body can *appear*, and can be believed to be anyone the beholder desires, I can understand, and some remarks of Ruskin which I came upon a few days ago seemed to me to be appropriate to the subject:—

"Some years ago, as I was talking of the curvilinear forms in a piece of rock to one of our academicians, he said to me, in a somewhat despondent accent:—'If you look for curves, you will see curves; if you look for angles, you will see angles.' The saying appeared to me an infinitely sad one. It was the utterance of an experienced man, and in many ways true; for one of the most singular gifts, or, if abused, most singular weaknesses, of the human mind is its power of persuading itself to see whatever it chooses—a great gift, if directed to the discernment of things needful and pertinent to its own worth and being; a great weakness, if directed to the discovery of things profitless or discouraging. In all things throughout the world the men who look for the crooked will see the crooked, and the men who look for the straight will see the straight."

"A. B. C." will see that I have printed no graver charge against Mr. Hall than being illogical, and writing in a strain which sounds to me by the name I gave it, and I hold that still, even though an officer in the Guards saw "it" too. I have no desire to enter any circle of French spiritualists, I can assure "A. B. C.," even if my leisure would allow it. Even the fact of there being three millions of spiritualists in the United States is no proof to me of the reality of spiritualism, when I remember there are many more believers in the ballot, republics, and protection tariffs in the same country, and that I still am unconverted to these American notions. I do not attach even so much importance as I fancy does "A. B. C." to the fact that the occupants of the thrones of France, Russia, and Prussia are believers in "spiritualism." They also hold beliefs which most men consider incorrect. Let the photographic test be really applied, and let these "appearances" be photographed. We shall then have fair field for argument in the pages of this Journal; and we may find some curious facts relative to the peculiar sensitiveness of certain chemical compounds to "appearances." I cannot call them otherwise, for I do not wish to believe in total imposture in these matters. I suppose the dark will do equally well as the light for *seeing* "them;" and, if so, it will be better for photographing "them," will it not? Do they produce the sensation of vision by means of special emanations of their own, or do "they" act as reflectors of light like material bodies. I think, as the matter has been discussed, the investigations of photographers in the way I suggest would be the right way for them to pursue in this matter.

I read in *Cosmos* that M. Neyt, a well-known scientific gentleman of Gand, has lately been producing some fine lunar photographs. M. Neyt is fond of English-made instruments, and had procured his nine-inch telescope in London. He receives the focal image of the moon directly upon the sensitive plate, after having slightly enlarged it by a lens. The original negatives are about one inch in diameter, and M. Neyt enlarges them in the camera to two inches. The transparent positive thus obtained is again reproduced as a negative, which serves to print from. This process, although tedious, he prefers to printing the pictures by means of the solar camera from the original negative, the great heat produced by the lenses being liable to spoil a delicate little negative, and, besides, a species of indistinctness is produced from diffraction, which injures the small details of the picture.

I expect to leave your readers for a week or two, but shall meantime be looking out in other countries for subjects for future letters. *Au revoir!*

R. J. Fowler.

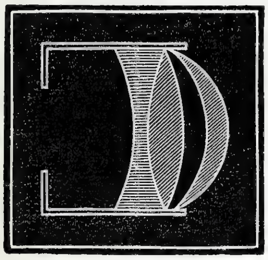
Home.

GODDARD'S LENSES.

To the Editors.

Gentlemen,—In the Journal for the 20th ult., chapter VI., *On the Lenses Used in Photography*, you speak of the late eminent J. T. Goddard's researches on lenses, &c.

I beg respectfully to say the deep-curved meniscus lens (*fig.* 3, page 399) was my invention, and not Mr. Goddard's. The first lens of that construction was made in August, 1858, and was 14 inches focus, 2$\frac{3}{8}$ inches diameter, and which covered a plate 14 × 11. It was in the possession of the late Mr. Henry Bath, of Swansea. The next lens made by Mr. Goddard of that form was for myself, which I yet have. It is 12$\frac{1}{2}$ inches focus, 2$\frac{3}{8}$ inches diameter, and covers a plate 12 × 10, the shortness of its focus doing work equal in surface to a Lerebours or other view lens of 16 to 17 inches foci, and fully one-third less exposure, the architectural lines being perfectly true, with greater pictorial effect as to the true gradation of the picture in aërial perpective.



1 2

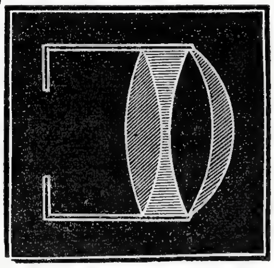
The cost of production was against it, owing to the great thickness of glass to work out the extra depth of curve required in the lenses. The position of the lenses in your cut, *fig.* 3, is not correct; it would not work other than centrally—the margin would be blurred. The right position of the lenses for working properly is as represented in the adjoining diagram—the concave sides out—1 being the over-corrected compound achromatic (the double convex is plate), and 2 the crown glass lens to back.

For truth of delineation, depth of actinic focus, freedom from flare, &c., this kind of lens has not been surpassed, and won for Mr. Goddard the victory in the lens trial at Edinburgh, it having the widest angle and non-distortion, against all the best makers whose lenses were submitted to test on that occasion, including lenses by Ross, Dallmeyer, &c.—I am, yours, &c., JOHN BROWN.

69, *Blenheim-street, Newcastle-upon-Tyne, Sept.* 4, 1869.

P.S.—This lens was described in *Photographic Notes*, with a cut, for, I think, September or October, 1858.

[It will not escape the observation of those who have carefully read our previous remarks on lenses, that our correspondent, in the above letter, is somewhat "at sea" respecting the real facts of the case. We give him full credit for inventing the lens which he has just described, but *that* is not Goddard's double periscopic lens. The last-named instrument is precisely what we described it to be, and is constructed just as we figured it. For facility of comparison, we here reproduce the diagram given in Chapter VI. As we have the lens in our possession, we must be presumed to know better what it really is than our correspondent, who, apparently, has not seen it. Mr. Brown has also been misinformed respecting the lens which, he says, "won for Mr. Goddard the victory in the lens trial at Edinburgh," for it was *neither* of those two here figured, but a triple lens, as figured and described at page 398 (*fig.* 2.) About one point more our correspondent has not acquired reliable information. There was an orthographic lens, by the late Andrew Ross, among those that were tested on the occasion to which reference has been made, but neither the present Ross nor Dallmeyer were there represented, and for the "good and sufficient reason" that the latter had not then commenced business, and the former only succeeded to the business of his father, the late Andrew Ross, upon the death of that gentleman. We are desirous of doing ample justice to every person who has contributed to the advance of photographic optics, but, from the foregoing, our correspondent will find that, in certain things, the information which he has received has not been of a thoroughly reliable nature.—EDS.]



SURFACE MARKINGS.

To the EDITORS.

GENTLEMEN,—I read the letter of "J. H." in your last with much attention, and I may here say that I have read carefully everything that has recently appeared in your Journal relating to surface stains, which I cannot avoid thinking are present this summer in great abundance, as we know is also the case with some subjects of the entomological kingdom, between whose exceptional increase and that of surface stains there *may* (who knows?) be something in common.

I, too, have been troubled with surface stains, but in my case they will not yield to the detergent influences of a special description of acetic acid in the developer. In fact, I have arrived at the conclusion that the fault lies in the bath, but is developed by special kinds of collodion, and this for the following reason:—

I have a bath which, when I use a first-class collodion supplied to me by a good maker, gives these stains; but when I use a rather old and very red sample of collodion yields pictures quite free from them. What other inference can I draw than that narrated? Sometimes, even when the most scrupulous cleanness has characterised everything, these markings have shown themselves faintly visible on the surface, even before the application of the developer, as if to verify the well-known saying that "coming events cast their shadows before."

I tried the acetic-acid remedy of "J. H.," but without success, and hence I arrive at the conclusion that a remedy in one case will not necessarily prove to be a remedial measure in another.

Every effect has a cause. This "effect" has troubled photographers more or less since the introduction of iron development for negatives. On watching, to some small extent, the advent of surface stains, I find that, while they sometimes appear previous to development, they do so under circumstances which lead me to think that they are caused by the nitrate of silver flowing towards the edge of the plate, and there getting infected by contact with the frame. That organic matter, in some form or other, is the cause I do not entertain a doubt. The developer, according to my experience, does not produce these markings until it has remained on for some time. Were I to stop its action as soon as the picture begins to appear there would be none of them visible; it is when the development is protracted that they show in greatest force.

Again: when I develope the negative with the old-fashioned pyrogallic acid solution no stains whatever occur; but immediately, when I change this for an iron developer, they at once put in an appearance. A somewhat strong solution of gelatine dissolved in acetic acid, *a la* "Clericus," is also a preventative measure against their formation.

In the Daguerreotype process grease or other organic matter proved a certain means of inducing fog and stains in abundance, and yet, when used under proper control, the same means conduced to very great rapidity. May there not be something analagous here? I throw out the hint without any comment on it.

If all the conditions under which these stains make their appearance be carefully recorded, it will facilitate the discovery of the exact law under which they appear.—I am, yours, &c., AN OLD PHOTO.

Liverpool, Sept. 13, 1869.

SUGGESTIONS FOR A PHOTO-ENAMEL PROCESS.

To the EDITORS.

GENTLEMEN,—Allow me to embody my cogitations during the past two hours in the form of a brief letter. The subject is carbon printing and also vitro-enamel printing, both being amalgamated.

A carbon print, as proposed by friends Johnson, Swan, or anybody else, is transferred to an enamel surface. Very well—there we have it, a print in carbon on a vitrifiable surface. Carbon does not change its colour by an exposure to a red heat. If you disbelieve this, please place some lampblack in a teaspoon and hold it over the gas until it becomes red, and then let it become cold. Very well, again.

Now then, having the carbon print on the enamel tablet, let it be sprinkled or dusted over with a very fusible glass powder—call it a "flux," if you insist upon technicalities—and then place it in a muffle until the glass powder is fused and forms a glassy varnish over the picture.

Or if dusting on the powdered glass be considered as involving too much trouble, suppose we make a kind of emulsion of creamy consistence, into which we dip our as yet unvitrified enamel!

When this is fused or "burnt in," what name would you give to such a picture? Would it not be a photo-enamel, and would it not be quite as delicate as, and somewhat more brilliant than, a carbon print upon paper?

My suggestion may be a somewhat crude one, but will any fellow-reader point out, if he can, a flaw in it?—I am, yours, &c., R.

September 15, 1869.

MR. SUTTON'S LAST DISCOVERY.—ALKALINE METHOD.

To the EDITORS.

GENTLEMEN,—The *principle* of Mr. Sutton's alkaline method seems to be that the film at the moment of exposure should be in an alkaline condition, and this condition he produces by pouring over a washed film a solution of gelatine made alkaline by subcarbonate of soda. But there is no novelty whatever in this alkaline *principle.* I have for a long time been familiar with an analagous process, and, though I have on several occasions tried it, I am compelled to admit my success has been anything but satisfactory, doubtless owing to my own mismanagement.

If your readers will take the trouble to refer to your back pages [*ante* vol. xiv., page 388], published exactly two years ago, they will find a communication from Herr Carl Haack, which you quoted from *Photographische Correspondenz*, in reference to an alkaline process which, I think, will take the greater part of the novelty out of Mr. Sutton's "discovery."

Mr. Sutton's alkaline preservative is *gelatine* and *soda*—that of Herr Haack is *tannin* and *soda*, with a little honey. The formula of the latter stands thus:—Dissolve five grammes tannin in 100 centimetres of water, then add two and a-half grammes honey. Filter into this 0·67 grammes bicarbonate of soda dissolved in fifty centimetres of water. (I give the original weights and measures; anybody who wishes to experiment can easily translate them into ours.) Herr Haack used an alcoholic pyro. developer.

What I wish to call attention to is that these two processes (though differing in details) are essentially grounded upon the same principle of

having the film at the time of exposure in an alkaline condition. Mr. Sutton is two years too late; and I am afraid this "very latest" wonder of his will not assure the photographic world that he is *yet* competent to set the Thames on fire.—I am, yours &c., H. HARDINGE.

35, *Harvest-road, Holloway, N., Sept.* 16, 1869.

EXCHANGE COLUMN.

I will exchange a $7\frac{1}{2} \times 4\frac{1}{2}$ bellows camera, two dark slides, also 1-1 plate camera, both in good condition, for a view lens (size to cover well 1-1 plate), by Ross or any good maker, or a Dallmeyer's stereo. lens.—Address, AMATEUR, Post-office, Plymouth.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

John Owen, Newtown.—*Three Views of Powis Castle.*

G. Higginson, Preston.—*St. Augustine's New Marble Altar, Preston.*

James R. Philpotts, Newnham.—*Portrait of Martini Maccomo, Lion Slayer, Manders' Grand National Star Menagerie.*

R. P. Yeo, Plymouth.—*View of H.M.S. "Victory" at Portsmouth.—Carisbrook Church.—West Hill Lane, Freshwater.*

☞ *Correspondents should never write on both sides of the paper.*

ARCHER CLARKE (Stourbridge).—No business notices can appear in this column.

HENRY J. VILLIERS.—If the water has acted upon the litmus paper in the manner described you must at once reject it as being impure.

EDWARD S. WILSON (Philadelphia).—We have not received your esteemed Journal this month, probably from the inadvertence of some of the *employés* in your establishment.

GEO. PLASSEY AIRD.—Diaphragms of the slit, bottle, or keyhole shape are quite unsound both in principle and in practice, and are only recommended by those who have not studied their effects. A round aperture in a diaphragm is, without doubt, the proper shape.

E. ECCLES.—The exhibition does not possess the "general interest" which you attribute to it; but notwithstanding this we purpose giving a notice of it, although it will necessarily be a brief one, as soon as we get possession of certain information of which we are in quest.

C. D. C.—1. We are at present uncertain who is the publisher of the work, but if you enclose fourteen stamps our publisher will procure it and send it to you by first post.—2. The information which you desire about the lantern was given in our last Almanac.—3. You will pay nearly as much for the loan of an instrument as will enable you to make one for yourself; however, we do not know of any that are kept for the purpose of being hired.

J. MANFRED STURROCK.—By encaustic paste is simply meant bleached beeswax thinned with one of its solvents, such as turpentine, benzole, oil of lavender, &c. Turpentine with some oil of lavender will make a useful and agreeable solvent. When used for imparting a gloss to photographs it must be applied to the surface by means of a soft pad, and then be rubbed with a flannel or other suitable body until a bright gloss has been obtained.

J. D. F.—Unless informed of the purpose for which you desire to use the lens, we cannot advise you whether a meniscus or a plano-convex would be the more suitable form. We can at present only say, in general terms, that the deeper the meniscus the smaller must be the stop. We have received many communications embodying the same ideas as yours, and we are naturally much gratified. The series is intended to be rather descriptive than critical.

F.—The Nottingham Photographic Society has been defunct for several years. It was at one time in flourishing circumstances, having had excellent exhibitions, but, as we have said, from some cause or other the Society has long since ceased to exist. There are many good photographers in and about the capital of the midland counties, and we know of no reason why they should not form themselves into a society to meet, if only during the winter months of the year.

"STRIKE A LIGHT."—It is to be regretted that you protected the scratches in the manner described; still with care the defect may yet be remedied. Place the negative in a bath of methylated spirits of wine, or otherwise apply it locally so as to dissolve the varnish, and then apply the fixing solution by means of a camel's-hair pencil. After washing, touch out the defects, and finally varnish. With respect to the other matter, the gentleman you name is at present from home; hence a short time must necessarily elapse before you get an "answer."

AMATEUR (Devonport).—Thanks for the opportunity afforded us of examining the picture, which we have returned as directed. You are probably aware of a peculiar kind of vignetting by which, after the printing of the vignette is effected in the usual way, the head is covered by any convenient means, such as a tuft of cotton-wool or a plate of glass with a central spot the exact converse of the vignetting glass, and then exposed, the result being a uniform dark ground. If on this plate of glass certain letters be written with an opaque ink, they will be represented in white on the picture when finished. A thin sheet of gelatine or mica possesses an advantage over glass, because any writing may be made on the upper instead of the under surface, the latter involving the necessity of writing backwards. These are somewhat crude suggestions, but they will probably enable you to arrive at results even superior to that which you enclosed.

C. P.—Albumeno-chloride of silver would answer very well for spreading over wood with a view to the impressing of an image upon it, and so would gelatino-chloride or collodio-chloride; but they are all objected to by the engraver, who complains that they prevent the free action of the graver.

JOHN T. GROUNDWATER.—It is very easy to remove the red colour from your old collodion, but, by doing so, you will not restore to it its original good qualities. Shake up with it some filings or small pieces of zinc, silver, or cadmium, and the redness will soon disappear. A little cyanide of potassium would have a similar effect.

J. H. B. (Cheltenham).—1. We are acquainted with the lens about which you inquire. It is made by Coiffier.—2. The object of a swing back is to correct the distortion which would otherwise arise from tilting the camera. Every lens that is made will distort the image (say of a building) if the camera be pointed upwards, unless it has a swing back. The ground glass *must* be on the same vertical plane as the building, otherwise the marginal lines of the building will converge. In such cases of distortion as we have examined the majority arise, not from incapacity of the lens, but from pointing the camera upwards, without exercising the corrective influence of a swing back. If it be imperative to use a camera without this appendage, the lens ought to be attached to a hinged flap on the front instead of the solid front. In this way the lens may be pointed upwards, leaving the camera quite level. Observe, however, that in proportion as the lens is tilted so must the sliding front of the camera be raised and the size of the stop reduced. A ball and socket arrangement for holding the lens may prove an effective substitute for the swing back.

RECEIVED.—W. H. Warner; D. Winstanley; J. Pollitt; Alpha; W. Howes; S. M'George.

VIEWS OF CANTON.—We are glad to perceive that our former contributor, Mr. John Thomson (formerly of Edinburgh), has made a most successful photographic "raid" upon the "celestial" city of Canton. We shall have a more detailed notice of some of Mr. Thomson's pictorial efforts in our next.

VIEWS OF HAMPTON COURT.—As a quiet way of being revenged on us for what he considered some apparently disparaging remarks we made last year relative to the pictorial effect of certain portions of Hampton Court Palace, Mr. J. J. Cole has placed before us, without comment, some really charming little pictures of the place mentioned. The *Outer Court* indicates, in the selection of the point of view and the amount of angle embraced, that the artist is an accomplished architect, while the technical treatment equally indicates the skilful photographer. Of the *Hall* the same may be said.

NON-POISONOUS COLOURS.—We have received two samples from Mr. F. Pettit, viz., yellow zinc and green zinc; and, after having tested them we are satisfied that the statements made by the makers of these colours are correct. Of the beautiful yellow and green pigments we have had the opportunity of testing, we affirm with pleasure that (1) they are not poisonous; (2) they do not become discoloured by the effects of burning gas; (3) they are not affected by sulphuretted hydrogen gas, and are not altered in shade—as far especially as the green is concerned—by artificial light. For paper-stainers, the manufacture of surface-coloured paper, for mixing with plaster-of-Paris for ornamental stucco work on walls, these colours will answer well, as they also will for mixing oil pigments, while, for pigment cotton printing, chromotypography, and lithography, they will supply colours of great brilliancy, durability, and quite sufficient body.—*Chemical News.*

LONDON GAZETTE, *Friday, September* 10.

NOTICE OF SITTING FOR LAST EXAMINATION.

J. F. SHEW, Newman-street, Oxford-street, photographic dealer.—Dec. 3.
J. S. BROOKS, Rochester, photographer.—Oct. 5.

METEOROLOGICAL REPORT,

For the Week ending September 15th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sept. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
9	29·86	73	58	63	67	SW	0·40	Fine
10	29·51	69	59	61	62	SE	0·01	Dull
11	29·57	69	51	53	57	SW	—	Fine
13	29·39	63	51	52	57	SW	0·45	Fine
14	29·92	69	51	56	57	SW	0·24	Dull
15	29·66	—	54	55	61	WSW	—	Fine

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 490. Vol. XVI.—SEPTEMBER 24, 1869.

THE ALKALINE NEGATIVE BATH.

We last week touched briefly upon the question of acidity of the nitrate of silver bath, chiefly with a view to point out the probable cause of the difference known to exist between a bath directly treated with a trace of free nitric acid and one which, though neutral at first, becomes speedily acid owing to the presence of free iodine in the collodion. We then stated the general rule that the more nearly neutral the bath and collodion are the greater is the sensitiveness, and, *pari passu*, the greater the tendency to fog under ordinary working conditions. In another column will be found an article by Mr. Valentine Blanchard relative to a very important and interesting exception to this rule.

Mr. Blanchard long since found that a bath which was slightly alkaline, even when employed with a neutral collodion, gave plates which were much more sensitive than those prepared with the ordinary bath, and, moreover, gave negatives free from fog. Success under these circumstances appeared to turn upon the presence or absence of an ammoniacal salt in the bath and in the collodion; for it was found that when the collodion contained an ammoniacal salt in excess of the other bromo-iodising compounds clean plates would be had, whereas when the ammoniacal salts were present in but small proportion a satisfactory picture could not be obtained.

The plan of Mr. Blanchard not only deserves close attention, because it emanates from so able a photographer and one possessing such practical skill as he is known to do, but, if followed up, it may lead to some important modification of the present system of treating the bath. One or two matters suggest themselves on reading the article referred to, and these we may now note down.

In the first place, it appears to be necessary to draw a distinction, *in limine*, between alkalinity of the simple solution of nitrate of silver *plus* oxide of silver and of nitrate of silver with the oxide in the presence of an ammoniacal salt. Pure nitrate of silver solution, free from ammonia, can be rendered faintly alkaline by oxide of silver, since the latter body, though soluble in the liquid to but a very small extent, is yet sufficiently so to communicate an alkaline reaction to the solution. Such a bath will give fogged pictures with ordinary colourless collodion containing much cadmium, but when ammoniacal compounds are present the alkalinity increases the sensitiveness, while fog disappears. It would seem, then, that apparently indifferent neutral ammoniacal salts, like nitrate of ammonia, act as decided "restrainers," and enable us to pass the rubicon of neutrality, not only without danger of spoiling our plates, but with a positive gain in the matter of exposure. According to Mr. Blanchard's plan the film must carry its own restrainer in the shape of a considerable proportion of iodide and bromide of ammonium; may it not be possible to add, once for all, a carefully-adjusted proportion of nitrate of ammonia to the bath, and then employ whatever bromo-iodiser we please? If the beneficial result obtained with the use of the ammonium iodiser be due to the restraining action of the nitrate of ammonia formed in the bath alone, this plan would be by far the most simple; but if not successful, the result would appear to indicate that the bromide and iodide of silver formed from he corresponding ammonium compounds were essentially different in molecular arrangement from the precipitates produced by other iodine and bromine salts.

Again: it would appear that the following plan might be advantageously adopted for rendering baths alkaline:—Prepare a solution of neutral nitrate of ammonia by exactly neutralising dilute nitric acid with ammonia, or by dissolving the pure salt of the shops in water. Precipitate some oxide of silver from the nitrate by caustic potash; wash repeatedly with warm water, and then dissolve the oxide to saturation in the nitrate of ammonia solution. This liquid has an alkaline reaction, and might be used to neutralise any free acid in the bath, or even to communicate an alkaline reaction to the solution.

Ordinary experience of saline additions to the negative bath would appear to indicate that little in the way of useful results need be anticipated from the additions which we have mentioned; but it remains to be seen whether more careful experiments may not show a marked advantage.

STREAKS IN THE DIRECTION OF THE DIP.

Again the subject of streaks in the direction of the dip has attracted attention, and the mode of formation of these lines has received another explanation. In our last number appeared a very interesting communication from Mr. M. Noton, in which we find it stated that the cause of this nuisance is the complete saturation of the negative bath with iodide of silver. Mr. Noton believes that the primary cause of the evil is the precipitation of a fine, but necessarily loose, layer of iodide of silver from the saturated bath on plunging into the solution the plate with its film of pyroxyline containing more or less water, the silting up of this deposit into ridges being due to the currents of liquid produced on immersing the plate in the bath.

This explanation is very ingenious, and, moreover, one which probably applies to certain classes of the phenomena. However, this deposition of a layer of iodide from the saturated bath does not appear to be by any means invariably the primary cause of the phenomena, but as we are not so fortunate (?) as to possess a bath giving these streaks at the present time, we cannot examine the matter as closely as we would otherwise do. So far as our experience enables us to judge, the streaks in the direction of the dip are not confined to plates immersed in an old bath, or one which may appear to be saturated with iodide of silver, as we have observed their production in new baths when a "skinny" collodion was employed, or a sample affording a rather repellent film on evaporation.

Mr. Noton states that he has observed this phenomenon when working with a bath saturated with iodide of silver, and that, however slowly the collodionised plate was immersed in the solution, the streaks always appeared; whereas the experience of many others, ourselves inclusive, is that in many cases slow dipping of the plate in the bath serves to guard effectually against the production of the streaks. As in most cases wherein decided statements in opposite directions are thoughtfully made, the truth lies partly on one side and partly on the other. It is probable, then, that Mr. Noton's "aqueous theory" is true for one set of cases, while for the others

we incline to the view that a rather repellent collodion and too rapid immersion of the plate are chiefly to blame for the mischief. The circumstance which Mr. Noton has pointed out will, very likely, greatly aggravate the evil when an old bath is used; but the occurrence of these streaks with a new bath unsaturated with iodide of silver is too familiar to enable us to accept the "aqueous theory" as being fully capable of explaining the production of the streaks under the circumstances just referred to.

THE PRESERVATIVE PROCESSES OF MR. MAXWELL LYTE.

When one who has become familiar with the details of the early history of the art-science of photography through a study of the published records of its rise and progress rather than from personal intercourse with those who watched with interest its inchoation and guided it during the youthful stages of its existence—when, we say, such an one is for the first time brought face to face with one of those "early fathers" of the art either *in propria persona* or through the medium of the contents of the album of the portrait collector, mayhap among the first expressions called forth on an introduction will be—"How very young our photographic fathers are!" It is scarcely possible to hear or read much about a man of science without speculating, no matter how crudely and unconsciously, upon his personal appearance, and thus with the name is associated a certain kind of physique, which generally, however, turns out to be most ludicrously unlike reality. And in connection with this subject, we may remark that the display of a collection of portraits of those whose names have been associated with photographic progress would prove to be an attractive addition to the proceedings of some of the photographic societies.

These reflections have been elicited by our recent introduction to a gentleman whose name, although seldom heard of late years, was at one time familiar to photographers as a household word—we refer to Mr. F. Maxwell Lyte, with whom we had not been previously acquainted. Only the very young photographer will require to be informed here that this gentleman was one of the pioneers of the art. In personal appearance we found Mr. Lyte *quite* unlike the ideal portrait of him which we had mentally limned many years ago.

The reason why Mr. Lyte has been so long absent from the scientific stage on which he at one time took a leading part has not been so much from an apathetic indifference as owing to his residence on the continent, where he has long been actively engaged in the promotion of a commercial enterprise demanding close scientific research in order to ensure complete success. With pleasure we are here enabled to announce that so soon as the object of his recent labours has been fulfilled he intends once more to emerge from his retirement into public life as an ardent photographic amateur. Mr. Lyte will prove a powerful auxiliary to the numerous amateurs who are occasionally, by their works, forcing upon public attention the claims of photography to be ranked as one of the fine arts.

So far as we are at this moment aware Mr. Lyte has obtained the greatest number of medals for his art-productions that has fallen to the fortune of any one man to secure. These, amounting altogether to twenty-five, have been awarded by the various societies at Edinburgh, Paris, Brussels, Antwerp, Portugal, Bayonne, Prussia, Nantes, and London.

Among Mr. Lyte's numerous contributions towards enlarging the resources of photography, few, if any, can in our opinion compete with his method of preparing plates so that their sensitiveness (as wet plates) should remain unimpaired for several hours. Previous to June, 1854, no effective manner of retaining these plates in a state of sensitiveness was known, but, at the above period, Mr. Lyte published in *Notes and Queries* (which, prior to the establishment of special journals, had been the "organ" of photography) a method of preparing collodion plates permitting their being used several hours after preparation. So good were these plates that when Mr. Lyte, towards the close of the month previous to that in which it was published, showed the process to the late Prince Consort, the former exposed and developed in the presence of His Royal Highness some plates which had been prepared the day before, but which still retained extreme sensitiveness. The means by which he effected this were so similar in principle to the glycerine process as generally practised at the present time we cannot avoid alluding to the *old* process and contrast it with the new, to see if we may not extract from it some element which may, even at the present day, conduce to further advances being made.

Mr. Lyte's process was briefly as follows:—To a solution of honey was added one of nitrate of silver; and this having been applied to the surface of the excited collodion plate, it retained great sensitiveness for several hours. It is here proper to mention that our predecessor, Mr. Shadbolt, had also about the same time used honey for the preservation of plates, but the aims of both gentlemen were different. Mr. Lyte sought to retain the maximum sensitiveness of the plate for a short period; Mr. Shadbolt, on the other hand, aimed at securing sensitiveness, although in a less degree, extended over a longer time. To the casual reader the processes appear to be similar, whereas in reality they are different. Mr. Lyte, moreover, had the advantage—though very slightly—of priority of publication.

The modern glycerine process consists in applying to the excited plate some glycerine diluted with a solution of nitrate of silver. By this preparation the sensitiveness is retained for a few hours. Dr. George Kemp, more than a year ago, sent us a small bottle of a mixture of honey and glycerine containing nitrate of silver, which we use from time to time and always with increasing admiration. It seems to improve the longer it is kept. Dr. Kemp attributes much of its good qualities to the honey with which the glycerine is mixed, and if we are to judge by a comparison of the results we must adopt the same belief.

Mr. Lyte's formula was as follows:—

After the plate is excited it is coated with the following solution:—

1. Take—

Nitrate of silver	200 grains.
Distilled water	6 ounces.

Saturate with iodide of silver, and filter.

2. Take—

Honey or grape sugar	8 ounces.
Water	6 „
Alcohol	1 ounce.

When required for use, mix equal parts of these solutions and pour them over the plate, which must be drained. It is then ready for being instantaneously exposed in the camera, the development being conducted in the usual way. One or two precautions are to be attended to:—First, the honey or grape sugar must be quite pure and free from any strong acid reaction; and, secondly, these substances are much improved by a long exposure to the air, by which their oxidation is commenced and the result made more certain and effective. The plates may be kept at least four hours without injury, and are sufficiently rapid to give, with a landscape lens, sharp pictures of the sea while in motion, ships sailing at the speed of ten knots an hour, as well as (with the same lens) instantaneous portraits.

Mr. Lyte subsequently adopted the following method of preserving plates:—Make a solution of metagelatine as follows:—Take one and a-half ounce of gelatine and dissolve in ten ounces of boiling water; then add two fluid drachms of strong sulphuric acid, which has been previously diluted with two and a-half ounces of distilled water, and boil these together gently for a quarter of an hour. Take the vessel off the fire and let it stand for twenty-four hours, then boil gently again for fifteen minutes more, and again remove it from the fire and let it cool for an hour or two. Heat up the liquid once more to boiling point, and saturate the acid by adding powdered whiting till effervescence ceases. Separate the sulphate of lime which is thus formed by pressure in a linen cloth, and then stir into the liquid about a teaspoonful of animal charcoal or kaolin, and filter through paper until perfectly clear. Add water to bring up the liquid to the bulk of eighteen ounces; and, finally, add one-sixth of its volume of common spirits of wine to make the solution keep.

To prepare the preservative solution take—

Metagelatine solution as above	5 ounces.
Distilled water	5 „
Honey	½ ounce.

When the plate is removed from the bath this solution is poured over the surface. It drives before it a portion of the nitrate of silver, and when it has reached the corner opposite that at which it was applied it is thrown off, and a second application of the preservative is made. If the plates are required to be kept for more than a day, it is better to dilute the silver solution on the film, by pouring over the surface, or otherwise washing it with, a little distilled water.

From what Mr. Lyte told us as to the keeping properties of his honey plates we imagine they must possess some advantages in this respect over the process of Dr. Kemp, which is as follows:—Mix together—

Honey	2 ounces.
Glycerine	2 „
Weak solution of nitrate of silver *	4 „
Kaolin	20 grains.

* From ten to fifteen grains to the ounce of water, we think.—Eds.

The quality of the honey is of some importance. Every person knows that it exists in two conditions—as a transparent syrup, and as a pasty semi-crystallised mass. It is the former kind that is to be preferred. When the above mixture is shaken up and exposed to the sun it darkens rapidly, and the kaolin subsides, leaving the liquid very clear. This is the preservative solution, which, when applied to the plate, causes it to retain its sensitiveness and general good working qualities for several hours.

Let us here pause and say that we think photographers err in not employing more than they do those processes by which the plate is kept in a high state of sensitiveness for a few hours after preparation. On the day when we heard of the sudden death of Mr. Roger Fenton we were on our way to pay him a visit at his residence at Potter's-bar, having with us a camera and some honey and glycerine plates prepared early in the morning of that day. Although our original intentions were frustrated, we exposed the plates, and in the afternoon we developed them with iron into excellent negatives. The whole method of operating was simple in the extreme. A somewhat old and highly-coloured collodion was used, the negative bath was rather acid (with *acetic* acid), and, when the sensitising had been completed and the silver solution allowed to drip off, a portion of preservative solution sufficient to cover the plate was applied and caused to flow all over the surface, the superfluous liquid being returned to the stock bottle. When the plate ceased to drip the back and edges were wiped, and it was transferred to the dark slide.

Any one who experiments with this process will not fail to observe the following peculiarity:—If a plate be exposed within a few minutes after its preparation the negative will not differ to any appreciable extent from one that is taken by the same collodion and bath without the preservative fluid; but if upwards of half-an-hour be allowed to elapse between the preparation and development the deposit of silver will be of such a nature as to yield an exceedingly dense negative. This property, we thought, should be very useful in reproducing engravings or subjects devoid of gradation; accordingly we copied some engravings by means of plates some of which had been kept two hours after their preparation. By a single application of the iron developer we got negatives of extreme density, but still very fine and clean in the transparent parts. This hint ought not to be overlooked by those whose peculiar avocations require them to reproduce manuscripts and engravings.

A NEW ALKALINE DRY PROCESS.

In connection with the article immediately preceding, the following is an alkaline dry process which Mr. Lyte worked out and communicated two years since to the Photographic Society of France, although, so far as we remember, it has not yet been published. We are indebted to the author for the annexed particulars.

No special collodion or bath is required, although a collodion somewhat highly bromised is preferred. The exciting is effected in the usual manner, and when the plate is removed from the bath it is washed—first in plain water, next in water containing a small proportion of common salt, and, lastly, in plain water again.

It is now coated with the preservative solution, which is made as follows:—

Albumen	2 parts.
Water	2 ,,
Spirits of wine	1 part.

The spirit must be mixed with the water previously to its being added to the albumen. These are well whipt together, and, after being allowed to settle, the liquid is strained. The albumen solution is mixed with a few drops of liquor ammonia—say twenty drops to the ounce. The above constitutes a stock solution, which will keep for an indefinite period.

When about to use it, mix a suitable portion, say an ounce, with half-a-drachm of a solution composed of liquor ammonia, which has been saturated with recently-precipitated chloride of silver. Each of the above solutions should be kept in a stock bottle, and mixed together in the above proportions when required for use. In this way they will always be at hand ready for use.

We now return to the plate, which has been excited and washed in the manner described. The preservative solution is applied to the surface in the ordinary way—that is to say, it is poured over it from a measure and made to flow backwards and forwards until every portion has been coated. Having been set up to drip, it is placed aside to dry in a chamber or drying-box in which is placed two vessels, one containing quicklime and the other sulphuric acid. The former (the lime) absorbs all the aqueous vapour, and the latter the ammoniacal vapours which may be disengaged. Of course any other means of effecting the same purpose may be employed instead of those described.

The development is effected by simply pouring over the surface a solution of protosulphate of iron of about one per cent. strength, without the addition of acetic or any other kind of acid. This application scarcely renders the image visible. Sometimes it is so, but occasionally it is so faint as not to be readily seen. Having been washed after the action of the developer, the plate is next treated with the usual pyrogallic acid intensifying solution; that is to say, a mixture of pyrogallic and citric acids with a few drops of a solution of nitrate of silver, as used by every photographer in the intensification of his negatives, great precaution being observed in adding the silver so as not to make the negatives too dense and hard. When the process has been carried through as we have indicated, the exposure is rather less than that required in the ordinary collodio-albumen or Taupenôt process.

Mr. Lyte sums up the advantages of this new process thus:—Great fineness in the negative; the rapidity with which the plates may be prepared; the preparation of the plate in an ordinary silver bath; delicacy of detail; the total absence of stains on the negative; and, especially, the admirable keeping qualities even in the most sultry weather.

THE DEEP MENISCUS.—MR. SUTTON'S RETRACTATION.

Notwithstanding the persistency with which Mr. Sutton obtruded his own claims to be considered the first demonstrator of the properties of the meniscus lens, and notwithstanding also his reiterated denials of the accuracy of the history of this matter as given in our chapters on *The Lenses Used in Photography*, and exposing the superficiality of his knowledge of what had been placed on record by Mr. Airy in the Cambridge *Philosophical Transactions*, our versatile friend has, owing to a communication received from the learned Astronomer-Royal, been placed in what should prove a somewhat unpleasant position—that of confessing that in our history of the deep meniscus we were right, and that in his contrary assertions he was wrong.

We, like other photographic journalists, share but few opinions in common with Mr. Sutton; but if that gentleman will only make himself acquainted with the facts of other disputed cases on which he has written, we feel certain that he will make quite as complete a retractation of such of his asserted opinions as are not already recanted or contradicted by himself as he has done in the meniscus lens controversy.

Concerning the latter he now says that the writer of the article on lenses in our pages is

"right in an important respect, viz., the first publication of the theory of the deep meniscus. Of course deep meniscus lenses have been made, as I said before, by tens of thousands ever since the art of lens grinding was known; and the question was not who first made or used one, but who first demonstrated analytically the fact of its flattening the field of a camera lens. My demonstration given in February, 1865, was quite independent and original, and I supposed it to be the first. I had read two of Airy's tracts for my Cambridge degree, and had looked over many others, but I did not remember having seen any such demonstration in his *Treatise on Eyepieces*. It appears, however, that that treatise, published thirty years ago, does contain a demonstration of the fact in question, and I was wrong in saying that it did not."

A little caution, on the part of Mr. Sutton, or care in informing himself upon the disputed topics on which he may in future expatiate, will save his friends much cause for chagrin, and himself such frequent renunciation of expressed opinions.

It is with pain that we are thus—and, we trust, for the last time—compelled to write punitively of one who, during the portion of his life when his intellect was supposed to be most vigorous, has been himself a journalist; however, we trust that he will lay our counsels to heart, even if they be accompanied or enforced by a little gentle castigation.

ON ALKALINE WET PROCESSES.*

Some five years ago I announced that after the treatment of an old bath with carbonate of soda, followed by exposure to sunlight, the after addition of acid was not necessary. I then stated my belief that the most exalted state of sensitiveness would probably be produced by an alkaline method of working. Mr. Sutton, at that time, took up the cudgels against me, and pointed out that carbonate of silver was insoluble in water, and, therefore, the bath became only neutral, not acid. I pointed out, in reply, that as nitrate of ammonia

* *Journal of the Photographic Society.*

would be formed in an old bath, and as carbonate of silver was soluble in a solution of it, the facts were somewhat against him. Since then I have found, after a lengthened experience, that a bath treated with carbonate of soda was not only better without acid, but that the addition of it frequently produced fog in a greater degree instead of curing it. Occasions have, of course, arisen when the addition of a considerable quantity of acid has been necessary to secure a result when some inexplicable fickleness has put all wrong. I have, however, been compelled to take the earliest opportunity to remove the acid, for the resulting negatives have been poor in quality, in fact totally unlike the creamy dense ones common in the normal bath.

Mr. McLachlan's experiments, running in some measure parallel with my own, led me to resort to oxide of silver, which was for many years my favourite method for neutralising acidity in the silver bath.

Instead of assuming, however, that the addition of a few drops of weak acid was necessary, I determined to try other methods for the removal of the fog which resulted on the trial of a plate after the foregoing treatment. Instead of adding acid, therefore, I employed a collodion in which ammonium predominated over cadmium in the bromo-iodiser. As the collodion employed was quite colourless, I was much surprised, after a few trial plates, to find that in each succeeding plate fog became less apparent, until, after a few trials, a total absence of it resulted.

In order that these facts may be verified by others I may mention that, on trying a collodion in which iodide of cadmium predominated, a deposit of total obscurity was the result, without the slightest trace of an image. On testing the bath with the litmus-paper an unmistakable alkaline reaction was apparent. Recently carrying my experiments further—being led to do so, I must confess, by Mr. Sutton's announcements in a contemporary—I found that, on the application of an iron developer containing one ounce of sat. solution of iron and half-an-ounce of glycerine to twenty ounces of water, and with no acid at all, I secured an image with a much shorter exposure than that needed when employing the ordinary acid method. The resulting image was thin and extremely powdery, being easily rubbed off when touched with the finger, and the shadows were slightly veiled; but with the addition of silver and a renewal of development the image acquired intensity with great avidity.

The colour of the deposit was very peculiar, being quite unlike that we are accustomed to see in the ordinary method of working. I do not, at present, look upon the results as equal to the old ones, and wish it to be borne in mind that the developer will rapidly decompose and, therefore, can only be prepared in small quantities. It is undoubtedly most desirable that the most rapid methods of working should be sought for, and I feel assured that a little hard work done by experimentalists in this direction would produce results at present scarcely dreamed of by the great mass of photographers. VALENTINE BLANCHARD.

ON DISTILLING WATER.

I CONCLUDED my last article with a promise of a few notes on distilling water. That promise I now redeem.

Some time ago, when looking about the house for a suitable boiler, I decided upon selecting for this purpose a tin kettle which holds about four or five pints. The lid of this I sent to a tinsmith, and had a hole bored in it, with a piece of tube about an inch long soldered in the hole, so as to form a socket in which another piece of tube might be inserted when it was required for use.

When the water to be distilled was placed in the kettle, I luted on the lid with a little plaster of Paris, and, when this had dried, the kettle was placed on the fire in my library. In due course ebullition ensued, when I connected the worm of the still with the kettle. This worm was, and still is, a most primitive piece of apparatus; but it has this in its favour—it answers its purpose exceedingly well.

My "worm tub" (I almost blush as I write it) is composed of an old wooden plate-box, constructed to hold three dozen 12 × 10 plates. I inspected the various utensils in the house which I considered as being likely to answer, and had mentally determined upon the appropriation of one of those galvanised iron slop pails so commonly met with; but, when I required it, it was being otherwise employed, and the lateness of the hour precluded the idea of sending a messenger to town for another. A wooden vessel, I considered, would answer as well as a metal one; and, although not a suitable form, there was no reason, I thought, why a square vessel should not answer as well as a round one. In my store room the first object that presented itself to my eye was the old plate-box which had rendered me some good service in Normandy, half-a-dozen years ago, as a packing case for a portable camera.

I had previously provided a few yards of the cheap, thin composition gas pipe of which I spoke in a former communication; so, having cut a hole near the bottom of my old plate-box, I inserted the end of the gas pipe, leaving a few inches projecting outside, and coiled the rest of it inside the box, bringing the other end to the lid of the kettle into the "adapter," in which I inserted it, making for this purpose a knee or hook near its termination. Having ensured freedom from leakage at the hole in the plate-box by applying a little melted pitch to the part, I filled the vessel with cold water, placed a bottle of sufficient capacity under the end of my worm, and went to the drawing-room to join some friends in a "rubber." When we all visited my library some time after, much merriment was created by the inspection of this novel kind of still; but everything was going on successfully, for my maid had, by means of an ordinary wooden beer tap which I had inserted in the "worm tube" or condenser, drawn off the water from the plate-box and filled it up with a fresh and cold supply.

The quality of the distilled water which I thus obtained has never been surpassed; it is quite pure, and may be used in the most delicate operations. I have never since that night been without what to me is a large supply of distilled water, for it can be obtained without either trouble or expense.

I have for some time been intending to modify this apparatus, and probably before these lines are printed the old plate-box will have been discarded in favour of a properly-constructed circular vessel, an American pail, into which I shall re-coil my worm, and secure greater immunity from derangement by having the upper as well as the lower end of it made to pass through a tightly-fitting hole in the side. The connecting pipe between the boiler and the worm will also be a separate piece, and its ends will "ship" tightly into both the short tube in the lid of the boiler and the upper end of the worm.

It would not be at all difficult to provide an automatic arrangement for keeping up a supply of cold water in the condenser, but the changing of it by hand is attended with so little trouble that no useful purpose would be saved by the addition named.

I hope that what I have here pointed out will prove an incentive to those of my brother amateurs who experience difficulty in securing a supply of that desideratum to a photographer—pure distilled water.

GEO. MARKHAM, M.D.

OUR PRINTING PROCESSES IN THE FUTURE.*

WHEN we examine the more recent specimens of Woodburytype, and the newest results of the Albert process, we cannot but regard the perfection of photographic printing as being within our grasp. Manipulations such as are involved in new processes of this kind are, at first, necessarily awkward and difficult of fulfilment, and impediments in the way of complete success must, therefore, constantly arise; but a well-organised system once established, and operators well practised in their work being secured, the process is thenceforth conducted in a uniform and satisfactory manner. That the Woodburytype is of real worth, and capable of utilisation in any branch of photographic printing, is a matter beyond all doubt to those who have had an opportunity of inspecting the beautiful Italian picture of a girl seated in an open window, published a short time since by the Photo-Relief Company. Here we have a female head of the most delicate description depicted in all its original softness and modelling, without even a suspicion of that sharpness and rigidity of outline which sometimes characterised the earlier portrait-pictures produced by the Woodburytype. The drapery, too, is likewise faultless, while the high lights, instead of being glaring and chalky, possess the soft burnished appearance of an ivory surface. This picture alone amply proves the suitability of the process to photographic portraiture; while, as regards its application to the reproduction of paintings, engravings, and less delicate photographic subjects, no doubt at all has ever existed on the matter.

The Albert pictures, again, are certainly very perfect productions. The first specimens shown were indeed wanting in vigour, especially in the deeper shadows, and had therefore a somewhat flat, monotonous appearance, similar to that exhibited by a silver print from a soft, over-exposed negative; this defect we at first thought would be a very serious if not an insurmountable one, from the fact of the prints being produced by a method similar to lithography. The failing was, however, merely due to imperfect manipulation, and by no means inherent to the process, as is evident from the pictures now furnished by Herr Albert, which do not betray any of the former imperfections. They have less the appearance of being photographs than the Woodbury pictures, resembling very much soft wood engravings of exquisite finish. Heavy blacks are, it is true, absent

* *Journal of the Photographic Society.*

from the pictures; but these would, of course, be out of place in a delicate sketchy engraving such as the results of Herr Albert are designed to represent.

Here, then, are two printing processes perfect in almost every detail, and requiring only a little more elaboration and practice to render them adaptable to any description of work.

The qualities of both processes have indeed already been severely tested; for the Woodburytype is being worked to a considerable extent by MM. Goupil & Co., of Paris, as likewise by the Photo-Relief Company in London, and is also to be extended to Italy and America, if not already in operation in those countries. The Albert process has been carried on for some time at Munich, where its inventor has just erected two spacious establishments expressly for its accommodation; while in Austria—where, by-the-bye, the photographers wished to secure the process entirely to themselves, and made overtures to Herr Albert with that view—the Royal photographer of Vienna, Herr Angerer, has effected a partnership for the purpose of carrying on printing in that town.

In regard to both these processes it has been stated that prints may be produced by them from any ordinary negative quite equal to silver impressions. This, however, we are apt to doubt. In the same way as in carbon printing a more vigorous print is generally produced than would be derived from the same negative if printed in silver; so we should imagine that certain kinds of *clichés* are better adapted to the Woodbury and Albert processes than others. In saying this, we do not mean to point to defects in the processes, but, on the contrary, to express our belief that, if suitable negatives were invariably used, the results would always be perfect. We are now accustomed to taking negatives solely with a view to printing them with silver, and we manipulate them accordingly in such a manner as to produce the best effects with our printing medium. Our *modus operandi* could, however, be modified at any time if we knew that certain alterations in the quality of the negatives were necessary.

For the future, therefore, we have before us two mechanical printing processes besides the modest, but very efficient, carbon process, and likewise the old method of silver printing. In regard to these four methods there arises this question—Are we to choose one and discard the others, or is it probable that we shall employ them all according to circumstances? The latter view appears to us the most likely; for, on due consideration, it would seem impossible for us to give up the silver and carbon processes entirely. These, or methods analogous to them, will always remain in vogue in certain cases where but few prints only are required to be produced in the most simple and inexpensive manner. With amateurs, for instance, or for scientific and technical purposes, where results require to be printed on the spot, a complicated process requiring special knowledge in its manipulation would be out of place; in ordinary photographic portraiture, also, where but a dozen or so of copies are necessary, it would likewise be more advantageous to adhere to the methods of carbon and silver printing. Where, however, hundreds and thousands of impressions require to be produced there a mechanical process must be employed, and in this case it will be a combat between the English and the German methods. At the same time, from what we have seen of the results of the two processes, we should not be surprised if employment be found for both, by reason of the marked difference existing in the nature of the pictures furnished, rendering each process more suitable for particular purposes. This may, indeed, be mere fancy on our part; but the results at present obtained in the two cases are certainly very dissimilar.

In the event of a mechanical process being extensively employed, the photographer's labours must necessarily be divided—the ordinary operator confining himself merely to the production of the negative, and giving over the same for printing to others occupied solely with that branch of work. An arrangement of this kind would be attended with one great drawback, that of placing the production of prints beyond the control of the taker of the portrait, who generally considers this section of photography one of the most important elements of success. This difficulty, however, would occur only in very rare cases, and could, to a great extent, be obviated by the submission of a pattern or proof picture; for, when the tone and style of printing were once fixed, no further care would be necessary.

H. Baden Pritchard.

Air-Bubbles in Toning.—After prints are toned, sometimes spots appear upon them that resemble grease-spots. These are caused by air-bubbles in the toning bath, which bubbles occur from placing too many prints in the bath at once, or from want of care to keep the prints from adhering to each other while toning. Remember!—*Phil. Phot.*

SURFACE STAINS ON THE NEGATIVE.*

There are few photographers who have not had occasion to observe this phenomenon, and without being able to account for it. It consists in markings which have the aspect of marble stains or flowers, which show themselves on the glass plate after the sensitising. In general, they are on the lower part, but sometimes on the middle of the plate, and can be distinguished perfectly on examining the latter by transmitted light, before the development. If the development be strong, these spots may be seen, by reflection, on the reverse side of the plate, and then they seem as if they were formed between the plate and the film.

With a very porous collodion, like that employed on dry plates, this phenomenon is rarely or never produced; with all the other collodions it frequently presents itself, or rather it may be produced, if the operation be not methodical.

A long series of experiments, instituted with the greatest care, have convinced me, by the clearest evidence, that these spots are neither due to the collodion nor to the silver bath, nor even to the defective cleaning of the plates. The sole cause is a faulty and inattentive manipulation during the sensitising. That which abundantly proves this is, that this phenomenon may always be produced or avoided at pleasure.

I come now to the causes of this irregularity, and a knowledge of these causes will suffice to point out the remedy. When a plate is covered with collodion, it forms, to whichever end it runs, a thicker accumulation than on the opposite end, and, consequently, is slower to set. Therefore, if the plate be plunged into the bath, holding downwards the side to which the collodion has run, a lateral refilling or thickening is produced in the liquid, and as this tends to retake its level after the immersion is completed, an undulatory movement results, which lifts the pellicle of collodion at the part which is still soft, and of which the adhesion to the plate is incomplete. This action naturally takes the direction from the side towards the centre; the parts raised, where the collodion is thickest, are also those which are iodised most strongly, while, further on, where the layer of collodion is thinnest, the iodising is, on the contrary, very feeble. It is this inequality of the deposit of the iodide which produces the stains in question. This defectiveness is particularly noticeable if the plates are immersed by a brisk movement before they are sufficiently dry; the more active the undulatory movement the more observable is its action upon the pellicle. On the contrary, if care be taken to allow the collodion to set, and to immerse the plates slowly and regularly, the phenomenon ceases to be produced. The making of a see-saw movement of the bath, when the plates have been immersed, in order to stop the formation of these spots, is a manœuvre of no consequence and of no avail, as the stains are completely and irremediably produced at the moment of the immersion.

In order to show that my observations are correct, I have made an experiment in another sense, which I desire to report, so that there may remain no doubt on the subject.

If the collodionised plates be turned so that the other side be uppermost, the stains are less frequent (we are supposing that the plates are immersed too soon and too quickly), precisely because the part exposed to the shock of the small liquid wave is thinner, and has already congealed. The rising of the pellicle is less marked when the opposite part of the plate comes in contact with the bath, and the action of the latter on that portion of the layer which is firmest is also much less energetic than in the former experiment.

There is another indisputable proof that matters take place in this way: if the plate be collodionised in the usual way, and left to drain diagonally, the spots take the same direction and with so much the more intensity as the side on which the collodion runs is thicker and less set. If a plate be divided into two parts by means of a thread of sealing wax, one-half being covered with collodion before the other, so that the first shall have set before the second—and if the plate be plunged in the bath, parallel to the sealing wax—it will be observed that the first half is very clean, and the other not so.

It is clear, according to this principle, that this phenomenon cannot be produced with horizontal baths, in which the liquid bathes the plates uniformly, affecting all parts of the collodion layer equally. The swelling of the latter is also prevented by the weight itself of the liquid, which spreads equally over its whole extent.

A collodion containing more ether than alcohol is less liable to this accident, because it congeals sooner and adheres more rapidly to the plate. Nevertheless, I cannot recommend the exclusive employment of such collodion, as it is inferior in quality to that which contains an excess of alcohol, and particularly now that the operator is made aware of the real cause of the defect, and how to avoid it.

L. G. Keffel.

* *Bulletin Belge.*

THE EXTRA-RED RAYS OF THE SPECTRUM.

In the early part of this year, while engaged in the work of getting up a history and description of the Royal Institution for the press, Dr. John Tyndall gave me much information about the manipulation of rock-salt when making it into lenses, together with other useful information about apparatus for use in experiments with the longest invisible rays of the spectrum. Glass stops these rays to a very large extent, consequently lenses and prisms of rock-salt or of bisulphide of carbon must be used instead.

At one time good large transparent blocks of rock-salt were obtainable only with great difficulty in England, but now a pretty good supply comes in from Westphalia and other parts of the continent. In damp air rock-salt is very deliquescent, so that in Faraday's laboratory at the Royal Institution the lenses made of it are kept under a glass shade, which also encloses a cup half full of sulphuric acid to keep the air dry. This acid, of course, has to be changed every now and then, as it weakens itself by the absorption of moisture.

When a supply of rock-salt is received, the first work is to cut down the blocks to nearly the size of the lens or prism intended to be ground. This is done by means of a dinner knife and small mallet; for rock-salt has two planes of cleavage at right angles to each other, so is readily split up into rectangular blocks of any size desired. Supposing one of these blocks to have a few opaque spots in its interior, for most purposes it does not matter much, for the spots will only stop a few of the heat rays.

Rock-salt may be conveniently ground upon glass to any desired curve, the glass itself having been previously ground and polished, so that it will give the required shape. During the grinding operations the glass is wetted with a saturated solution of common salt, and the saturation must be absolute, otherwise the crystal itself will dissolve in the liquid. A little fine emery may be added, to assist in the grinding operations. The curved surface of the rock-salt is then wiped dry, and polished in a lathe with rouge.

In grinding rock-salt into prisms there is some little difficulty, as was pointed out by Mr. Brooke, F.R.S., at the last meeting of the British Association at Exeter. Let A B, *fig.* 1, be the base of the prism, parallel to one of the lines of cleavage of the crystal. Mr. Brooke and Mr. Browning, the optician, in grinding the sides A E and B F found that, long before the prism had been ground to a sharp edge at D, the blunt apex of the prism split off in the cleavage lines represented between E and F. The operators, therefore, agreed to try what effect annealing would have upon crystals which exhibited such a strong tendency to split. After a few trials, they found out that the annealing must be performed very slowly indeed. They imbedded the pieces of rock-salt in sand, in a tin pot, and then, by means of a Bunsen's burner, they very slowly raised the temperature, until, after the lapse of twelve hours, it amounted to 250 degrees Centigrade, after which the crystals were allowed to cool very gradually. These pieces of rock-salt could then be ground into sharp-edged prisms without much danger of splitting.

FIG. 1.

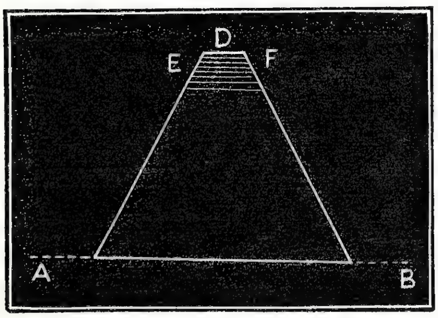
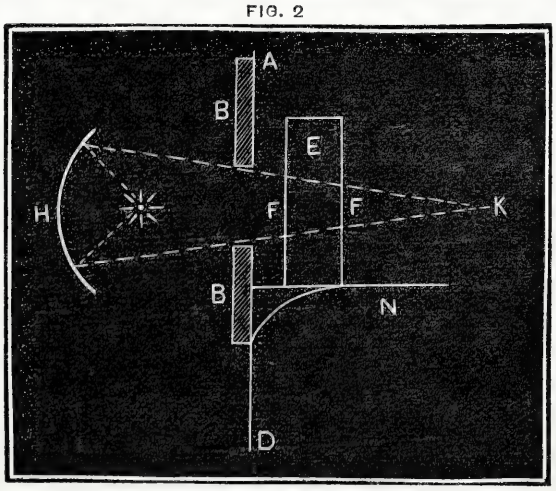


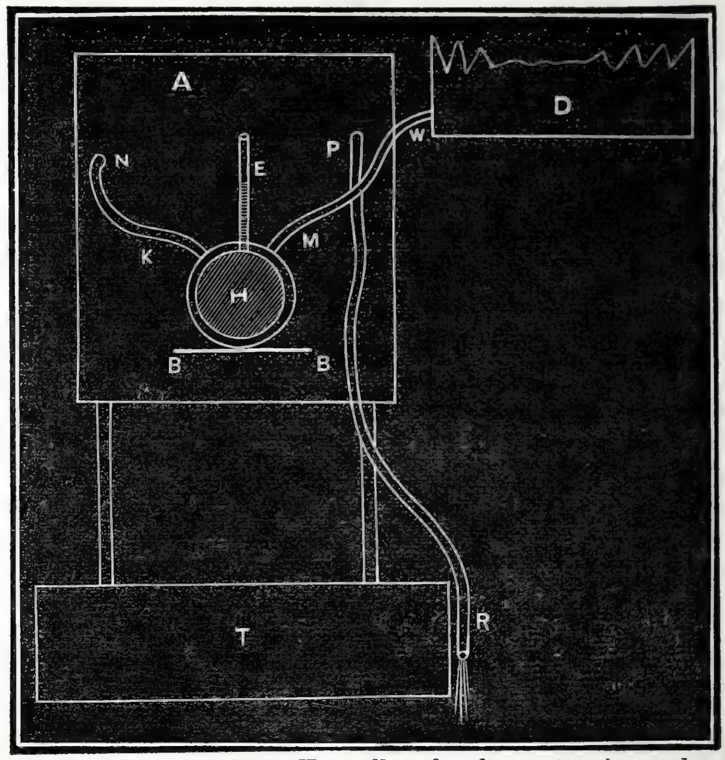
FIG. 2



Practically it has been discovered by Dr. Tyndall that rock-salt condensers in the electric lantern do not concentrate the heat rays so efficiently as when a reflector is used without condensers. The method he finds to act most efficiently to melt iron and to set fire to brown paper with the invisible heat rays of the spectrum is shown in *fig.* 2. In this cut A D is the brass front of the electric lamp, which is made double and water-tight at B B, in order that the water which fills this hollow front may absorb much of the heat which otherwise would reach the vessel E. An accurately ground parabolic glass reflector is placed at H. This reflector is silvered on the surface next the light, because if it were silvered on the back the glass would stop some of the heat rays. A projecting metal shelf at N supports the vessel E, so that if the vessel with its highly inflammable contents should break, those contents cannot get into the hot interior of the lantern, but will pour down outside. The faces F F of the vessel E are of thin glass, because, although glass stops some heat, it is better, on the whole, than rock-salt plates—the latter being so easy to break and so difficult to clean from the opaque solution of iodine in bisulphide of carbon, which fills the vessel E. This solution cuts off all the light, but allows the heat rays to come to a focus at K, where an invisible point of intense radiant heat is available for experimental purposes.

Some further details of this arrangement are shown in *fig.* 3. In this cut A is the front of the electric lamp, with the shelf B B supporting the vessel H. This vessel, filled with the bisulphide solution, has an open glass tube at E to allow for the contraction and expansion of the liquid. It also has a double outer case of brass, through which case a stream of cold water constantly circulates to keep the bisulphide of carbon cool. D is the bottom of a vessel holding a good supply of cold water, which passes along the elastic tube W M to the case of the vessel H, which it leaves at K, and by another piece of elastic tubing is made to enter the hollow front of the electric lamp at N. It passes out again at P, and finally escapes at R, below which point it is caught in a pail. The legs of the electric lamp stand in an open tank of water T, so that if the bisulphide of carbon should catch fire, the burning liquid will fall into a vessel of water.

FIG. 3.



A pure variety of bisulphide of carbon, without unpleasant smell, is now on sale in the London market. William H. Harrison.

PERSPECTIVE *VERSUS* TRUTH IN PHOTOGRAPHY.

When we had read a small portion of the following communication to the *Bulletin Belge*, we thought that some facetious person had been parodying an old and favourite "notion" of Sir David Brewster, that unless the lens of the camera was infinitely smaller than the head of a pin—in fact, a mathematical point!—the resulting photograph would not be absolutely accurate.

The writer of the following appears to have imbibed the idea that because the Apollo Belvedere, when projected on the margin of a plate by an exceedingly wide-angle lens, is more obese than he would be if placed in the centre, and because a row of round balls photographed on a wide plate by a similar lens become each more and more elliptical in form as they approach the margin, that therefore there is no truth in photography. Pictures thus projected are absolutely true. If the elliptical cannon balls at the margin of the picture be examined from the correct point of view, they will appear as accurate spheres. If in the photograph or in a painting they were round when near the margin, then would the picture not be accurate if judged by the laws of plane perspective, in which the eye of the spectator is supposed to be placed at a definite point opposite to, and a little distance from, the centre of the picture, this distance being practically equal to the focus of the lens. Had they been taken by Johnson's pantascopic camera, they would undoubtedly have been represented as round and not oval; but, in that case, the picture would not have to be viewed as if it had been drawn in plane but in panoramic perspective—otherwise it would not appear accurate. Each is absolutely true, when viewed properly. The sentiments enunciated in the following only more and more confirm what we have so often said—that a wide-angle lens ought only to be placed in the hands of those who can select the proper kinds of subjects for them:—

If there be an expression which is stereotyped upon the lips of the admirers of photography it is, that what they call the "young art" reproduces objects true to nature, of which it is the faithful counterpart. This common saying, repeated by thousands of persons who reflect less than they speak, has at length been accepted as a dogma. Well! it is this would-be correctness of the photographic image that I propose to dispute; and I do not stand alone, for the tribunals themselves have, in fact, admitted that this correctness does not exist.

Is the exactness of the representation of objects by photography quite absolute? At the risk of being treated as a heretic I venture to say no. Photography employed in its place, and in a judicious manner, without doubt furnishes images more correctly than any other system; but these images are not the identical reproduction of the objects themselves, and it appears to me interesting to inquire into the causes of these deformations—causes which are extremely numerous.

Let us commence with the optical errors.

We will examine this proof of a monument taken from below with an irreproachable objective. The lines which should be vertical converge towards the summit. Is that what you call correct? "Good," you reply; "that proceeds from the chamber not being on a level with it." Very well. Let us take now a globe or pantascopic objective and make a view of a long street. How the perspective extends! How excessively wide the first houses appear, and how the objects grow smaller and smaller in proportion to their distance from the first plane. The edifices situated at a hundred paces seem to be a mile and a-half off! Is this nature? No; certainly not. Yet the objective works correctly, and the camera is exactly on a level. The perspective is mathematically just; no draughtsman could make it more so. Where, then, is the defect? It is the visual angle that is too wide. Unfortunately that is an evil for which there is no remedy, and, curious enough, it affects the curves in the same way that it affects the straight lines.

Take, for example, a pile of cannon balls. An artist would represent them as circles, made in a photographic proof with a wide angle objective, and so that the pile is reproduced on one of the sides of the image; but instead of circles you will have ellipses. The science of mathematics accounts for this perfectly; each ball sends to the optical centre of the lens a cone of rays, and if the cone is not cut at a right angle by the plane of the image its projection will be an ellipsis.

A photographer of my acquaintance showed me one day a *chateau* which he had taken with a pantascopic lens. In front of the edifice there was a range of statues. Well, nothing could be more grotesque than the effect of the figures, particularly those near the margin of the image. There was an Apollo Belvedere that had the bad luck to be banished to the extremity of the frame; the elegant youth had received, thanks to that peculiar position, an obesity and rotundity of form which gave him the mistaken air of the statue of Luther. Was that truth? And, unfortunately, these are not the only sources of evil; there is an infinity of others.

You published, at page 18 of the volume for 1865 of your Journal, four portraits of the same personage, taken under different exposures. This was an example in support of the theory of exposure so completely established by MM. Loescher and Petsch. The first image had a besotted and stupid expression; the second, a ferocious and ill-natured; the third was a type of the saturnine and cunning. Which of the three was correct? Not one. The most faithful portrait was No. 4, whereon had been employed a combination of different kinds of exposure. It would be seen by that example how the mode of exposure may be the cause of considerable errors; and the demonstration is applicable not only to portraits but to landscapes.

The view of Rochersberg, at Bingen, on the Rhine, has been often described as one of the finest in existence. I visited that locality several times, in company with friends, and we never could perceive the beauties which had been so vaunted. I revisited the place afterwards—not in the morning, as on former occasions, but in the evening—and then the panorama was ravishing—the effect of light! But independently of the exposure as a source of error in this matter, there are numerous other circumstances which affect the correctness of photographic images. In general the clear parts are too white and the shadows too dark in proofs obtained by photography. This is a fundamental error which belongs to the nature itself of the processes, and which it is sometimes very difficult to avoid. It is particularly striking when the proof reproduces objects strongly lighted by the solar light. If it be attempted to obviate it by reducing the exposure, the details only of the light parts are obtained; the shades are confounded in a compact mass, without detail and without fineness. If, on the contrary, the exposure be prolonged, the details of the shadows are obtained, but the over-exposed lights present only a long white spot where the details are effaced. Is that what you call photographic exactitude?

Therein is the reason why we experience so much difficulty in our studios when we wish to produce an image suitably exposed. We obtain light more diffused and shades clearer than painters would give us, and the latter are often astonished to see a picture which had figured in a gallery under a detestably false light furnish, in the hands of a photographer, a perfect copy, correct according to the exposure.

It is not so easy to judge the effect of light on taking a landscape, an architectural view, and particularly an interior, as in executing a portrait. I happened once to have to reproduce a chemist's laboratory. It was a vast piece with a vaulted ceiling. In my proof all was perfectly just—table, stove, chemical vessels, lamps, &c. The ceiling alone was wanting: it was all black. I made other attempts, with exposures of twenty, thirty, and forty minutes. I finished by obtaining a trace of ceiling, but, in return, the objects placed near the windows were over-exposed and had lost all their details. The result was we had four proofs, none of which was exact. At last I decided to reflect the solar light upon the vault. But this circumstance of lights too bright and shadows too black, which is often reproduced in photography, is felt even in the most simple operations; for instance, when prints or engravings are reproduced.

One of the most skilful photographers was one day requested to reproduce the famous *Battle of the Huns*, by Kaulbach. The proof was excellent, except that the subject was too dark, too hard, and not sufficiently vaporous. It was refused, and another required to be executed with a longer exposure. This had the vaporous aspect of the original, but the figures in the foreground, which should have been vigorous and marked, were of a dull pale grey. A passable result was eventually obtained by retouching the negative. But I ask you, again, is that what you call the fidelity of photography?

I have only cited simple examples in support of what I have advanced—that is to say, the difficulty of producing really exact photographs. It remains for me to touch another part of the question, the most important of all, and that is the colour.

Photography translates cold tones by an excess of light, and warm tones, such as the red and yellow, by an excess of darkness. The picture of Hildebrand is well known—*The Setting Sun on the Ganges*. The sun is as red as fire, deep chrome yellow clouds, sky of a deep marine blue. Let us see what photography has made of it: a black disc, surrounded by black clouds, which seem pregnant with storms, in the middle of a white sky! The sun reminded me of the view I had of the solar eclipse at Aden.

I could multiply examples, but what I have said will suffice to disabuse the minds of those who imagine that the photograph is always the identical reproduction of its models. Happily for this art the greater part of the defects which it attracts may be avoided or corrected by the enlargement of the lenses, by a suitable placing of the camera, by an intelligent exposure, by the employment of originals or of negatives which have been retouched. That which constitutes art in photography is to represent the reality—but by embellishing, and not by causing it to lose any of its truth. H. Vogel.

Berlin, September, 1869.

CAMERA FOR WORKING THE WET PROCESS WITHOUT A TENT.

Mr. Lane has shown us a camera which he is making with the intention of superseding the use of a tent when working the wet collodion process in the field.

Its novel features consist of a slide which is in the form of a case, open only at the top and bottom. Through the top of this slides a shutter the height of the frame, and attached to the lower end of this shutter is a plate-holder similar to the inner frames of an ordinary camera slide. When the shutter is drawn up, so as to stand above the "case," the plate-holder is then inside of the latter, and if a sensitive collodion plate be *in situ* in the holder, it will be quite protected from the light and may be carried about, even in the sun, without suffering damage. The plate-holder, or frame, is saturated with shellac varnish, so as not to be affected by its immersion in the nitrate of silver bath.

The method of using it is as follows:—The plate, having been coated with collodion, is placed in the frame, which is then lowered down into the nitrate bath, to which it is made accurately to fit without the possibility of the admission of light. The bath itself is made of wood saturated with shellac.

When about to be transferred to the camera the plate is drawn up into the case, which is then placed over an aperture in the camera similar to that in the bath, and the exact counterpart of the bottom of the case. The plate is then lowered down, when it assumes the place of the ground focussing glass previously withdrawn. After being exposed it is once more drawn up into the case, which is then removed from the camera and transferred to the developing bath—a thin, vertical vessel, with sides formed of deep orange glass. By a simple arrangement—on the principle of a bolt—the plate is dropped down into the developing solution in such a way as to prevent the frame or holder coming into contact with the iron solution. The progress of the development is watched through the glass sides of the vessel, and when complete the plate is lifted out through the agency of a dipper which is kept in the vessel.

This camera, we think, will answer well the purpose for which it is intended, and considerable ingenuity is displayed in its construction.

Contemporary Press.

CUTTINGS OF FIXED PRINTS WORTH SAVING.

[Philadelphia Photographer.]

Photographers generally think that "cuttings of prints previously toned and fixed contain so little silver as scarcely to repay the trouble of collecting." This is true for cuttings of vignette prints, but for the plain ones it is a mistake which has been the cause of great loss to many of your readers, for nearly all the treatises on photography (even Hardwich's) affirm that they do not contain enough silver to pay for their saving.

To correct such an error, and to give an idea of what is lost, I have saved my cuttings of fixed prints for about six months. The ashes weighed thirteen pounds, avoirdupois. I fused them, and here is the result:—

Gold and silver collected:—

$27\frac{1}{2}$ pennyweights gold, at 1.35 currency		$37.12½
$12\frac{3}{4}$ ounces troy silver, at 1.75 ,, ...		22.31¼
		$59.43¾
Expenses of collection:—		
7 crucibles, at 60 cents........................	$4.20	
35 pounds bicarbonate of soda, at 9 cents...	3.15	
14 bushels coke, at 10 cents.....................	1.40	8.75
Profits......		$50.58¾

P. C. Duchochois.

NOTES ON PHOTOGRAPHY.

[Mechanics' Magazine.]

The Photographing of Machinery—Removal of Nitrate of Silver Stains—The Photographing of Spirits—A New Polarising Prism—Alkaline Wet Plates.

A notice has appeared in the *Scientific American* to the effect that M. Bourbouze has succeeded in representing by photography machinery in motion. The statement is that he constructs his photographs in movable parts as transparencies upon glass; each movable organ is photographed on a separate glass, and the fixed parts upon another glass plate. The fixed parts and the movable glasses are arranged in a frame, and motion is given to the latter glasses by means of a winch so as to represent the actual motion of the machinery. The whole is then, in all probability, illuminated by the lime light and projected on a screen, but the published notice is so brief as to give too little information. A plan by which moving figures have been successfully represented is to take several small transparencies of the moving object in its different positions, and to arrange these pictures in a circle near the rim of a large, flat wooden disc. This disc is made to spin round in front of a magic lantern, so that all the pictures are brought in succession into the focus of the object glass, and thereby thrown upon the screen one after the other. By the law of the retention of vision, the object then appears to be in motion, supposing the wheel to be driven at the proper speed, and each picture to be rendered stationary for the instant that, by suitable appliances, it is flashed upon the screen.

In order to remove the dark stains of nitrate of silver from linen without destroying the fabric, Herr Grimm recommends that the stain be first treated with chloride of copper, to produce chloride of silver by double decomposition, and that then the spot be treated with hyposulphite of soda. When the silver has been thereby dissolved, the linen should be well washed. Another plan is to treat the stain with a weak solution of permanganate of potash to which some hydrochloric acid has been added, and then to finish with hyposulphite of soda and washing, as before. A solution of iodine in iodide of potassium also answers the purpose for the first washing.

A very great deal has been published in all the photographic journals for some time past about the Mumler spirit photographs. It will be remembered, from the notices which appeared in the newspapers, that a photographer named Mumler has been for many years taking photographs in New York wherein shadowy human forms accompany the sitters—which forms have usually been alleged by the sitters to represent deceased relatives of their own. Nothing is easier than to produce good ghost pictures with the connivance of the sitter; but nothing of this kind took place in producing the Mumler photographs. Mumler was prosecuted as an impostor by the photographers of New York, but many respectable witnesses came forward and swore that the pictures produced in their presence were actually those of their deceased relatives, and one of these witnesses was Mr. Livermore, the New York banker. The result of the trial was that Mumler was acquitted, as imposture was not proved against him. Faint ghost-like pictures may be produced upon imperfectly cleaned glass plates treated in a peculiar way known to scientific photographers, so a favourite explanation of the case in the photographic journals when the trial was over was that ghost-like smudges were thus produced, and imagined to be likenesses of departed friends by weak-minded purchasers. But when the photographs themselves reached England, it was seen that the phantom faces were well-defined, absolute likenesses, presenting marked features. To still further complicate the matter, some witnesses testified that these pictures came out in Mumler's presence in the operating rooms of other photographers where Mumler was not allowed to touch the glasses, chemicals, or sitters. Up to this point the case was puzzling enough, but very recently The British Journal of Photography published a part of a letter from Mr. S. C. Hall, F.S.A., Barrister-at-Law, which had been written about the Mumler case to Judge Edmonds, an eminent man who defended Mumler and believed in his innocence. In this letter Mr. Hall said that he and eight witnesses all at the same time saw the spirit of his sister at a circle, Mr. Daniel D. Home being the medium. Among the eight witnesses was the Hon. Mr. Lindsay. The spirit, he said, was visible for about two minutes, and stood out palpably and distinctly enough to be photographed had any photographer been present with his apparatus. So stands the evidence at the present time respecting the Mumler case, whilst that remarkable photographer himself is now at large producing his spirit pictures and loudly offering to submit to any reasonable investigation of his powers. Can he not come to England?

M. Jamin, of Paris, has invented a new polarising prism, but no specimen, so far as we know, has as yet reached England. It consists of a glass box filled with bisulphide of carbon, and a slice of Iceland spar is placed diagonally in the centre of the box.

After reading the correspondence called forth by the publication of Mr. Sutton's new process, it seems to us that a new principle in photographic science has been discovered, without any of the writers having noticed the fact. Major Russell says that Mr. Sutton's prepared plates contain a large amount of soluble bromide. Now, with any ordinary preservative this bromide would have to be for the most part removed, or the plates would be very insensitive. But Mr. Sutton does not so completely remove it, yet on pouring a weak alkaline solution containing traces of organic matter over the plate great sensitiveness of the film is said to be the result. If so, we have the new discovery that alkalinity of the organifier will give sensitiveness to a film containing a large amount of soluble bromide. As yet no evidence has been published supporting Mr. Sutton's opinion that his new process is far more sensitive than the wet one, and upon this point all its value depends. It is to be hoped he will soon send to London pictures of street scenes, giving abundance of half-tone and sharpness in moving figures. When practical photographers see that he can produce much better instantaneous pictures than they themselves can by the wet process, Mr. Sutton's fame will be established.

COMETS AND THEIR CAUSE.

[Philadelphia Photographer.]

Mr. B. W. Kilburn, Littleton, N. H., one of our most able landscape photographers, has sent us a plan for the eradication of an interesting but troublesome little luminary, that very frequently mars the beauty of the photographic heavens, which will be gratefully received. He has, no doubt, traced the cause to the true source, which may be proven effectually by trying the experiment of producing them. He writes as follows:—

With me comets were a source of great annoyance for a long time, but they appeared almost always under similar circumstances. I looked for the cause in my chemicals, but without success. I finally found the cause in my glass and dust brush. In certain states of the atmosphere there are minute globules of moisture deposited on the glass and in the brush, and, when the brush is used, it makes a marking on the glass resembling a comet. This mark, in extreme cases, can be seen faintly, resembling ground glass, but not always to be discovered with th naked eye.

The remedy is made plain by the cause, and is effectual with me always. Re-clean your glass with alcohol and a clean piece of cotton flannel; then thoroughly dry your brush, or, when this cannot be done, dry your glass in the sun before touching it with the brush. This being done carefully, one great cause of comets will be effectually removed.

Heretofore I have supposed that comets were always produced by dust on the plate, or some foreign substance in the collodion. This I know is not always the case by any manner of means. B. W. Kilburn.

Our Editorial Table.

Views in Canton. By John Thomson.

We referred last week to some views in Canton by Mr. Thomson, whom many of our readers, doubtless, will recollect in connection with a series of views of ruined temples in Cambodia, which he took, if we remember aright, at the suggestion of the King of Siam, and which, when exhibited at the Nottingham meeting of the British Association in 1866, were examined with much interest by geographers and archæologists.

The views in Canton before us form only a small portion of the series upon which he is engaged, and which will, we believe, when completed, find their way to the public through the usual channels. Those with which Mr. Thomson has now favoured us represent rather scenes illustrative of the manners and customs—the everyday life—of the Chinese than of the architecture of the city. What is especially noticeable is the "natural" groupings of the various figures introduced into the pictures. Although there is internal evidence in many of the photographs that careful posing and even protracted exposure have been resorted to, there is such an absence of the stiffness usually incident to these operations one might almost suppose they had been taken by an instantaneous process, when the subjects were quite unconscious of the operation to which they were being subjected.

In a Canton Tea Merchant's represents a scene probably common enough among the inhabitants of the country over which the "brother of the sun and moon" holds imperial sway. Some half-dozen celestials are engaged in smoking, and in examining, tasting, and otherwise trying, samples selected from chests and baskets presumably filled with souchong, lapsang, bohea, pekoe, or other kinds of that leaf which, when properly infused, supplies "the cup that cheers but not inebriates." A *Group of Buddhist Priests* is another photograph of an instructive character, and also excellent from its pictorial merits. *Tartar Soldiers* is a picture of about a dozen soldiers, and is interesting from the variety of character displayed. In point of apparent smartness and intelligence it would be no easy task to select an equal number of men from one of our own regiments who would prove superior to these Tartar warriors. Mr. Thomson's faculty for easy and natural posing is very ably displayed in this picture. An interior in the *Temple of Five Hundred Gods* reveals such a spectacle as we might expect to see in the gallery of a modeller in plaster, or in the show-room of a Mrs. Jarley when her stock is in excess of the accommodation for suitable display.

The specimen of the *Homes of the Poor in Canton* indicates an amount of wretchedness which we had fain hoped was confined to western nations. Despite of the squalid misery depicted it is a view which will not fail to attract attention, as it illustrates a phase of social life which photographers often ignore. In representative pictures of groups of men Lazarus should have a place as well as Dives, otherwise much of their value is destroyed. *Beggars at the Gate of a Temple in Canton* is another picture of the class to which we have referred, and, like the other, tells its story with much effect.

We congratulate the artist upon the success which has so far attended his efforts to produce, by means of his camera, a sort of pictorial encyclopœdia of scenes illustrative of Chinese manners and customs.

On the Beach, Conway. By George Wardley, Manchester.

The notice which we gave of the recent exhibition of photographs in Falmouth (in connection with the general Exhibition of the Royal Cornwall Polytechnic Society), and which we received from a friend who was present, did not appear to convey much information beyond the facts somewhat baldly stated in our announcement of the medal awards, and hence we did not consider it necessary to again revert to the subject. It could not, of course, be expected that we should visit Cornwall for the sole purpose of placing before our readers our opinion of the photographs exhibited. We have already informed those interested *who* were the exhibitors, and to whom medals were awarded.

Referring to these medal awards a very foolish law appears to exist. An exhibitor who has been so fortunate as to receive this coveted distinction is thereby excluded from ever being allowed again to compete for medalistic honours. Mr. Stevens, the late Secretary, informs us that this does not apply to the case of the exhibition of photographs; but the committee of award evidently appear to be ignorant of this concession, as we find it stated in the report published in the *West Briton* that "Mr. Briggs, of Leamington, is again an exhibitor, *but having received a medal last year is excluded from taking a prize.*" The sooner the committee come to a distinct understanding on this point the better it will be. Once let it be understood that exclusion from taking a prize is to result from having been once awarded one, few, if any, photographers of spirit will contribute in future—certainly not one of those who are thus excluded from participation in the *chance* of obtaining a fitting recognition of merit.

As we intimated at page 423, Mr. Wardley, of Manchester, had the honour of receiving a first-class silver medal for the best landscape. That gentleman has forwarded the picture so distinguished for critical examination. The picture is entitled *On the Beach, Conway;* it is 18 × 14 inches in size, and represents a small schooner aground alongside a jetty. In the background of the picture are fine gradations of distance, with excellent atmospheric effects, held in nice subordination to the principal subjects, the vessel and the jetty. The cloud effects are also managed with much skill.

Mr. Wardley's name has so long been associated with the practice of the Taupenôt process (of which he has had thirteen years' experience), that were it not that so many dry-plate men have recently been practising wet collodion, we should have considered it unnecessary to intimate that the negative of this picture was taken by the dry process named. In its minutest details the photograph is very perfect. The collodio-albumen process owes a good deal to Mr. Wardley; for it was he, if we mistake not, who first introduced the method, now commonly practised, of developing with a plain solution of pyrogallic acid, instead of the *acid* pyro. and silver formerly employed. Of the superiority of the former over the latter method we might easily here speak, but want of space prevents us indulging in such observations at present.

Correspondence.

Home.

PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—In thanking you for your useful articles on lenses, as we are sure all interested in photography must do, we shall shortly have the pleasure in submitting to you examples of the work of Steinheil's aplanatic doublet.

Herr Steinheil introduced this lens in 1867, and Dr. Monckhoven, in his work on *Photographic Optics*, published in that year, refers to it as follows:—

> "For portraits the only possible lens is Petzval's doublet, but we are able to state that this form itself will soon be abandoned for a combination recently invented by M. de Steinheil, of Munich, which is free from spherical and chromatic aberrations both along its axis and obliquely to it, from distortion, and from astigmation, and which further reduces the curvature of the field to a much smaller quantity. This lens, the fruit of immense and ingenious calculations, will not fail to attract the attention of all photographers, as in every respect it deserves to do."

We think it will be seen, therefore, that to Herr Steinheil belongs the credit of being the first to introduce an aplanatic doublet which works with absolutely the full opening, and for this invention he received a gold medal at the late exhibition of photography in Hamburgh.—We are, yours, &c., Murray & Heath.

69, *Jermyn-street, S. W., September* 17, 1869.

[A few words appended to the letter of our respected correspondents may not be out of place. The rapidly-acting lenses of Steinheil, Dallmeyer, and Ross are all different, the greatest similarity, without doubt, existing between those of Dallmeyer and Steinheil; but the lenses of the former are composed of flint and crown, whereas those of the latter are made exclusively of flint, two kinds being necessarily employed. We have not the means to enable us to ascertain which of the two is the more advantageous; but we believe that Dallmeyer's rectilinear, in what we may call its generic form, was introduced by him at a date prior to any notice of Steinheil's lens having been published. The first notice of the latter, of which we are aware, will be found in an article (translated from *Photographische Correspondenz*) at page 492 of our volume for 1867, the date being

October 18th, in which Dr. Monckhoven describes it as a cylindrical tube, at the end of which are two achromatic meniscus lenses composed wholly of flint glass, the two combinations being within themselves identical and like in form to the globe lens. It will be observed that this description does not apply to the rapid rectilinear, which is not composed exclusively of flint glass, but of flint and crown; and which is not composed of combinations similar in form to the globe lens. True, the description and engraving of this lens, which we gave in our number for November 15th of the same year (page 545), at first sight appear to be similar to Dallmeyer's lens, although the exclusive employment of flint glass is insisted upon; but we should state that the same volume to which reference has been made contains the patent specification of Dallmeyer's lens (see pages 221 and 246) and at a date considerably anterior to that of Dr. Steinheil, so that even if both were alike, which is not the case, Dallmeyer would still have the advantage in respect of priority of invention. We have said more on this than might appear to be necessary, but our attention has been called to the subject by others as well as our friends who have sent us the above communication.—Eds.]

To the Editors.

Gentlemen,—Relative to the subject of lenses, about which several chapters have appeared in The British Journal of Photography, I thought it might not be uninteresting, as you refer in your last issue to the Steinheil lens, to send you a few prints from negatives taken with that objective, including one or two comparative experiments with other lenses of known excellence.

The lens of which I speak is one of the first made by Steinheil. It is not achromatised, and, after focussing sharply on the ground glass, should be brought nearer to the sensitive plate by about $\frac{1}{40}$th of its focal length. Such, however, is its depth of focus that this alteration is not material, as I have frequently neglected to do it without being able to detect in the slightest degree any falling off in sharpness of definition. Of course the smallness of the stop renders it simply useless for badly-lighted interiors; but for well-lighted architectural subjects, where only a wide-angle lens can be used, it is, I believe, invaluable.

I do not advocate the use of a small stop when a similar result can be obtained with a large one; but my own opinion is that, by a judicious management of the exposure and subsequent strengthening up of the negative, the objection that a small stop produces flatness will disappear altogether.

I claim, then, for this lens that whilst it includes a larger angle than any other of which I know, it produces little distortion or exaggeration in size or distance. In other words, objects in the immediate foreground do not appear distressingly large, neither do distant ones appear unnaturally dwarfed; at the same time, where there is no tilting, the perpendicular lines, even at the margin of the plate, are perfectly straight.

In some of the samples sent there is a slight falling in of the perpendicular lines; but it has been the result of tilting the camera where elevation could not be obtained.

The two views of the Manchester Assize Courts were taken respectively from exactly the same point of view with Dallmeyer's wide-angle rectilinear lens and the Steinheil, each possessing the same focal length. They were, however, taken on different occasions, and between which there was a marked difference in the quality of the light. Apart from this, the prints, I think, will afford a good illustration of the comparative merits of both the lenses in question.

As you correctly state, the use of wide-angle lenses requires some judgment, and in general landscape work they are to be deprecated. No photographer of average experience, however, would think of taking a view of Cardigan Bay on the Menai Straits from the summit of Snowdon with a lens of such a character, while subjects such as the south front of *Haddon Hall* from the terrace, and *Abergele Church* from within the graveyard, would, if taken with lenses other than those including the widest angle, present little or no pictorial effect, or convey to the eye an adequate idea of their character.

In calling your attention to a comparison of the merits of wide-angle lenses, I do not detract from the value of the splendid instruments made by our two eminent English opticians. I believe their lenses are altogether unsurpassed for general excellence. I do it simply because I look upon the subject as an interesting, if not an instructive, one, and to elicit other opinions besides my own relative to a lens about which little appears to be known.—I am, yours, &c., J. Pollitt.

Manchester, September 16, 1869.

[When we spoke of Steinheil's "aplanatic" lens in the concluding paragraph of our article, at page 433, we did not allude to his wide-angle or "periskop" lens, but to an objective having a large angular aperture, the same, indeed, to which reference is made in the letter of Messrs. Murray and Heath. The wide-angle Steinheil periskop is an excellent instrument when it falls into the hands of a person competent to use it with as much effect as our correspondent. With respect to the annoyance of having to make the requisite adjustment between the chemical and visual foci of this lens, we once took occasion (when we were favoured by Mr. Hummerston, of Leeds, with an opportunity for critically examining an excellent periskop belonging to him) to try if a better method of adjustment could not be introduced than the somewhat clumsy one of sliding in the camera a fortieth part of its length after obtaining a sharp focus. The following is the principle upon which we grounded our trial:—The change from a large to a small stop is attended by an alteration in the focal length of the lens, and as the visual focus of the Steinheil periskop is longer than the chemical focus, by employing a large stop for focussing, and then inserting a smaller one for working with, such a difference between the respective apertures may be made as that the focus will be lengthened the sum of the difference between the visual and chemical foci. After the insertion of the stop the chemical focus will then be lengthened to what the visual focus was previous to its insertion. On this principle was founded the experiment we tried with Mr. Hummerston's lens, and we found it to answer the purpose very well, the pictures taken by it under these circumstances being exceedingly sharp, without any adjustment of the camera. We have examined the specimens sent by Mr. Pollitt with considerable interest; and we shall exhibit them at the first meeting of the South London Photographic Society as good illustrations of the value of an extremely wide angle lens when employed under special conditions.—Eds.]

SULPHANTIMONIATE OF SODIUM.

To the Editors.

Gentlemen,—At page 38 of The British Journal Photographic Almanac for 1869 there is an article entitled *How to Make Dense Negatives from Engravings.* The sulphantimoniate of sodium is mentioned. I have tried to procure it in Liverpool, but cannot.

It appears that it is an article in little demand. I should take it as a favour if you will inform me in your Journal how I can procure it, and the probable cost of it.—I am, yours, &c., Fredk. Bridges.

21, *Mount-pleasant, Liverpool, Sep.* 14, 1869.

[This material is usually known by the name of "Schlippe's salt." Some time ago we tried nearly every wholesale house in London with a view to obtain some, and succeeded only in one place. The price, we think, was 3s. a pound. Cooley gives the following directions for making it:—Take

Effloresced sulphate of soda	8 parts.
Sulphuret of antimony	6 „
Charcoal	3 „

Triturate them together, and then expose the mixture to a red heat in a covered crucible until the fused mass ceases to throw up scum; boil the residuum in a porcelain vessel with *sulphur* one part, and *distilled water quant. suff.* Filter whilst hot, and, lastly, evaporate and crystallise. Liebig's method of preparing it is as follows:—

Tersulphuret of antimony	72 parts.
Dry carbonate of soda	68 „
Hydrate of lime (fresh)	52 „
Sulphur	13 „
Water	*quant. suff.*

Boil together for some hours, and filter the liquid whilst hot; concentrate by evaporation, and then set it aside to crystallise.—Eds.]

CAN A SPIRIT BE PHOTOGRAPHED.

To the Editors.

Gentlemen,—Mr. Fowler's remarks perplex me. He says that spiritual beings cannot be seen because they *are* spiritual, for which reason, also, they cannot be photographed.

Whence does he get his information? Certainly not from spiritualists, who say that they often see spirits at "circles." Certainly not from the Bible, for nearly every spirit mentioned therein is alleged to have been seen by some man or other. Nay, they are said to have been so substantial as to have been mistaken for human beings, and are stated to have sat down and eaten a kid for dinner.

If a spirit entered Mr. Fowler's house at dinner time, and sat down and ate a beefsteak before his eyes, would that spirit be substantial enough to be photographed?

Assuming, then, that Mr. Fowler's ideas are purely speculations of his own mind, who is most worthy of credence—Mr. Fowler, who says "I have a *notion* that spirits are thus constituted," or Mr. S. C. Hall, who says "I and eight persons, all at the same time, saw the spirit of my sister, and this was the nature of the appearance"—which, I say, is most worthy of credence?

The Master of Lindsay, in his evidence before the Dialectical Society, said that he saw the spirit of Mr. Home's wife. The figure was quite

solid and substantial to look at, but gradually melted away into thin air. He could not see through her.

Mr. C. F. Varley, C.E., F.R.G.S., of Fleetwood House, Beckenham, deposed that a spirit appeared visibly to him in Kent and to another gentleman in Birmingham on the same night, and gave them the same message, which was unexpected and news to both of them.

Mr. Home deposed that spirit hands and forms have been seen by the Emperor of France, the Empress of the French, and the Emperor of Russia, he being the medium present; that the spirit hands were felt and handled, after which they melted away into thin air.

Mr. H. D. Jencken, M.R.I., F.R.G.S., Barrister-at-Law, Kilmarey House, Penge, and Mr. John Jones, of Enmore Park, Norwood, deposed that they have both often seen spirit hands and forms. Mr. E. L. Blanchard, the author, gave similar testimony.

Should individual opinion or practical experience carry the day when considering whether these things be so or not?

Now, as to the dresses of spirits. When the spirits appear in dresses everybody cries out "How very illogical!" But after one lady of title deposed at the Dialectical Society that she had seen a whole roomful of spirits without dresses, all the newspapers cried out "How very improper!" What, then, are the poor spirits to do to give satisfaction?

Will Mr. Fowler tell us whether, as spirits cannot be seen by men, they can see each other? If they can, are there other spiritual things which they can also see and perhaps make into garments? In appearing to people, they doubtless try to offend the notions and prejudices of their friends as little as possible; so I hope that Mr. Fowler may wake up some night and find a host of his departed relatives sitting round his bed in solemn conclave, but without a shred of clothing. Even then I doubt if they would please him. A. B. C.

London, Sept. 18, 1869.

Miscellanea.

New Gas Burner.—A new French invention is a gas burner, the object of which is in part to do away with the flickering of the flame, so as to render the light steady, also to cause a more perfect combustion of the carbon. It consists of a metal piece having several openings, through some of which gas issues, and through the others atmospheric air, which mixes with the gas. It appears to be a modification of the ordinary Bunsen burner.

Touching Out Spots.—A correspondent of the *Philadelphia Photographer* says—"I use for touching out transparent spots in negatives, and black spots in prints, the *enamel* taken from *visiting* and *business* cards. This style of card being very much used, the operator will not have much trouble and no expense for material. First, moisten the pencil *brush* with water, and with the brush dissolve off some of the enamel, and stop out the spots. I find it fine for giving (which is sometimes needed) good high lights to the pupil of the eye, &c., &c."

The Light of Meteors.—Professor Newton, a distinguished American astronomer, in the course of a speech made at the British Association, said that observations of meteors made in the United States tended to prove that the November meteors burnt up at a much higher altitude in the air than the August meteors. He, therefore, raised the question whether the resisting medium in space which transmits waves of light may not have retarded the lighter fragments forming the meteoric showers more than it retarded the heavy substances. If so, it might be possible that the lighter fragments were formed of different chemical substances to the heavier ones, so burnt up at a higher altitude in consequence. He broached this question, he said, merely as a passing idea, and not as possessing any great weight. Perhaps the spectroscope may hereafter give some information upon the point.—*Mechanics' Magazine.*

Reflection of the Long Waves of the Spectrum by Fluor Spar.—During the visit of the British Association to Exeter, several novelties of interest were brought under the notice of the members. One of the principle of the discoveries was made known by Professor Gustav Magnus, who found out by experiment that fluor spar reflects the waves of ether thrown off by hot rock-salt more than any other polished surface out of the very large list of substances which he tried. Hence, if these long waves were visible to the eye, fluor spar would sparkle more brilliantly in such rays than would the polished surfaces of metals. Dr. Balfour Stewart, who was on the platform of Section A during the reading of the paper, called attention to some experiments of his own made a few years ago, tending to prove that the heat rays emitted by rock-salt are very long ones, belonging almost to the extremity of the spectrum. He also found out that, despite the general transparency of rock-salt to obscure heat, it shows great opacity to the heat rays emitted by a second piece of its own substance.

Newton's Toning Bath.—The tones are bright in colour, varying from warm purple to warm brown, of exceeding richness and brilliancy, and all one could possibly desire. Mr. Newton claims that his bath is easy, rapid, keeps well, and of the results there can be no mistake. He generously gives us the details of his method as follows:—"Agreeably to promise, I send you the formula for producing those tones which you so much admired when I last saw you in this city. First, make a saturated solution of borax in hot water; second, dissolve one ounce of tungstate of soda in sixteen ounces of water; stock bottle third, mix the contents of Nos. 1 and 2 in equal parts. With this make your gold solution slightly alkaline an hour or two before wanted for use. A toning bath thus prepared gives tones more satisfactory to me than any I have ever used, and I have tried almost every published formula for toning. The tones are different from any that I have been able to produce with any other bath. With the ordinary amount of toning, a warm purple is attained, very clear and brilliant, without any tendency to mealiness. If the toning is carried further, a soft, pearly, lavender tint is produced, combining with the purple, but not superseding it. A very beautiful warm brown tone, with a tinge of purple, is produced with this bath by toning less than ordinary; the prints for such toning should not be printed as deep as usual." If the tones are too purple, add more borax until the purple is dark enough to suit the taste.—*Phil. Phot.*

Practical Application of Sensitive Flames.—An apparatus has been invented by Barrett for making practical use of sensitive flames. It consists of two perpendicular copper rods, one of which, on its upper end, holds a metallic ribbon, which is composed of thin leaves of gold, silver, or platinum, welded together. Such a ribbon expands unequally under the influence of heat; it bends towards one side, and in doing so comes in contact with a fine platinum wire attached to a galvanic battery. As soon as the poles of the battery are closed a bell begins to ring. The working of the apparatus is as follows:—"A sensitive flame is lighted, about ten inches from the metallic ribbon. This burns quietly so long as there is no noise, but a shrill whistle, or any unusual disturbance, will cause it to diminish one-half in length, and to spread out wide in the middle, like the wings of a bird. It thus heats the metallic ribbon, which expands unequally, and occasions the contact of the poles of the battery, which rings a bell." Such a light as this in a banking house would betray to the watchman the noise of robbery, and the inventor proposes to use it as a species of burglar alarm. As sound can be transmitted in water four times as rapidly as in the air, it is also suggested to employ this method on shipboard to make known the approach of a vessel in time of a fog. There is probably the germ of curious applications of sensitive flames in Barrett's invention, and it would not be surprising to hear of its use in war to warn a sentinal of the approach of the enemy, or of its application to a new species of telegraphy.—*Scientific American.*

Pulpit Denunciation of Science.—We once heard a small-minded preacher of a certain sect in Scotland, now extinct, denounce photographic portraiture on various grounds, and, among others, that it was antagonistic to the command, "thou shalt not make unto thee any graven image, or any likeness of anything that is in the heaven above or that is in the earth beneath;" but that was a long time since, and men—yea, and preachers—are wiser now than they were twenty years ago. We had hoped that at the present time the old "scare" as to science being antagonistic to religion had ceased to trouble the land. But the Dean of Carlisle appears not to be a participator in the enlightened opinion now happily prevalent among clergymen; for, preaching in Carlisle Cathedral, on Sunday last, to the candidates who had been ordained that morning, Dr. Close (the Dean) drew a parallel between the learning, philosophy, and intellectual power of the Augustine age and the condition of the world at the present time. We had not now, perhaps, such great philosophers as flourished in the Augustine age, but as a nation we were far in advance of that period in regard to science and knowledge of various kinds. What had been the effect of that high development of human power and intellect in the Augustine age? The moral result had been universal depravity and voluptuousness, which had led more to the disruption of the mighty Roman empire than all its civil divisions. Spiritually, the result of heathen philosophy had been to plunge its votaries into the drivelling idiotcy of idolatry. In the present day, on the other hand, the direct tendency of knowledge and science was the perversion and destruction of God's truth. A few Christian philosophers used their knowledge in upholding it; but there was at this moment a widespread, subtle, deadly influence of infidelity abroad upon the earth. It was openly declared in the land where the Reformation first burst forth, and in Italy, France, and Spain the same spirit was making advances. There was no question that there is in the present day an evil spirit of the "bottomless pit" rising up among us, poisoning God's truth, poisoning the faith of thousands, and turning them away from godliness, and he was bound to say he laid a large portion of it at the door of science. Did not philosophers at the present day dig out of the bowels of the earth evidences against God? Did they not seek in the heavens, in nations, and in languages every means to shake our faith in the Bible? How fearful and how humbling a thing it was that there were those who would venture to overturn the whole Bible narrative of the creation of man, which involved man's salvation by Christ, and would prefer any dream, however foolish or vain, to the faithful testimony of God respecting the origin of our species. He was bold to say that in all the dreams of Hindoos and all the false religions—corrupted, degraded and ridiculous—that were ever amusing among the Pagans, there were none so frivolous and childish as those unto which the science of the present day had reduced our scientific men.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

An expensively-made 15 × 12, or 15 square mahogany, bellows-bodied enlarging and copying camera would be exchanged for a 15 × 12 Kinnear's camera, one double back, and tripod stand.—A pair of Horne and Thornthwaite's stereo lenses will be exchanged for THE BRITISH JOURNAL OF PHOTOGRAPHY, 1860 to 1865.—Address, A.B., care of Messrs. Cartwright, opticians, Fishergate, Preston.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

GEORGE BENTLEY, Stockport.—*Rev. J. Pywell.*

JOHN OWEN, Newtown, North Wales.—*Three Views of Portmadoc.*

EDMUND ROGERS, Salisbury.—*Portraits of the Hon. and Rev. Canon Gordon, and of Lady Helen Gordon.*

☞ *Correspondents should never write on both sides of the paper.*

A. E. LESAGE.—In our next.

ANNIE.—Float the paper on the solution rather than brush it on.

J. L.—The albumenised paper you enclosed is bad. Under no circumstances could we get a good picture upon it.

GEORGE GORDON.—Your iron developer is too strong. Fifteen grains to the ounce will give you much better pictures than a forty-grain solution.

JOHN GRAY MANSON.—You may try the experiment easily enough without a lamp. Hold a bit of magnesium wire or ribbon in a pair of pliers and then ignite it.

A BEGINNER.—Nos. 3 and 4 are best in respect of lighting, but 1 and 5 are superior in every other respect. No. 2 is badly lighted, badly posed, and sadly out of focus.

AN OLD READER.—What is known as *ivory black* will, so far as we know, answer your purpose quite as well as the expensive "refined animal charcoal," for which you are now paying such a high price.

TANNIN.—1. Warm the developer.—2. The exposure will be four times longer with the smaller stop than would be required with the larger.—3. The blisters are probably caused by the albumen not having got hold of the fibres of the paper.

W. HOWES.—You will fix the prints in an equally efficacious manner, and without the evils at present encountered, if you reduce the strength of the bath nearly fifty per cent., and permit the prints to remain in the solution for, at least, ten minutes,

J. W. H.—Your formula is not so good as that upon which you try to improve; still, we highly commend the spirit in which you have sought to make the improvement. Try four instead of six grains to the ounce, and you will succeed better.

THOS. G. PERRY.—1. The lens will, we think, cover the plate you name, but you will require to use a small stop.—2. The salt you got was probably ammonio-sulphate of iron. Some prefer it to the plain protosulphate, but others prefer the latter. Thanks for the other information in your letter.

G. B. WARD.—We do not know the present price of bitumen of Judea, but when we last purchased it (from a drysalter in Long-acre) we got a large lump of it for a few pence; hence, it is by no means either an expensive photographic chemical or one difficult to obtain. Chemists, as a rule, do not keep it for sale.

ALPHA.—Bank-note forgeries by means of photography are so very easy of detection that this species of fraud is now seldom, if ever, indulged in. Were the forgery accomplished by photolithography it would prove a much more serious evil, because, in that case, safety to the public would depend only on the dissimilarity of the paper.

SCOTUS.—While you are quite right in attributing to dust and dirt a strong tendency to produce pinholes, the real cause of the genuine pinholes must be sought for in a chemical, rather than a mechanical, disorganisation, viz., the formation of crystals of iodo-nitrate of silver, which are decomposed and dissolved out in a subsequent stage of the production of the picture.

ADOLPHUS.—Transparencies quite sharp enough for the lantern may be obtained by direct printing from the negative on a wet collodion plate. Keep the two from touching by interposing a slip of thin card at the ends and sides, and print by means either of the light from the sky admitted through a hole in a shutter, or by a lamp placed at as great a distance as possible without causing the exposure to be too long. The further the lamp is away, or, in other words, the smaller the source of light, the sharper will the picture be.

ONE IN DIFFICULTY.—Immerse the glass positive in benzole until all the black varnish is dissolved off, then dry it, and obtain a transparency by means of the camera. You may make the transparency a little larger than the negative, and, in like manner, make the negative which you take from the transparency larger. This is the readiest way by which you can obtain a large and dense negative from a small and thin collodion positive, the face of which has been protected by Brunswick black or some other kind of black varnish.

S. M'GEORGE.—The removal of the scratches on your lens by re-grinding may be easily effected, and, if the same curves be adopted, there will be no practical difference between its original performance and that experienced after the operation. In the object glass of a telescope, the thickness of the glass is an element for careful consideration, but while this is likewise the case in a photographic lens, it is not so to the same extent. You ought not to attempt the operation yourself, but should send it to a skilled optician, who, no matter who the maker may have been, will doubtless undertake it as a matter of business. If you know the maker, it will, of course, be better that you send it to him, if convenient.

W. HAY.—Very nice effects may be obtained by sizing paper with gelatine, and, when dry, floating it for three or four minutes over a bath composed of—

Saturated solution of bichromate of potash	1 part.
Water	2 parts.

When dry, expose under the negative. Now place first in cold water to dissolve out the unaltered bichromate, and next in hot water to dissolve out the unaffected gelatine. If there be a discolouration or tint on the parts where the light has acted, immersion in a bath composed of equal parts of sulphuric acid and water will effect a remedy. When dry, these pictures are invisible, or nearly so, but, when made wet, they become transparencies of more or less brilliance.

HENRY M.—We are glad to perceive that you are once more about to resume your old cast-off love. We believe you will experience in photography all the pleasurable excitement that you anticipate. So many changes and improvements have been effected since you gave it up, that you will for some time be somewhat puzzled at the present nomenclature of the art. Respecting the distance at which the lenses should be placed apart, while adhering to the distance between the human eyes as a general rule, modifications in this distance may be made to suit special circumstances; for example, when a long and flat grass park intervenes between the camera and the subjects to be photographed, you may separate the lenses or stations a considerable distance—several feet in some instances—in order to secure appreciable relief in the picture.

COLLODIO-CHLORIDE.—Mr. Adolph Ort, of Vienna, has recently published a very good formula for the preparation of chloride of silver collodion:—

Take of Cotton	2	parts.
,, Alcohol	50	,,
,, Ether	50	,,

In a pound of this collodion seventy-five grains of crystallised chloride of magnesium are dissolved by constant shaking; add to this three-eighths of an ounce of crystallised nitrate of silver dissolved; half-an-ounce of water; shake for four minutes, and finally add one drachm of citric acid dissolved in two drachms of water and two drachms of alcohol. The collodion is left to settle for two days, when it is ready for decantation. It will keep for a long time. Besides the above, Ort uses the following collodion:—

Collodion	1¼	pound.
Chloride of magnesia	60	grains.
Nitrate of silver dissolved in water, as above	½	ounce.
Citric acid	1	drachm.

He prepares his albumenised plates by first flowing them with collodion No. 1, and afterwards with No. 2. He also makes enlargements by this process; he first makes a positive, and then takes with the camera, in the ordinary way, an enlarged negative.—*Philadelphia Photographer.*

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Sept. 28th	Liverpool Amateur	Free Public Library and Museum.
,, 30th	Oldham	Hare & Hounds Inn, Yorkshire-st.

METEOROLOGICAL REPORT,

For the Week ending September 22nd, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sept. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
16	29·65	67	54	55	61	WSW	0·04	Fine
17	29·86	65	53	59	61	SW	0·08	Dull
18	29·66	68	51	61	65	SW	0·95	Dull
20	29·63	59	47	48	53	SW	—	Dull
21	29·84	63	42	51	55	W	0·01	Fine
22	30·20	69	46	52	55	WNW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 491. Vol. XVI.—OCTOBER 1, 1869.

PURIFICATION OF BROMIDES.

In the number of this Journal for July 30th last, page 360, Mr. M. Carey Lea called attention to the great variations in purity of samples of commercial bromide of potassium, and suggested the employment of a simple test, by means of which the presence of iodide of potassium as an impurity could be detected, but was unable to suggest any simple means by which bromide of potassium could be purified from the iodine compound. In the last number of the *Journal de Pharmacie et de Chimie* MM. Bobierre and Herbelin have discussed this question from a pharmaceutical point of view, and have suggested a very easy mode of purifying the bromide, which we shall presently describe.

In dry-plate processes dependent on the use of a simply bromised collodion and alkaline development, the purity of the bromides employed in making the collodion is of very considerable importance, since the presence of traces of iodides may (as Mr. Lea suggested in the article above referred to) most materially affect the results obtained in employing any special process. As a matter of fact, we may state that bromide of potassium and other bromides can be obtained pure in commerce, but it is not usual to meet with these salts in such a condition.

In order to test the purity of a given sample, Mr. Lea gives the following simple plan, which is but another application of a well-known test for iodine:—In two or three ounces of water dissolve a drachm of sulphate of copper and two and a-half drachms of sulphate of iron. Filter and keep in a corked bottle. To test a specimen of bromide dissolve a few grains of it in about a drachm of cold water. Add to it two or three drops of the copper solution. If a dirty whitish cloudiness at once appear the specimen is quite impure, the greater or less quantity of precipitate marking the degree of adulteration; but any precipitate showing itself immediately indicates a considerable amount of iodide. If no troubling show itself set the test tube aside for some hours. If by this standing some light brownish flakes collect at the bottom, a small amount of iodide is indicated. Lastly, if by standing the liquid becomes only a little troubled, a trace of iodide alone is indicated. Such is Mr. Lea's method.

The plan of MM. Bobierre and Herbelin is in some respects less generally applicable, but since it is a test easily applied we may give it here:—The bromide to be tested is powdered and placed on a white plate, and a drop of liquid bromine placed beside the powder; on allowing the vapour of the bromine to act on the suspected bromide iodine is immediately liberated if the latter body be present, and is recognised by the dark colour it quickly communicates to the powdered bromide. In practice it is easy to make the vapour of the bromine act upon the salt under examination by gently blowing in the direction required; it is also well to have a little perfectly pure bromide of potassium beside the salt tested, as any variation from the yellow colour communicated by the vapour of the bromine can be then easily appreciated.

On the whole we regard the sulphate of iron and copper test as that most suitable for use in photography. Chemists have long known that its indications are not very delicate, but it is quite sufficiently accurate for all practical purposes.

Having ascertained that our sample of bromide contains iodide as well, we have now to get rid of the latter body. In order to do this MM. Bobierre and Herbelin take advantage of a well-known chemical fact that we may now endeavour to make clear. It is found that iodine is capable of displacing both bromine and chlorine from their *oxygen* compounds; for instance, iodine will take the place of bromine in such a compound as brom*ate* of potassium, the bromine being set free. But from direct compounds of metals with iodine, bromine and chlorine are capable of displacing the iodine. In accordance with this principle, it is found that if we treat iodide of potassium with bromine the latter forms bromide of potassium, and sets free iodine, which can be volatilised by heat.

In order to apply this principle to the removal of iodide of potassium from the impure bromide, MM. Bobierre and Herbelin very simply dissolve the impure salt in water, and to the solution they add a few drops of liquid bromine. Any iodide of potassium present is quickly decomposed, the bromine taking the potassium and forming bromide of potassium, while the iodine set free remains in the liquid. In order to remove this iodine and the excess of bromine the whole quantity of the liquid is evaporated to dryness, and the residue heated gently until all the iodine and residual bromine have been dissipated in vapour, and the salt remaining in the evaporating dish is of a pure white colour. The bromide will now be found to be quite free from iodide of potassium.

We have little doubt that this simple mode of purification will prove of considerable value, as it can be easily carried out, and at a small cost. Its use, moreover, is not necessarily confined to bromide of potassium, since other bromides are capable of similar treatment—for instance, bromides of cadmium, magnesium, calcium, barium, &c.; but the employment of specially purified salts in dry-plate work will, in all probability, tend to diminish the difficulties often met with in using a simply bromised collodion.

WHITE PIGMENT FOR CARBON PRINTING.

In another column will be found an interesting article from Mr. Blair, in which he refers to a white pigment for gelatine tissue. The white colouring matter used was the "ground flint" employed in the manufacture of articles of porcelain and imitation porcelain in Staffordshire. This, when washed with dilute acid to remove the carbonates, Mr. Blair found to give fair prints, though not perfect.

We happen to know that the so-called "ground flint" used in Staffordshire is a mixture of white porcelain clay and flints reduced to powder. Sometimes, by heating the stones to redness and plunging them into cold water, they are then easily ground to a very fine powder. All forms of flint are more or less transparent, and not calculated to afford a dead white powder. We would, therefore, suggest the trial of the pure white porcelain clay alone, since this, after washing with hydrochloric acid, yields pure white powder possessing considerably more "body" than the mixture of clay and ground flints.

The porcelain clay occurs in abundance in several localities in

England—amongst others, Cornwall, Devonshire, and Durham; and is often found in beds in the neighbourhood of granitic rocks, since the porcelain clay is one of the products of the disintegration of the felspar always present in this class of rocks.

A FEW WORDS ON DRY PROCESSES.

Several years ago I determined to devote a considerable amount of time to the study of dry processes, in order, if possible, to obtain one which should work to my entire satisfaction. After much consideration I selected the collodio-bromide process as the base of my experiments, and occupied many months in testing it with all the preservatives (sensitisers, more correctly) that seemed to promise favourable results. Some of the results which I then obtained, and which have never been published, acquire just now a certain amount of interest, as will presently appear.

At the time that I commenced these trials no one, I believe, had worked with the collodio-bromide process except its discoverers, Messrs. Sayce and Bolton and Mr. Mawdsley, and I am glad to think that the results I published aided in bringing this invaluable mode of photography into general notice. Up to that time no "preservative" had been used except tannin. Amongst the very large number of substances which I tried several gave interesting results, besides those which I have described in what I have already published on the subject.

Amongst others, I got very curious results by using *coffee* as a preservative, combining it with *carbonate of soda*. My first trials with this mixture were so remarkably satisfactory in their result that I anticipated great success for it. Coffee, without carbonate of soda, was neither very sensitive nor very bright; but, when the alkali was added in the proportion of two or three grains to the ounce, the sensitiveness was greatly enhanced, and a bright, clean picture was got. Further trials, however, did not confirm these favourable indications. The plates were irregular; that is, they varied in sensitiveness and cleanness without any evident reason. Probably I should have tried to find out the cause of irregularity had I not, in the meantime, got better results with other materials.

These experiments have been recalled to my mind by the details of a process lately published by an English photographer, Mr. Sutton, by which he appears to think that no one before has made dry plates with an alkaline preservative. So much was claimed by the inventor for this process in advance of its publication, and so much originality for the idea of alkalinity in the plates as a condition of sensitiveness, that it becomes worth while to consider the subject a little further.

Mr. Sutton prepares his plates precisely as directed by Major Russell for his well-known rapid process. The collodion contains bromide only, and is sensitised in an eighty-grain bath of nitrate of silver. The plate is then washed and coated with a solution of three grains of gelatine and three of carbonate of soda. It is affirmed at the same time that all the materials must be of a particular quality, only to be had of Mr. Sutton's agents. This is certainly not an attractive feature in the process.

In describing it Mr. Sutton lays great stress upon the supposed discovery that plates treated with an alkaline preservative will yield good results, affirming that "we" have all been working in the wrong direction, &c., &c. It must, therefore, be stated in the most positive manner that there is no novelty whatever in the use of an alkaline preservative. As I did not publish my own experiments in this direction for the reasons already stated, they, of course, would not suffice to establish the point. They are not needed, however, for about the same time a process was published in Germany, according to which plates prepared in a nitrate bath and washed *were coated with a solution of tannin to which carbonate of soda had been added.*

Whilst the two alkaline preservatives here cited emphatically settle the question of priority, it is nevertheless of interest to remark how large a proportion of the substance used for coating dry plates are acid in their reactions. Thus albumen reddens litmus paper, and forms combinations with bases—amongst them, with oxide of silver. *Tannin* also unites with bases. Many *syrups of fruits* have been tried; these mostly contain malic acid. *Gallic acid* is another instance. From one remark of Mr. Sutton's it would seem that he believed that, up to the time of his publication, even neutral preservatives had not been tried; but it is easy to cite several very familiar cases of such. *Glycerine* and *honey*, used often together, are both perfectly neutral. Gum is a compound of gummic acid and lime, and is a neutral body. Neutral salts of morphia are effective as preservatives.

It is, therefore, clear that for years past preservatives have been used of acid, neutral, and alkaline characters, and that no claim such as that here referred to can be entertained for a moment.

Some time since, in speaking of the development of dry plates with the aid of ammonia, I remarked upon the objection which then existed to the smell of ammonia, and regretted that I had not found it possible to substitute carbonate of potassa for carbonate of ammonia. In alluding to this, Major Russell, in a recent article, doubts if the objection has any importance.

Much depends upon the mode of operating. I prefer to place the plates in pans with from six to ten ounces of developer according to size, and to carry on two or more developments at once. Moreover, I prefer to use a warm developer. With several pans before me, containing the above-mentioned quantity of solution of carbonate of ammonia, the odour is very considerable, even with solutions not containing more than one or two grains to the ounce. I believe that I explained that I thought this objectionable, not because of its unpleasantness, which would be a small matter indeed, but because I think—indeed am certain—that the inhalation of an atmosphere so charged for any considerable time, and frequently repeated, must interfere with the proper ventilation of the blood, the corpuscles of which ammonia is known to have a tendency to paralyse. If, on the other hand, Major Russell develops one plate at a time on a levelling stand, the inconvenience may be much less apparent, though even then, I think, not wholly removed. I have, however, always disliked the levelling stand method. It is certain that in working with ammonia developers there should always be a good ventilation of the room, and the developing liquid should not be left standing about either before or after it has performed its functions.

M. Carey Lea.

P.S.—Since furnishing the foregoing remarks, I notice an article in your columns by Mr. Dawson, contradicting my statement as to the non-applicability of bicarbonate of potash, and affirming that he had obtained equally good developments with a variety of alkaline solutions as with carbonate of ammonia.

These statements are so obviously erroneous as scarcely to require notice at my hands. Major Russell, in the article already referred to, gives the result of a repetition of my experiment with bicarbonate of potash as a developer; it was wholly in accordance with mine. As Major Russell made his experiments with plates prepared in the same way as those used by Mr. Dawson, the contradiction becomes all the more striking. I cannot but consider the experiments lately brought forward in more cases than one by Mr. Dawson, for the purpose of disproving statements of mine, to have been superficially and carelessly made. His principal object has seemed to be—for what reason I do not know—to dissent from me at any hazard; and this has led him, as in the present case, to publish much that he will hereafter regret. In this matter of alkaline development he will find, just as in that of pyroxyline, that the opinions and experience of others most decisively confute his views.—M. C. L.

PRINTING IN PIGMENTS.—IMPURITIES IN THE LIGHTS.—A WHITE PIGMENT.

In a former short article in this Journal [*ante* page 360] I mentioned that I had met with a difficulty in obtaining carbon prints with clean lights, in consequence, as I supposed, of some impurity in the bichromate of potash of which my bath was composed; but I discovered that this nuisance arose from organic matter accumulating in the bath, and, perhaps aided by the warm weather, entering into insoluble combination with the bichromate salts. Simple filtering did not cure it; but, having an old bath containing a good portion of acetic acid, I mixed the two together and then filtered. A considerable quantity of glutinous matter was filtered out, and now the bath works very well. The lesson to be learned from this is to filter frequently, and, when that fails, to make a new bath.

A number of my prints, which were thrown aside as useless in consequence of the stains referred to, were afterwards treated with dilute muriatic acid, which completely removed the stains, and made the prints worth preserving. One thing, however, deserves here to be particularly noted. It was only the prints which had been sunned through the paper (by the turpentine process) that would stand this treatment. Some *transferred* prints that I treated in the same way showed a strong tendency to pucker up and leave their mounts; but those that were fixed to the paper in the operation of printing showed no tendency of this kind.

In my former paper I concluded with a statement to the effect that I believed that I had got another white pigment that was likely to prove useful in pigment printing; but, before saying much about it,

I deemed it safer to give it a trial. It is as well that I did so, for I can say something about it now that I could not then.

In the course of my recent little publication on pigment printing, I got into correspondence with a gentleman in the county of Wilts, who, though holding an important position in the church, does not think it unbecoming his office to take an interest in photographic and kindred operations. He was rather amused with my idea of utilising broken crockery and white clay pipes, and converting these into a white pigment for the production of photographic pictures; and he suggested that the *calcined flint* so largely used in the Staffordshire potteries should be substituted, as likely to be preferable. I at once jumped at the idea, but had never seen the material, and did not know how to procure it. He at once, through a friend in Staffordshire, got a little bag of it sent to me by the "pattern post."

Well, I was in high hopes that I had now got the right thing; but it lay more than a month with me before I got it put to trial. So soon, however, as I could find the necessary leisure I set to work and made some white tissue. The tissue looked all right, and my expectations were somewhat sanguine. Then came the sensitising. A sheet was floated on the bichromate bath for the usual time, and, when removed, I observed that the whole surface was pimpled over, resembling very much a sudden and serious case of measles. Another sheet was tried with the same result. However, the sheets were dried and printed and washed, and the resulting pictures were, of course, the most genuine trash.

I was not seriously discouraged, however, as the cause was evident. The pigment could not be the pure silica, but must be combined with carbonates of some kind. I therefore mixed the whole with water, and treated it with muriatic acid. It effervesced pretty strongly. I then washed it three or four times to remove the acid and soluble matter, and made more tissue with the residue. I now found that the enemy had been dislodged, and, though I have not yet succeeded in making pictures that will stand criticism as specimens of good gradation of light and shade, I have good hopes of this pigment as a *white*, and would call attention to it on the part of those who are experimenting in this direction.

The impressions I have got with it are as white as snow, with a certain amount of half-shade; and the deepest blacks are black enough, for they are produced by washing through to the black medium to which the prints are transferred. Some of these impressions, when transferred to white thin paper instead of black, make beautiful negatives. WILLIAM BLAIR.

Bridgend, Perth.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER IX.—PORTRAIT LENSES.

LET us commence by speaking of those essential properties in a lens by virtue of which it is entitled to be called a "portrait lens."

Every photographer is aware that by means of any photographic lens a portrait may be taken, provided the person to be photographed is able to sit motionless during the requisite time of exposure. With a wide-angle lens, in which the aperture is very small compared with the focus, the exposure required would be so long as to preclude the idea of employing it for such a purpose unless in a very exceptional case indeed.

A portrait lens may be said to be the direct antithesis of a wide-angle view lens. The latter embraces a large amount of subject, working with a very small stop; the former embraces only a small angle of view, but works with a large stop.

The relation of the focus of the lens to the size of plate which it will cover has, by some writers, been designated "angular aperture;" but this term is quite a misnomer, "angle of view" being the correct appellative in this case. "Angular aperture," on the other hand, marks the relation between the working aperture of the lens and its focus, and it is this principle which really determines the difference between a portrait lens and one which is not so characterised.

As the subject of angular aperture is so intimately associated with that of portrait lenses, we here reproduce our definition of the former, as given in our Almanac for 1868:—

"*Angular Aperture.*—This quality in a lens is erroneously supposed by many to mean its power of reproducing a view comprising more or less subject. If there are two lenses of exactly the same focus, but of different diameters, the one having the largest diameter has the largest *angular aperture.* A lens only one inch in diameter may have a much larger angular aperture than one four times its size, provided its focus, relative to its diameter, be shorter than the other. The acting angular aperture of a lens varies with each different stop that is employed. The angular aperture of a portrait lens is, in practice, much greater when worked 'open' than when a stop is used. The larger the angular aperture of a lens the quicker, *cæteris paribus*, will be its action. Lenses for instantaneous work should possess this requisite in a large degree."

Let us now inquire—How is a portrait lens constituted? Starting with a plano-convex achromatic lens of a moderately short focus as compared with its aperture, if we turn the flat side towards the subject we shall have what is called a "fuzzy" image reproduced on the ground glass. A stop or diaphragm placed outside of the lens would render the image sharp, but in the present inquiry we must ignore diaphragms.

If now the lens be reversed, we shall have an image of much sharpness and brilliancy, but these qualities are confined to a small space surrounding the axis of the lens. If this sharpness could be extended over a larger area without much sacrifice of light, then the lens would be effective for portraiture.

In constructing a portrait lens the problems to be solved are—the securing of the largest angular aperture united with the largest angle of view. In no single combination need such qualities be looked for. It is not difficult to correct a single lens so that it shall give a luminous and well-defined image on a small spot; but when such image has to be spread over a large, flat surface, then the skill of the optician is taxed.

All portrait lenses are alike in one particular—they are composed of more than one achromatic lens. In our collection of old books and manuals relating to photography we have found several combinations of the compound nature indicated. One has a double-convex front and a plano-convex back, the lenses of each combination being apparently cemented, or at least are in a position to be so, from the contact surfaces being of similar curvature. Other objectives were composed of a plano-convex element placed at each end of a tube with a diaphragm between.

To Professor Petzval is due the credit of being the first to indicate practically the principle on which achromatic portrait combinations should be constructed. His views were given in a paper presented to the Academy of Sciences of Vienna. In a mathematical point of view this paper is a masterpiece.

The portrait combination invented by Petzval had a front lens which was either plano-convex or a meniscus so shallow as to be at first sight estimated as plano-convex. The back lens of the combination was externally a double convex, so constructed as to have a large excess of negative spherical aberration, which combination, from being composed of two different kinds of glass, was achromatic in itself, and, moreover, corrected the positive spherical aberration present in the front lens.

In a lens possessing positive and spherical aberration, those direct rays falling upon the margin of the lens are brought to a focus nearer the objective than those more centrally transmitted; while in a lens possessing negative aberration the opposite is the case. In the latter the centre of the lens has a shorter focus than the periphery—the farther from the centre the longer being the focus. A back lens of a portrait objective, therefore, ought to possess just so much negative spherical aberration as to correct the positive aberration of the front lens, and extend the focal length of oblique rays so as to project them on the same plane as the central rays.

Now, it is not a very difficult matter, after all, to make a combination that will give a flat field, or, for that matter, a "bellied" field, were such a thing desirable; but it is not quite so easy to obtain a flat field free from astigmation. This may be thought to be merely an euphuistic word, and many photographers may not have much acquaintance with its scientific bearing, although too many of them may know all about its effects.

If a *carte* portrait be employed to depict a particular individual, and it be necessary to use the lens with full aperture, and, further, to place the head high up on the plate, the farther that deviation is made from the centre of the plate the less sharp will be the face of the sitter, and no amount of racking of the lens in or out will give such sharpness as was observable in the portions near the axis of the lens. This arises from astigmation.

If such an object as the astragals of a window be focussed on the centre of the plate it will be quite sharp, and will diminish equally in sharpness when the ground glass is pushed in or out. If this object (the window) be now projected on the side of the ground glass, by turning the camera it will be less sharp than it was when in the centre. This arises from a point in the object being represented by a line in the image, which property is known by the term "astigmation." In virtue of this, if the lens be pushed in and out, a point will be found at which the horizontal bars of the window will be sharp when the vertical bars are "nowhere," and another at which the vertical bars will be sharp, the horizontal ones in turn being out of focus.

Or suppose that a round hole has been made in a shutter, or an opaque piece of paper, with a circular aperture, has been pasted over the ground glass of a lamp, and the image of that opening be focussed in the centre of the plate, it will be represented as a sharp, well-defined round spot, which will still be circular, even when it is placed both within and without sharp focus. Now rotate the camera so as to bring it to the extreme margin, as in the case of the window in the previous experiment, and it will have lost much of its sharpness. If we then place it respectively outside and inside of the best focus by the rack and pinion we shall find that, instead of retaining its circular figure as it did when in the centre of the plate, the spot becomes elongated alternately, vertically or horizontally, according as the lens is nearer to or farther from the ground glass than the best or mean focus. When the lens is brought nearer to the focussing screen the luminous spot is elongated vertically; but when, on the contrary, the focus is lengthened, the spot expands horizontally.

A talented civil engineer, Mr. Robert H. Bow, of Edinburgh, once investigated this subject in a most masterly manner, and published the results of his investigations in THE BRITISH JOURNAL OF PHOTOGRAPHY, Vol. X, page 228, *et seq.*; and to this able and elaborate demonstration of the defect in question we refer those readers who desire to become thoroughly conversant with its details. Mr. Bow, furthermore, constructed a model of an ingenious nature, in which the rays, each represented by threads, could be watched as they passed from the lens to the focus. This, in our opinion, was one of the most admirable and practical demonstrations of an imperfectly-understood point in optical science that we have yet seen, and which possessed so much of an educational character as to convey, in a few minutes, a more definite idea of astigmation than the perusal of a lengthened treatise.

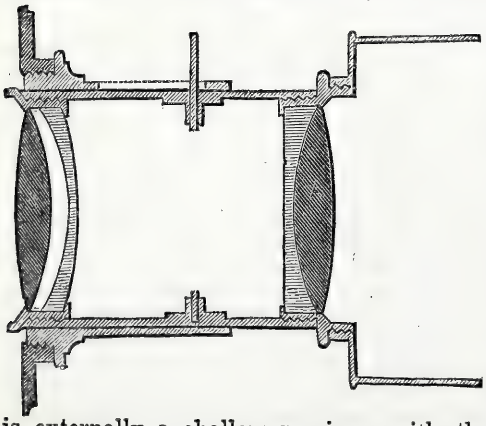
It is almost impossible to get flatness of field without some astigmation, and it is the province of the optician to give us as much of the former, combined with as little of the latter, as he can.

The first portrait lenses of note were made by Voigtländer, of Vienna and Brunswick. He was at that time associated with Petzval. But although his small or quarter-plate objectives were admirable, the performance of those of larger size was not equally efficient. It was at this epoch that Ross entered the field of photographic optical research, and by investigating, on the principles laid down by Petzval, all the conditions requisite for securing the highest degree of excellence in these objectives, he succeeded in producing lenses of every size, and of such high character that their superior quality was recognised throughout the word.

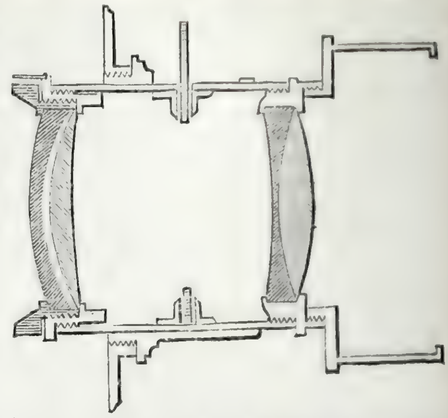
From the biographical notice of the late Andrew Ross, the founder of the firm of that name, which appeared in the *Photographic Journal* ten years ago, we find that it was with some reluctance that Mr. Ross was induced to add this branch to his business, and he only did so on the persistent solicitations of his son, the present Mr. Thomas Ross, to whom, during his father's lifetime, was entrusted that department of the business.* We may here add that Mr. Dallmeyer, son-in-law of Mr. Andrew Ross, was a pupil of that eminent optician, and after his death commenced business on his own account.

The demands of *carte* portraitists for portrait combinations combining in the most concentrated form every good quality have led, in the hands of scientific opticians, to so many refinements in the production of photographic objectives that it is doubtful if there be much more left to be effected.

Annexed are two engravings of lenses. The first is the portrait combination as manufactured by Mr. Ross and other opticians.



It consists of a plano-convex cemented front combination and a double convex back uncemented lens. In the latter the inner surfaces are such as would entirely preclude the possibility of cementation, there being a meniscus of air interposed between them. The portrait combination more recently constructed by Mr. Dallmeyer differs from the above in the back lens, which is externally a shallow meniscus with the flint element nearest to the ground glass. By separating the elements of the back lens the sharpness of the focus may be lowered at will, and, in order to do this, an adjusting screw is so graduated as to permit of any desirable degree of aberration being introduced so as to make the picture less sharp.



A portrait lens possessing great rapidity was several years ago made by Voigtländer. Its front lens was three and a-quarter inches in diameter, the back being somewhat smaller (about two and three-quarters). The front and back were each composed of three lenses cemented; hence there were in the tube no fewer than six elementary lenses. The focus was exceedingly short and the power of light immense—so much so that portraits could easily be obtained in a private room moderately lighted. Although of so large a size the lens only covered pictures of the ninth size, or two and a-half by two inches. Herr Voigtländer has for a considerable period ceased to construct any lenses of this description.

* *Photographic Journal*, Oct, 1, 1859, page 235.

THE NON-ACTINIC ROOM—DEVELOPING.*

IN former times the rooms in which the pictures were developed, the plates sensitised, &c., was properly called a dark room; it was dark, gloomy, and disagreeable. It is no longer so now. From discoveries that have been made this developing room may be the lightest room in the establishment, as long as the light is of the proper colour. Let the window of the room be glazed with orange-red coloured glass, and in addition fix up a curtain of thin red woollen cloth or flannel. The light that passes through this window exercises no action upon the sensitised plate; you may develope the plate in front of this window without any danger of fogging the impression. But be sure to shut up every avenue to white light; the smallest beam of this light is detrimental to your success. The light that comes through your keyhole is injurious.

This room ought to be called the non-actinic room, because the light with which it is suffused is non-actinic, which means that it has no action on prepared chemicals.

It is well to try the efficacy of your non-actinic room by experiment. Sensitise, therefore, a collodionised plate, and then expose it to the light which enters through the orange-red window for two or three minutes. Pour on the developer in the usual way. If the plate does not change colour in the least it is an evidence that actinic light, at least, has not made any impression upon it, and you may then with full confidence afterward perform all your developing operations with ease and certainty.

To facilitate the operation still further, we always prefer developing by the aid of a light which comes from below, and thus shows the progress of development by transmitted light. For this purpose let the developing corner or table be a projection beyond the wall of the building, and let a large square of non-actinic glass be glazed in an aperture on the top of this table. This pane can admit light only from below upward.

During development the plate, whether large or small, may be held, it is true, between the thumb and finger; but it is much easier to hold it supported on a pneumatic plate-holder. In this position you can cover the plate with the developing solution with the utmost facility. It requires some experience before you can flow the developer evenly without any stoppage or interruption; the operation must be quick, and yet it must not be violent, otherwise much of the developer will rush off at the opposite side, and carry with it much of the free nitrate of silver which was still on the plate, and which is so very beneficial in producing intensity. If the developer proceed slowly over the exposed film the development will be uneven, one part being already out before the other has commenced. If the developer stop and refuse to proceed in a given direction, there will assuredly be found in the finished negative a dark line or curve at that place, which will be very offensive in the print.

Furthermore: if the developer be poured from a great height (and I regard two or three inches high in this experiment), its momentum the moment it comes in contact with the collodion is sufficient to wash off the impressed silver from this part, and to produce in con-

* *Humphrey's Journal.*

sequence a very weak patch at this spot. To avoid all these troubles, and especially with a large plate, I prefer laying it at the bottom of a dish of gutta-percha at one end. In this case, the dish being slightly tilted, the developer can be poured into the opposite end in sufficient quantity to cover the plate the moment it is again raised to a horizontal position or tilted in the opposite direction. This is a very effectual plan of development, and especially so if the dish has a transparent bottom, for then you can watch the development by transmitted light.

A transparent developing dish is constructed in the following manner:—Take a thin piece of hard and well-dried wood, four or five feet in length, one inch wide, and half-an-inch thick, and plane a groove along the middle about three-sixteenths of an inch deep, sufficiently large to allow the edge of an ordinary pane of glass to slide along it. Four lengths are then cut out so as to make a rectangular frame, the ends being cut in a mitre-box at an angle of forty-five degrees. A pane of glass is then tightly framed in the groove, and the frame is firmly nailed together. After this is done a cement, consisting of five parts of resin, one part of bees'-wax, and one of red ochre, are melted together, and when fluid a sufficient quantity is poured along each seam or groove all round on either side, and along all the corners. After the cement has set the excess is pared off and polished down smooth with a red-hot pointed piece of metal. The frame is finally covered with a coat of varnish, made by dissolving sealing-wax in alcohol in a teacup over the stove. Coach or any other varnish will answer the purpose.

I have a set of such frames, of different sizes, for the different-sized plates in use. Each transparent plate is at least two inches longer than the plate to be developed; the excess of length is the part which is to receive the force of the developing fluid as it falls out of the vial which contains it. If the plates to be developed are very large, the dish that is to hold them may be constructed so as to have two projecting handles either screwed on to the ends of two parallel sides or formed out of these two sides themselves, which are left projecting some four or five inches beyond the ends. The dish and plate are then easily supported by the two hands while an assistant pours on the developer. J. Towler, *Prof.*

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

The violent hurricanes which, a fortnight ago, swept over, not merely the metropolis, but many other portions of the kingdom, has not been without its effects upon the glass houses of photographers. The roof of one was lifted up, and, as my informant said, was "blown into smithereens;" another had some brickbats from a neighbouring chimney transmitted through its roof, and so forth. Query: were these the equinoctial gales? Some say that they were—others that they were not, but that they may be expected about the end of next week, with a degree of force more effective than desirable. For the sake of the glass houses, let us hope that the latter prophecy will prove to be quite false. During the progress of the recent storm, I took occasion to observe the effects of the wind upon the leaves of the trees, and found that, in the course of two days, they had assumed a more brown and wintry aspect than it is probable they would have done during several weeks of ordinary weather.

I observe that one of the numerous and varied family of professors —"Professor Jenkins"—has had his portrait taken by a photographer under circumstances which savour somewhat of novelty. Having decided, either for glory or money, to cross Niagara on a bicycle, he mounted his two-wheeled vehicle, and moved across on a rope stretched for the purpose, halting twice in the course of this exciting journey to permit the photographers to secure mementoes of this singular passage. Professor Jenkins, however, was by no means the suicidal fool that many would consider him to be; for, by having deep grooves in the edges of the wheels, and a heavily-loaded balancing pole placed underneath the rope, it was almost impossible for him to have fallen, unless he had made strenuous efforts to do so.

Recently, in the course of conversation with Mr. Stephen Thompson, who has spent a short time in Venice, I was informed by that gentleman that photographs of the various places of note in that interesting city are sold there at prices astonishingly low. I think it is scarcely too much to say that every visitor to Venice brings away with him a *souvenir* in the shape of a few pictures. The size and appearance of these pictures are familiar to most people. In London they are frequently to be seen in the windows of the frame makers, and still more frequently in those of the picture dealers. The size is fourteen inches by ten, or thereabouts, the price charged being only fourteenpence. At this price they are mounted on plain white cardboard, showing about an inch of margin. The secret of such a low charge is that the principal business is in the hands of very few; that rents and wages there are very low; that immense numbers are sold; that the merchant is also the producer; and, finally, that the cost of obtaining or reproducing negatives is trivial, the best subjects lying almost within a few hundred yards of the establishments in question.

I observe from the daily papers that Professor Graham, F.R.S., Master of the Mint (whose name has frequently appeared in your columns), is dead. He was appointed to the above office in 1855, succeeding Sir John F. W. Herschel. He was born and educated in Scotland, and, after distinguishing himself as a chemist, he came to London in 1837, having been appointed Professor of Chemistry in University College—a situation he retained until the death of Sir John Herschel opened the way to further preferment. There are many valuable things we owe to Mr. Graham; but it is probable that that with which his name will be most permanently associated will be the discovery of dialysis, or the separation of gases and liquids by means of a septum. The *Chemical News* says that "his analysis of an aërolite, which he found to be partly composed of hydrogen, afforded an interesting confirmation of the results obtained by spectrum analysis as to the constitution of heavenly bodies." His *Elements of Chemistry* is a standard work, and has had a large circulation both in England and Germany. The loss of the deceased *savant*, who was a bachelor, will be very seriously felt in the scientific world, and also in connection with the department over which he presided, where he has rendered eminent service to the nation at large by the introduction of many great improvements.

Referring to a lens query put by Mr. Attwood, which I find recorded at page 441, I have to remark that if his lens be over-corrected for colour, he will probably get it remedied in the same way as a friend of mine rectified one of his in which the visual and chemical foci did not coincide. The front lens was not quite plano-convex, but was very slightly meniscus; so he had this surface—the flattest surface of the flint—ground quite flat. When again tried the focus was a little shorter than formerly, but the image was rather more brilliant, while the two foci were united; and the lens, up to the present time, continues to be one of the best I have ever seen. The diameter of the glasses was either two and a-quarter or two and a-half inches—I am not at this moment sure which.

From the various letters which have appeared on the subject of Mr. Sutton's latest discovery it would seem that, after all, there is nothing new in it. Mr. Sutton may here turn round and say—"If it were known before, why was it not practised?" To this question I might, with equal pertinence, reply—"Well, whether it were previously known or not, it is at any rate known *now*, and why is it not now practised?" Suppose that in the course of two or three years, and when it has been forgotten, some enterprising "discoverer" should republish it, and adduce in favour of its originality the fact of its not having been practised—will, I say, this allegation really prove it then to be original?

But, whatever idea may have been formed respecting the originality of the alkaline process, there will, I feel sure, be but one opinion entertained respecting the originality of a still later discovery of Mr. Sutton's, and to which he himself has given the very scientific name of the "ham fat process." It appears that it was suggested to its learned discoverer, inventor, or author, by the perusal of an article by Mr. George Price which appeared in your Journal. Mr. Sutton thus describes his new process:—"A sheet of paper is rubbed over with a piece of ham fat, which, of course, has been salted; it is then immersed in a bath of nitrate of silver, dried between sheets of blotting-paper, exposed in a pressure-frame, and fixed without toning." I presume that Mr. Sutton has appointed an agent in this country for the sale of the genuine kind of ham fat, which, I further presume, is "manufactured" under his special superintendence—each cake, lump, or jar of it bearing his signature as a guarantee.

SENSATIONAL COLOURING FOR STEREOSCOPIC SLIDES.

Upwards of seven or eight years since a very pretty effect was introduced in connection with coloured slides for the stereoscope, and we have now in our possession the first specimens of the effect in question that we ever saw. It is a picture of a large shell, on the interior

surface of which is seen the beautiful play of colours peculiar to the original.

The effect is exceedingly good, and the means of production simple. Every person knows what is meant by "shot silk"—that is, threads of a certain colour, such as blue, running at right angles to threads of another colour, such as yellow. On a principle not very unlike this is the iridescent play of colours in the shell produced.

The interior of one of the pictures on the slide is delicately tinted of a pink colour, while that of the other is of a different colour, such as pale green. Now, when a slide so coloured is examined in the stereoscope, we have a tint arising from the blending of these two, and according to the power of any particular eye so is the predominance of the colour in the particular picture examined by it.

We observe that, in the *Athenæum*, Col. Sir Henry James has been directing attention to phenomena of this kind, unaware that stereoscopic slides painted in the manner in question were produced and publicly sold several years ago. The communication of Col. James is as follows:—

"*Portree, Isle of Skye, Sept.* 14, 1869.

"If the following method of colouring stereoscopic views is new—which, as far as I know, it is—I think it will interest your readers to be made acquainted with it. In the stereoscopic views one image of the view is superposed on the other and produces the effect of relief, and it occurred to me that the colours of the views might be made to combine. If we tinted one of the views with a transparent colour, such as a tint of cobalt blue, and the other with a tint of carmine or lake, we should have the combination of these colours in the stereoscope, viz., a purple tint; and so with regard to the colours to produce the various shades of green, brown, &c. The colours thus employed produce remarkable effects by their transparency; and to see a view first with one eye in one set of tints, and then with the other in a different set of tints, and then with both eyes to see a third and a differently-coloured picture, is an optical effect as instructive as it is amusing. We, in fact, combine the colours in the eyes instead of the colour-cups. This is so very obvious a method of colouring stereoscopic views that I can hardly imagine it has not been tried before, and yet I can scarcely fancy that it has been and that I should not have heard of it and seen some specimens of it. "HENRY JAMES, Col. R.E."

HOW THE SOLAR ECLIPSE WAS PHOTOGRAPHED.

MAJOR CURTIS thus describes in our Philadelphia contemporary the means employed by the party with which he was connected in photographing the solar eclipse:—

THE telescope used was the large equatorial of the United States Naval Academy, at Annapolis, Md., loaned by Admiral Porter for the expedition. This instrument has an object-glass seven and three-quarter inches clear aperture and nine and a-half feet focal length. It was fitted up with a camera box of such proportions as to carry negative plates seven inches square, upon which the image of the sun enlarged by an eyepiece appears four inches in diameter. Two spider line position wires, crossing each other at right angles, were adjusted in the eyepiece at an angle of 45° to a parallel of declination. The arrangement for making the exposures was as follows:—At a distance of about two and a-half inches from the end of the eyepiece a partition ran across the camera box, perforated with an aperture just large enough to admit the entire cone of rays from the eyepiece. Immediately in front of this partition there slipped freely through rebated slots in the side of the box a slider of wood twenty inches long, pierced with two apertures of the same size as the hole in the fixed partition. These apertures were fitted up differently—one with an instantaneous slide for use during the partial phases of the eclipse, and the other with a simple sliding shield, to allow of more prolonged exposures during the totality. Either aperture could be brought over the hole in the fixed partition by simply running the slider to and fro for a few inches, and in either position the latter was held in place by a spring bolt on the side of the camera box. The instantaneous slide was a rectangular plate of sheet brass, having a slot in it, whose width could be varied at pleasure, from the merest slit to a rectangular aperture half-an-inch in diameter. This slide ran freely on two brass guide-rods, around one of which was coiled a fine steel wire spring, to give the instantaneous motion. The slide, when drawn up against the spring, was held by a wire loop catching over a little pin projecting from a hair trigger attached to the free end of the wooden slider. This loop was released by the lightest touch upon the trigger, so that the timing of the exposures could be made with the utmost accuracy. The second aperture in the slider, for use during the totality, was fitted up with a movable shield of very thin brass, which could be rotated to and fro by being attached to a catgut cord to a milled head at the end of the slider, near the trigger of the instantaneous slide. By means of these two apertures in the wooden slider, the change from the arrangement for the partial phase exposures to that for the totality could be made in an instant of time.

The exposures actually used during the eclipse were excessively long, owing to the unfortunate weather that prevailed at Des Moines. Though the sky was cloudless and clear enough for observations with the eye, yet the dense haze that filled the air, rendering the whole western sky white instead of blue, was fatal to quick photographic work. During the partial phases, instead of two inches, the entire aperture of the object-glass, large as it was, and the whole diameter—half-an-inch—of the instantaneous slide had to be used to secure sufficient exposure, and during the totality the two plates, for which alone there was time, were exposed respectively sixty-six and forty-five seconds; and even with this excessive exposure the development of the image was very slow. There were obtained in all one hundred and twenty-two negatives of the eclipse—two being of the totality. These latter were timed exactly right for the red protuberances, and show the most exquisite detail in the structure of these strange appendages to the sun, especially in a group of faint fantastic forms on the eastern limb, which, throwing out long tongues of light, have the appearance of delicate flickering flames, in many cases entirely disconnected from the surface of the sun. The corona, stronger in some parts than in others, is also shown around the entire periphery of the moon. The large size of the negatives—the moon's disc being represented over four inches in diameter—adds to the distinctness and beauty with which the fainter and more delicate prominences are depicted; and it is believed that, as photographic representations of the form and structure of the red protuberances, these negatives stand unequalled.

Our plan of operations was as follows:—Seven negative baths were used, standing in a trough of water to keep them cool; four plate-holders, and a large wooden trough with grooved sides similar to a negative rack, and capable of holding one hundred and fifty negatives. This was filled with a weak solution of hyposulphite of soda and provided with an overflow pipe. The wall of the dark room adjoining where the telescope stood was fitted with two dark valves or dumb-waiters, by which the plate-holders could be passed in and out of the dark room without the admission of light or the necessity of any of the operators moving from their places. The first operator's duty was to coat plates and put them into the baths; the second took them out, wiped the backs, put them into the plate-holders, and passed the latter out of the room by means of one of the dumb-waiters. The third operator—he at the telescope—took the plate-holder from the dumb-waiter, placed it in the camera, adjusted the telescope, exposed, noting the time by a chronometer standing at his elbow strapped to a tripod stand, returned the holder to the dark room by the second dumb-waiter, and recorded the time of exposure on a sheet of paper tacked to a shelf. The fourth operator took the plate from the holder, developed, washed, and then dropped it into one of the grooves in the large fixing-trough. There the plates remained, slowly fixing, till after the eclipse was over, when they were taken out in the same order in which they were put in, washed and numbered with a diamond. By this even distribution of labour, and by the help of the dumb-waiters and the large fixing-trough, negatives were taken at the rate of one every even minute during the eclipse—one hundred and twenty-two in all—with the utmost ease and deliberation. Each operator had about fifteen seconds to spare with each exposure, so that all were enabled to perform their duties coolly and carefully.

Negatives of the sun were also taken on eight different days preceding the eclipse and on the two following, and preserved as records of the appearance of sun-spots before and after that event.

There was nothing unusual in the photographic processes employed. A cadmium and ammonium collodion was used, a forty-grain bath slightly acidified with nitric acid, a rather weak iron developer, and hyposulphite of soda fixing bath.

In connection with the solar photography, I also made an elaborate series of photographic experiments, to determine the exact amount of actinic force received from the sun at different hours of the day according to its height above the horizon. These experiments were conducted for eight different days, and comprise seventy-nine photographic tests of the sun's chemical power.

THE LATE PROFESSOR GRAHAM, F.R.S.*

THE announcement made in our columns last week of the alarming illness of this eminent chemist no doubt prepared the public for the event which has now taken place—his decease. The unfortunate gentleman never rallied from his severe and somewhat sudden attack of inflammation of the lungs, but rapidly sank, and died on the night of the 16th inst., at his house in Gordon-square, London. Mr. Graham was, to a certain extent at least, what is known as a self-made man. He was, in fact, one in the ranks of that numerous army of adventurous North Britons who, year by year, find their way southward, and who succeed in securing for themselves so many of those rich prizes which are the rewards of energy, perseverance, and tact.

The late Master of the Mint was born in Glasgow in 1805, his father having been a manufacturer in that city. His boyhood was spent in the midst of that industrial hive, and he obtained the rudiments of education in the grammar school of his native place. At a proper age he was

* We extract this interesting memoir of the late Master of the Mint from our contemporary, the *Mechanics' Magazine*, of Saturday last.

entered as a student in the University of Glasgow, and in 1824 took the degree of M.A. Under Dr. Thomson, then Professor of Chemistry at the University, young Graham took his first lessons in the science of which he afterwards became a celebrated expositor. For two years the young scholar pursued his studies in chemistry, diversifying the labour with mathematical pursuits. Subsequently he removed to Edinburgh, where he gained the favour and patronage of Sir John Leslie, so well known for his investigations of the phenomena of heat. Mr. Graham returned to Glasgow in 1828, and established a public laboratory there for the study and practice of chemistry. This led to his appointment as lecturer at the Mechanics' Institute of Glasgow, and where he became somewhat popular. In 1830 he was nominated Andersonian Professor of Chemistry in the University. This post he held until, his fame having found an echo in the British metropolis, he was appointed to the chair of chemistry in University College. In 1837 Graham was elected a Fellow of the Royal Society, and for the space of ten years he held also the office of Chemical Examiner in Arts in the London University. In 1846 he was named as a member of the commission appointed to report to Parliament on the ventilation of the Houses of Parliament. Mr. Graham was the first President of the Chemical Society, which he was instrumental in founding (in 1841), and to the transactions of which he largely contributed. At the Great Exhibition of 1851 the subject of this memoir acted as vice-president and reporter to the jury on chemical and pharmaceutical products.

It is scarcely possible on this occasion to enumerate the various scientific discoveries and inquiries with which Mr. Graham's name is associated, but the most remarkable and important, perhaps, is his elucidation of the law which governs the diffusion of gases. For his investigations into and demonstrations of this peculiarly interesting subject he received the Keith prize at the hands of the Royal Society of Edinburgh, and the gold medal from the Royal Society of London. He was besides connected honorarily with the Institute of France and the Academies of Washington, Berlin, Munich, Turin, &c. In the year 1855 Mr. Graham received the appointment of Master of the Mint, rendered vacant by the resignation of Sir John F. W. Herschel. It is understood that the late Prince Consort was the mainspring of this upward movement in the career of the late Professor. He had previously filled the office of an assayer to the mint, and it was imagined by his patron that his chemical knowledge would be found valuable in that establishment. This, however, was scarcely the case, as other assayers were appointed whose duty it was, and is, to submit all bullion presented for coinage, and all coin produced from it, to scientific control. It is by no means necessary, therefore, that the Master of the Mint should be a chemist. Far less is it essential that he should be an astronomer! The real qualifications for the post are a complete acquaintance with machinery and mechanical operations, mathematical knowledge, and familiarity with the art of banking and the laws of political economy. It is questionable whether the late Master's chemical acquirements were of any real service in the money manufactory itself, however useful they may have been to the world at large. At his laboratory in the Mint, nevertheless, many experiments in physical science were no doubt conducted, and many of Mr. Graham's more recent contributions to the scientific wealth of the country were there concocted. His assistants—Messrs. Stoikowitsch and Roberts—were his able and zealous co-operators. As has been stated, Mr. Graham became Master of the Mint in 1855; this was some three years after the departure of the Company of Moneyers, and the reorganisation of the establishment by Captain (now Lieut.-Colonel) Harness, R.E., who, it was thought by some, might well have been promoted to the Mastership after the successful accomplishment of that work.

The new Master found, on his assumption of office, that its duties were onerous and difficult in the themselves, and that they were not diminished by a certain spirit of personal antagonism existing within its walls. His own close attention to business, and the zealous aid which was given him by some of his subordinate *employés*, enabled him to surmount many obstacles of a social and practical nature, and to establish a control which was paramount and effective. The remodelling of the copper coinage in 1860-1, and its reissue in the form of bronze, may be justly considered the most arduous and important work executed during the fourteen years of Mr. Graham's rule at the Royal Mint. The advantages which have resulted from this change in the subordinate currency of the United Kingdom are too well known to need further comment here; but it may be remarked that, instead of the pockets of the British public being encumbered with five or six thousand tons of copper money, two or three thousand tons of bronze are all they now have to support. Within the fourteen years alluded to nearly one hundred millions of sovereigns and half-sovereigns, and some two or three hundred millions of silver coins, have been stamped into existence at Tower Hill. In the interests of truth it must be admitted that the late Master of the Mint did not seem to understand, or at least did not always practice, that gentle art which has the effect of inspiring colleagues and subordinates with an affectionate attachment to their chief. He was consequently not a popular Master, however conscientious he may have been in fulfilling the requirements of his office.

Mr. Graham's remains were removed to Glasgow on Tuesday, the 21st Sept., and his funeral took place at the scene of his nativity the following Thursday. It is but seven months since his brother John, who filled the post of chief coiner for a brief period, preceded Thomas Graham along that dark vale whither the footsteps of all humanity tend. The Royal Mint was closed on the day of interment as a tribute of respect to the memory of its departed Master, who, it is somewhat singular to observe, is the only one that has died in office since the days of Sir Isaac Newton.

ON PAPYROXYLINE, OR SOLUBLE GUN PAPER.*

The special advantages of papyroxyline with wet collodion processes are the great sensitiveness of the film and its perfect solubility. Both of these properties have been well established. That a collodion perfectly structureless must yield finer pictures than one *with* a structure is self-evident. This property is also of considerable importance in the production of microscopic pictures, as well as in that of enlarged microscopic objects.

It is scarcely to be anticipated that paper collodion would be more sensitive than cotton collodion; and yet such proves to be the case. I have now before me three photographs by Herr Jos. Albert, of Munich. On each plate are two portraits—one executed with paper collodion and the other with cotton. The two layers were silvered, exposed, and developed at the same time. In every case the paper collodion shows considerably more detail in the shadows than the other; and where the latter has received the correct exposure the former is much over-exposed. Herr Rensing, of Amsterdam, also writes to say that he works considerably faster with the paper collodion than with that made from cotton wool.

The layer is likewise firmer, and clings better to the glass.

Particular directions for the use of paper collodion are not required, because papyroxyline is employed in the same manner as wool pyroxyline. As, however, I have been requested by many to do so, I give one prescription:—

Ether	750	grains.
Absolute alcohol	450	,,
Papyroxyline	18	,,
Rectified spirits of wine	150	,,
Iodide of cadmium	10	,,
Iodide of strontium	10	,,
Bromide of cadmium	8	,,

The solution is filtered and mixed with the collodion.

The silver bath for this collodion must be at least eight per cent., and the developer must not be too weak.

For collodio-chloride it appears that a mixture of paper and cotton is best adapted. On the last occasion we used the following:—

Ether	600	grains.
Alcohol	600	,,
Papyroxyline	9	,,
Collodion cotton	3	,,
Chloride of lithium	5	,,
Citric acid	3	,,

This collodio-chloride was filtered, and twenty-four grains of the finest powdered nitrate of silver put into it by small pinches; after each addition it was properly shaken.

The nitrate of silver must be in an exceedingly fine state of division, so that not a grain of precipitate may result. Lastly, three drops of Canada balsam should be added. If the collodion film on the glass, notwithstanding the warming of the plate, does not continue the same, but shows crystallisation, thicken the collodion by adding one or two grammes of papyroxyline. E. Liesegang, Ph.D.

THE SLIDING PLATE-HOLDER.

We have been aware that, for some months past, litigation was pending in America in connection with the taking of two pictures upon one plate by means of the sliding or repeating camera back so well known for some years in this country. This "invention" has, it appears, been patented in America, and disputed. It has been at length decided in a proper manner, and many interesting details will be gathered from the following decision of Chief Justice Nelson, which we extract from *Humphrey's Journal* for September:—

The bill filed in this case is founded on a patent to A. S. Southworth, April 10th, 1855, for a new and useful plate-holder for cameras, and re-issued September 25th, 1860.

The claim in the re-issued patent is bringing the different portions of a single plate or several plates successively into the field of the lens of the camera, substantially in the manner and for the purpose specified.

The patentee states in his specification that it had been customary to use a separate plate for each impression, the plate being removed from the camera and replaced by another when several impressions of the same object were to be taken, as in multiplying copies. This caused delay and trouble, to obviate which was the object of this invention, and which consisted in bringing, successively, different portions of the same plate or several smaller plates secured in one plate-holder into

* *Photo. Archiv.*

the field of the lens of the camera; and, in carrying out the invention, the patentee has made use of a peculiarly-arranged frame, in which the plate-holder is permitted to slide, and in which the position of the plate-holder is definitely indicated to the operator, &c.

The only real question in the case is whether or not the patentee was the first and original inventor of the above improvement.

The burden of the proofs, both on the part of the complainant and defendant, bears upon this point. It is insisted on the part of the complainant that the improvement was conceived and put into practical use as early as 1846, and, if not, as early as the winter of 1847-8. The patent was not issued till 1855. I have looked with some care into the proofs, which are quite voluminous, and am satisfied this position is not sustained.

On the contrary, the better opinion is the improvement was not perfected by the patentee till the year 1854. He went, according to his own account, to California in the winter of 1848-9, and remained there two years, and on his return he took up the subject of the stereoscope, and was engaged in considering new plans and new ideas on this subject, and taking out patents thereon until he was taken sick and shut up in his room, when he applied himself to finish up the idea of taking pictures rapidly in the centre of the lens, by adapting the movement in a frame which would fit any ordinary camera. Again: he says, on his cross-examination, that it was three years after his return from California that he was sick, and which was in November, in the fall of 1854. He says, also, on his examination in chief, that he had not perfected the mechanical parts of his machine so as to carry out his ideas readily when the California excitement led him to go there. He further says that the instrument made by Coburn, in the fall of 1846, was abandoned, and that he then contemplated a different improvement; this was by moving the lens over the plate. This idea was not in the first patent at all, and is only alluded to in the re-issued one.

Now, the proofs are full that this idea of making the same impression on different parts of the same plate by the use of a sliding plate-holder, and carried into practical operation by working machines, existed as early as 1846-8, and was in use by several practical photographers some seven or eight years before the date of the patent of Southworth, and before he had perfected his machine.

Entertaining these views, it follows that a decree must be entered for the defendant.

Contemporary Press.

IODISED COLLODION IN PHOTOGRAPHY.

[Mechanics' Magazine.]

In the early days of photography collodion containing iodides only and no bromides was in almost exclusive use. Spots, fogging, and all kinds of evils then beset the photographer, who was not long in tracing most of these evils to impurities and too much acid in the nitrate of silver crystals which were used in making the sensitising bath. Still a residuum of imperfectly-understood causes of failure remained, until bromo-iodised collodion was introduced in company with development with protosulphate of iron. This very much reduced the chances of failure, so that commercial photographers of necessity adopted the new plan, and then, after purer materials began to be used in the manufacture of collodion, failures ceased altogether among intelligent photographers who used moderate care in the selection of their chemicals.

With the light of the better knowledge thus gained by photographers by experience, Mr. Thomas Sutton, B.A., of Jersey, tried some experiments with the old-fashioned simply-iodised collodion, in conjunction with the purer chemicals of later date. He found it to be much less liable to spots and markings than generally supposed, and the few sources of error remaining he traced to impurities in recrystallised nitrate of silver—quite pure enough, however, for use with bromo-iodised collodion. He accordingly exerted himself to introduce an exceedingly pure description of nitrate of silver into the market, and of all the strong proclivities of Mr. Sutton to turn his discoveries into commercial profit, for this one he certainly deserves the thanks of photographers and gain to himself. With such nitrate of silver, and other chemicals of moderate purity, it was found that the sources of failure with iodised collodion had been abolished; but by this time the new method of operating had struck such deep root that few photographers re-entered the ancient path thus cleared of its difficulties by industrious experiments.

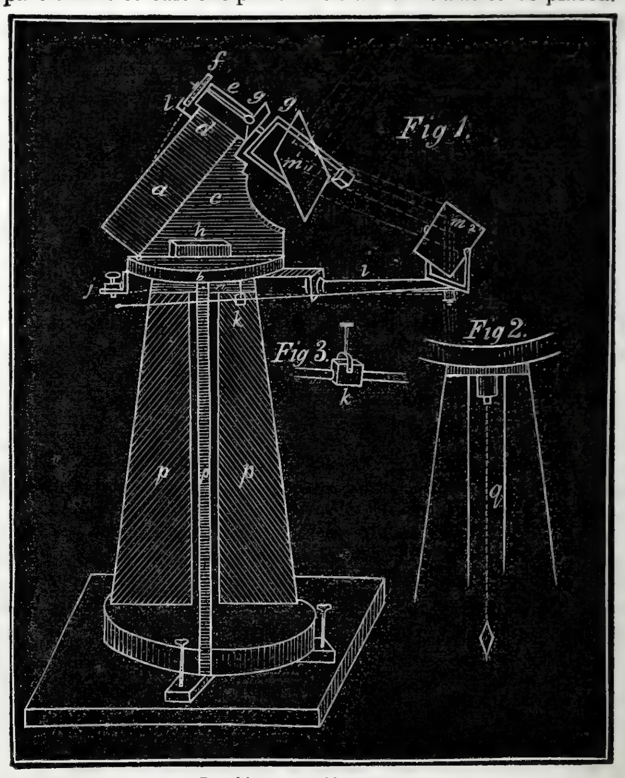
The statement of facts in the foregoing preamble is intended to lead to the consideration of the question whether the desirability of returning to iodised collodion in portraiture is not worth very serious consideration. In the first place, every plate coated with iodised collodion abstracts, by chemical decomposition, much less silver from the bath than bromised collodion, therefore it is cheaper to use. In the second place, the iodised plate requires a shorter time of immersion in the bath, so is cheaper in the saving of time. An iodised collodion requires about three minutes in the bath, a bromised collodion requires about twelve minutes in the bath, and a collodion containing chloride only requires more than half-an-hour in the bath (as discovered by Mr. Harrison) to give a good film. Iodised collodion, again, requires the weakest bath of the three, 25 grains of nitrate of silver to the ounce being sufficiently strong; the other two collodions require 60 and 100 grains to the ounce respectively. Another advantage of good iodised collodion is that it permits of very short exposures and rapid development with pyrogallic and formic acids—so rapid, indeed, that it is doubtful whether iron development will give more rapid results. The advantage of this is that, with a suitable pyroxyline in the collodion and pyrogallic development, a good intense picture can be obtained at once, so as to save the photographer all the dirty work and waste of time of after-intensification. The ordinary formic acid of commerce is very impure, and nine samples out of ten are pretty sure to cause fogging and other evils. The pure monohydrated formic acid must therefore be used. This is only obtainable with difficulty, and is usually imported by wholesale dealers from the continent. We do not know that it is on sale in London by any chemists except Messrs. Hopkin and Williams, for several photographic chemists who have it on their lists have it not in stock. The pure acid, when obtained, should be diluted with water, as it acts very painfully upon the flesh. The quantity of it required in the developer is so small that it is less expensive to use than the acetic acid ordinarily employed for the purpose. Some of those very few photographers who have tried iodised collodion, now that the conditions of invariable success with it are known, say that it gives rather hard pictures. So it does when the lighting of the sitter is the same as for bromo-iodised collodion; and some of the hardness complained of was caused by the too great reduction of the time of exposure in the attempt to get instantaneous results under unfavourable conditions. M. Claudet, F.R.S., frequently used this process in portraiture with much success as to rapidity; but his glass house had too much top light and too little side light to give the best results by any process.

What is required is that some commercial photographers should give this process a long and fair trial. The probable result will be a saving in time and money and the general abolition of the tiresome work of intensification. But the chemicals must be pure to avoid failure, and some little care must be taken to light the sitter properly. Much as iron development is in vogue, we know some photographers, in a very large way of business, who turn out capital portraits regularly by the old pyrogallic development. It would be well to try the merits of the old plan once more, with the present advantage of higher knowledge and purer materials.

HELIOSTAT FOR PHOTOMICROGRAPHY.

[Microscopical Journal.]

The accompanying valuable communication on a cheap form of heliostat has been lately forwarded to me, and offered for publication in the journal of the Royal Microscopical Society, by Lieut.-Colonel J. J. Woodward, M.D., Army Medical Department, Washington, U.S. To it I venture to prefix the plan adopted by myself, as it differs in a few minor particulars to suit the position in which it has to be placed.



Dr. Maddox's Heliostat.

Mr. Rutherford's arrangement, as now modified by Brevet-Major Dr. Curtis, appears exceedingly perfect.

In 1867 Professor Laurence W. Smith, Kenyon College, America, when in England, showed me a drawing of a form he had adopted which was very simple in its construction, and, later, furnished me with full particulars. The base or support being in the form of a long cross set in the direction of the meridian of the place, did not suit well for my narrow window-ledge, facing S. W., at which it had to be used, but led to the plan of stand noted in the accompanying sketch, which is firm and portable. To this arrangement I have since appended the little cubic box as given by Dr. Curtis, it being easier to set than the four pointers I had originally adopted.

The arm carrying the second mirror *m* 2 was at first attached to the firm upright piece at the shutter end of the camera base-board, but from the length needed, twenty inches, to give the light reflected from the first mirror the necessary horizontal direction, centrally with the microscope, it was liable to vibration under a gentle wind; hence it has been much shortened and fixed to the under-surface of the circular base *b*. The clockwork of an American clock is removed from its case and set in a rectangular block of teak,* united at its lower end by a hinge joint to the upper surface of a stout circular base, *b*, which carries a short central pin, *fig.* 2, from which is suspended a bob or plumb line. The back of the clock reclines against and is fastened to one surface of a block, *c*, cut to the angle of the latitude of the place, and fixed over the central line of the circular base. On the upper part of the clock case is screwed a stout brass plate, *d*, turned up sharply at each end at right angles, and pierced with two centrally opposite apertures, through which passes the rod, *e*, carrying at its upper part a grooved wheel, *f*, divided into twenty-four divisions twelve and twelve, and subdivided into quarters, and at its lower end the crutch which holds the mirror *m* 1, one side being prolonged to carry the little cubic box, as suggested by Dr. Curtis, which rotates on a clamping pin. These parts are supported by two friction rollers, *g*, resting by their bevel edges on the lower plate of the doubly right-angled piece of stout brass plate, and turn easily by an endless band carried over the wheel *f*, and a wheel half the size, fixed on the arbor of the hour hand of the clock. On the upper surface of the circular base *b* is fixed a square compass box *h*; from the lower surface of *b*, beneath the mirror *m* 1, is screwed a stout plate bent at a right angle, and slotted to allow, by clamping, of exact adjustment of the arm *i*, that carries the mirror *m* 2, the arm being pierced at the farthest end to admit the central pin of the mirror-crutch or support which, passing through it, is beneath provided with a wheel and an endless band carried over a second wheel with a milled head, *j*, fitted for rotation at the opposite side of *b*. By these the mirror, *m* 2, rotates in the horizontal plane.

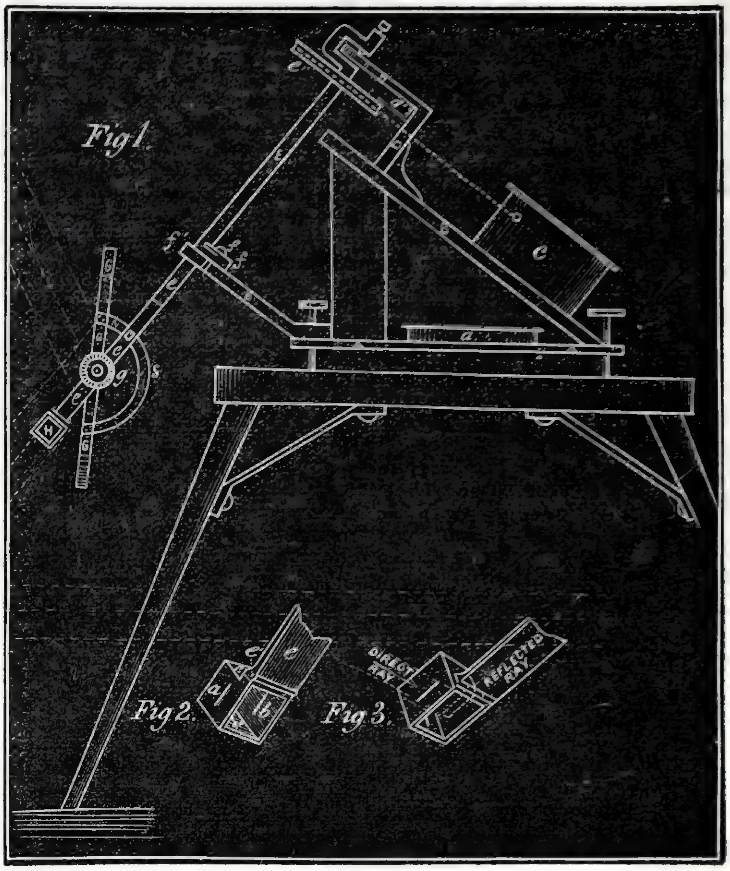
From the under-surface of *b* hangs a short stem with crutch and block, *k* and *fig.* 3, through which runs a steel rod, attached at one end to a lever arm connected with the mirror; by it a vertical motion is obtained. A small index point is fitted at *l*. This completes the heliostat proper, which, for use, is fixed by the central pin passing through a circular hole in the centre of the square block *n* that forms the top of the column or pedestal, it being connected to the foot, *o*, by four uprights, *p p p*, set a little apart, in which space hangs the plumb line (*fig.* 2) *q*, levelling being effected by three screws on the feet of the support. This pedestal, although fourteen inches high, has to be placed on a stool set on the window ledge and cut to its bevel; when put in position, about a quarter of an inch of free space remains between the clock-case and the under edge of the top window sash. If made of two parts only, it would have been less easy to get in position.

The hand is passed through a sliding frame in the shutter to set the angle of the second mirror by the milled head and rod, which is less convenient than the method adopted by Dr. Curtis, of two rods working through apertures in the shutter and handled from within; but, in my case, the shutter exposing a very large surface, it was found preferable to have the heliostat entirely disconnected.

The loss of light occasioned by the employment of a second silvered surface I find to be *about* in the proportion of three to two, or to require thirty-three seconds' exposure, when twenty-two sufficed with a single mirror. These periods would doubtless be much reduced by using mirrors silvered on the upper surface. R. L. Maddox, M.D.

This heliostat is designed to throw a steady beam of sunlight in the direction of the south pole of the heavens. It consists essentially of a mirror, adjustable perpendicularly according to the declination of the sun, and attached to the south end of a rod set parallel to the axis of the earth. This rod is then rotated at the rate of one revolution in twenty-four hours, by having a wheel fixed upon it, which is connected by a band with the arbor of the hour-hand of an ordinary clock.

Fig. 1 represents a side view of the instrument. A is a triangular base-board mounted on three levelling screws, and furnished with a compass, *a*; B is a triangular plate of metal or wood, which supports the clock C and the right-angled arm D for carrying the polar rod E. This plate, B, is immovably fixed upon the base-board A, so as to make with it an angle which is the complement of the angle representing the latitude of the place where the heliostat is to be used. The polar rod E, which carries the mirror, is crank-shaped at the upper end, and rests by a pointed centre upon a depression in the bearing *d*, at the end of the fixed arm D. It is supported below by resting against two friction rollers, *f f*, attached to the extremity of the arm F, and is prevented from slipping from its position upon these rollers by being em-



Col. Woodward's Heliostat.

braced by the loose collar *f'*, also fixed upon the end of the arm F. This rod, D, must make an accurate right angle with the plate B. It terminates below in a crutch-shaped arm, *e*, seen in the drawing in profile, which supports the mirror G at the sides, allowing it thus perpendicular motion for adjustment for declination. The mirror may be clamped in any position by means of the screw *g*. The rotation of the rod E is effected by a band which connects a wheel on the arbor of the hour-hand of the clock with the fixed wheel *e'*, made twice the diameter of the wheel of the arbor, so as to perform one revolution to the latter's two, and, therefore, to turn itself once in twenty-four hours.

The adjustment of the heliostat for time of day and declination of the sun is most easily effected by the following means :—One arm of the crutch-shaped support *e* of the mirror is prolonged beyond the edge of the latter, and has attached to it extremity by a hinge a small cubic box, H, and which projects over the surface of the mirror, and is open only on the side represented in the drawing as facing the observer. *Fig.* 2 gives a perspective view of this box ; *e* shows the arm of the mirror-support to which it is hinged, furnished with a projecting knee, *e'*, to prevent the box from turning too far back upon the hinge. In the face of the box *a*, which fronts to the sun, is a fine slot, running exactly north and south, and upon the under face *b* is a corresponding slot or line. Then, to set the heliostat for time, it is only necessary to rotate the polar rod until the fine ray of sunlight passing through the slot in the face *a* falls exactly on the line on the under-face *b*. In similar manner the face *c*, which is turned towards the surface of the mirror, has a fine slot cut through it in a direction at right angles to that of the other slot, and upon the opposing surface *d* is a corresponding slot or line. Since these two slots lie in the direction of the polar axis, it is only necessary, in order to set the mirror for declination, to turn it until the reflected beam from its surface, which passes through the slot in the face *c*, falls exactly upon the indicator slot in the face *d*. After the adjustments are made, the little box may be turned up on its hinge so as to rest against the supporting arm *e*, and leave the reflected beam from the mirror unobstructed. *Fig.* 3 shows in dotted lines the directions of the direct and reflected rays of the sun when the adjustments are corrected.

If desired, the wheel *e'* may have a dial-plate on its upper surface, divided into twenty-four hours, and numbered from twelve above to twelve below, for the purpose of setting the instrument for time. *d'* in the drawing represents an indicator for reading the time on the plate attached to the arm D. A graduated arc attached to the edge of the mirror-frame may in like manner be used to obtain the adjustment for declination. Such an arc is represented in the drawing, and, if used,

* A brass box is preferable, or one made of zinc.

should be graduated as follows:—The indicator being a line drawn on the edge of a fenestrated opening in the arm *e*, the zero line on the arc should be taken at 45° from the diameter of the arc which passes through the plane of the mirror's surface. Then graduate the arc into half-degrees for twenty-four half-degrees to each side of the zero line; number each half-degree one, two, &c., counting each way from the zero line. Then each half-degree to the left or right of the zero line gives the necessary adjustment of the mirror for each whole degree of the sun's declination north or south respectively. To make the adjustment, therefore, turn the mirror until the indicator points to the number of the graduations on the arc which represents the actual degree of declination of the sun for the given day.

In the drawing the heliostat is represented standing upon a stool on the outside window-ledge of a window having a south exposure, and the dotted lines show the direction of the sun's rays reflected from the heliostat mirror upon a secondary mirror, and thence horizontally into the room. This secondary mirror may be conveniently mounted on a rod fixed in the window-shutter. J. J. Woodward,

Lieut.-Col., M.D., U.S. Army Medical Department, Washington.

PHOTOGRAPHIC COLLEGE FOR NEW YORK.

[Humphrey's Journal.]

In the last number of your journal, in my notes on the Boston meeting, fairs, &c., I glanced at the subject of a photographic college, and promised to express my views more fully at some future time.

As I therein stated, I am of the opinion that an institution of that kind could be successfully established in the city of New York, and upon that basis could be formed a photographic society—one that would interest photographers generally throughout the length and breadth of our land. This would seem to be a tangible starting point for a photographic union, a step towards advancement in sunlight drawing, and would present a remunerative aspect to its members.

The question now arises—1. How can an enterprise of such immense magnitude, requiring such a vast amount of capital, be accomplished? Where are the requisite funds to come from? 2. How can a college be managed and arranged so as to elevate the art, and, at the same time, pay a fair dividend on the capital invested?

How to get funds is always a perplexing question to solve. I have already stated, in my former article, that a college fund could be raised in two different ways—either by donation or by a joint stock company.

If the plan of a joint stock company were adopted, it would be necessary, in the first place, to organise a company for that purpose, and get a charter from the National Government, and appoint permanent officers. This company would then have a legal right to issue bonds or stocks in shares of ten or one hundred dollars each, as might be deemed best.

Issue a sufficient amount of bonds to cover the entire cost of the college, and sell them for fifty or sixty cents on the dollar, as circumstances may require; it will be necessary to obtain at least one-half the cost of the college in cash, and the balance can be put on bond and mortgage, to be paid off from the income of the institution.

As soon as the college is made to pay ten per cent. per annum the original bonds will rise to par value, and a new issue or second bonds may be made sufficiently large to pay off the entire debt; this being done, the first bonds would at once command a high premium in market. The donation plan is less complicated, and, in some respects, preferable, if the necessary funds can be obtained in this way. By this plan the college would necessarily become a free institution, self-sustaining, and no more—and, perhaps, preferable in this respect. I am under the impression that the requisite funds could be obtained in this way.

I am told that Prof. Morse has offered to donate $50,000 for this purpose; Professors Draper and Avery each have manifested a desire for a college, and their willingness to contribute liberally towards erecting one.

I believe that if proper influences were brought to bear upon our wealthy men in this great city, they might be induced to contribute bountifully to this fund. I base this opinion upon this fact, that our wealthy men in New York have always manifested a lively interest in the photographic art. Also, in our own profession, we have men of wealth and liberal ideas. J. Gurney, A. Bogardus, C. D. Fredericks, M. B. Brady, R. A. Lewis, Whipple and Black, of Boston, and many others I could mention, I believe, could be relied upon for strong support in this enterprise.

This is not all, for in the stock trade there is much wealth and liberality combined. We have the Messrs. Scovill Manufacturing Company, E. & H. T. Anthony, Willard Manufacturing Company, Benjamin French, Peter Smith, and others too numerous to mention—each and every one of whom, I have no doubt, would help in this effort to advance the art of photography.

Of the two plans for a college suggested I prefer the former or stock company, and will proceed to construct an imaginary edifice on that plan, which, however, is equally applicable to both.

I would say that a building 100 × 50, and five stories high, with a rear, two stories high, for galleries, would answer the purpose. I would locate on Broadway, as centrally as possible. The building should be of white marble, and the architecture beautiful and appropriate.

D. D. T. Davie.

(To be continued.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 6th	North London	Myddelton Hall, Islington.
,, 6th	Edinburgh	Hall, 5, St. Andrew-square.
,, 7th	Glasgow	Andersonian University.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 17th ult.,—M. Ch. Teisseire in the chair. M. Poitevin was present as an honorary member of the Society.

Amongst the correspondence a letter was read from MM. Drivet and Co., relative to some proofs which they had forwarded to the Society, obtained by their process of helio-engraving. These proofs, which were of different kinds, were examined with the most lively interest, the Chairman remarking that the commercial future of the art of photography would be found to reside in helio-engraving, and, consequently, every attempt to improve that beautiful practical application deserved to be encouraged. Some of the proofs sent by MM. Drivet and Co. were very remarkable. The landscapes from nature, however, had rather a dry aspect, which, doubtless, these skilful operators will succeeding in correcting.

A letter was afterwards read from MM. Weinhold and Co., of Dresden, accompanying certain specimens of albumenised paper called "Victoria glacé." Sheets of this paper were distributed amongst the members present, two of whom undertook to report as to its value.

A letter was read from M. Despaquis, informing the Society of a new application of that property of bichromated gelatine which causes it to swell, after exposure, when plunged into cold water. This application consists in the moulding and countermoulding of an image in relief upon gelatine, in order to obtain dry stamps. Thus impressions in relief would be obtained on paper representing objects in a similar manner to those stamped officially. M. Despaquis intends to make as much as possible of this application by extending it to wet impressions, as is practised in the Woodbury process.

M. Poitevin remarked that this application of moulding reliefs of bichromated gelatine had been introduced by him in 1855, and he exhibited some proofs of that kind recently obtained by him in plaster.

The Chairman recognised the claim made by M. Poitevin, which, however, he said, was unnecessary, as every one was aware of his rights as the original inventor. He (the Chairman) saw nothing in the idea of M. Despaquis beyond the commercial application of an invention for which he never could obtain the credit. He, however, wished M. Despaquis success in his special application of it. It was, he said, by practice that the photographic art must become more and more advanced, and take its place amongst the number of useful inventions. Every attempt at a new application merited the interest of the photographic community.

A copy of the pamphlet of M. Montagna, of Milan, entitled *Procesos Fotografico al Carbone*, was presented and discussed. It contains a series of manipulations for obtaining carbon proofs, and the work is full of interesting and valuable details. It was considered one of the best guides to consult respecting this new means of obtaining permanent pictures. The fact of his offering a medal for the best positive carbon proof executed according to his process, proved the importance attached by him to the practice of carbon processes.

The Chairman said that, before the meeting was addressed by any members who might have communications to make to the Society, he thought it his duty to pay a tribute of regret and respect to the memory of the late M. Lieber, who had died during the vacation. M. Lieber, he said, had merited well of the photographic art, having been specially engaged in the publication of photographic works, and in founding the photographic encyclopœdia. He hoped the successors of M. Lieber would follow the example he had set them, and continue the work he had so well commenced.

M. Leon Vidal exhibited a specimen of his photometer for the printing of carbon positives. This small instrument has already been described by M. A. Marion, but some minor improvements have been made which M. Vidal thought it opportune to mention, and thanks to which the instrument would be found to work with the greatest possible precision.

MM. Teisseire and Vidal exhibited a series of carbon proofs obtained by different means: some by M. Marion's and some by Mr. Johnson's process. This collection contained reproductions of nature, portraits, and landscapes, and reproductions of engravings, lithographs, and paintings. The portraits were remarkable for the softness of the half-tints. M. Vidal said he had prepared for publication the whole of the process of operating by which he, in concert with M. Teisseire, has produced these proofs, which were for the most part very remarkable. According to these gentlemen, who have devoted three whole months in making experiments without number in these new processes, carbon photography will henceforth be so perfectly practical that any photographer may announce, without fear of promising too much, that he is in a position to deliver carbon portraits on demand.

After some other business the meeting was adjourned.

Correspondence.

Home.

STREAKS IN THE DIRECTION OF THE DIP.

To the EDITORS.

GENTLEMEN,—This is no new thing to me; I have been troubled with it hundreds of times. On many occasions I have taken in one day more than a hundred 5 × 4 pictures. Although in the morning the chemicals may work well, yet invariably after three or four dozen pictures have been taken streaks made their appearance.

The cause of this I cannot tell; but experience (after seventeen years' practical application) has taught me a remedy which I have always found to answer well, even when systematically at work from morning till night for three months together—Sundays excepted.

Suppose four dozen pictures be taken with a new bath, and streaks then begin to appear, my remedy is to pour the silver solution into a glass pickle or preserve jar (kept for the purpose) and put it into a saucepan of cold water, which I place on the fire till the water (not the silver solution) boils, or say about ten minutes. This is to drive off the excess of ether from the bath; after which I let all cool together, then filter the silver solution, and proceed with picture taking. This cures the streaks; and, if necessary, I repeat it twice or three times with the same bath.

When I find an excess of iodide in the bath producing injurious effects, my remedy is then (for I cannot wait for the bath to cure itself as many do) to pour the silver solution into a clean bottle, and add some distilled water to precipitate the excess of iodide in the bath, which falls down with a milky appearance. I then add sufficient nitrate of silver to make up the required strength in proportion to the quantity of water added. I then filter and proceed to work again.

With these two remedies I can always ensure good results by carefully watching the acidity of the bath.

Again: I have many times been working well with my own collodion, but having to try the collodion of other makers, called "extra quick," I often get a great quantity of streaks. This I have had to cure by weakening the collodion with alcohol and ether, or otherwise altering the condition of the bath. These are my practical remedies.

Now as to their cause. Is it the excess of ether in the bath? Practice teaches that it is if I boil it and get rid of it. That portion of the plate that goes nearest the bottom of the bath is the worst for streaks, and the ether would be at the top. Again: the streaks will be increased in proportion to the time that elapses between the pouring on of the collodion and the immersion in the bath; and the corner of the plate that rests on the bottle while draining the collodion off is differently affected to the top corner or part of the plate.

I do not write this to ask for information; practice has given me an effective remedy, although I am thankful for any hint that may be given. My object is to benefit others by these plain and ungarnished remarks throuth the medium of your valuable Journal, and doubtless others will comment further on this subject to the general improvement of the photographic community.—I am, yours, &c., J. LANCASTER.

Colmore-row, Birmingham, Sept. 28, 1869.

BOURNE'S VIEWS.—CLEAR SKIES.

To the EDITORS.

GENTLEMEN,—Your advice on past occasions having been of the greatest value to me, I seek it again.

Two or three years ago you inserted in THE BRITISH JOURNAL OF PHOTOGRAPHY a review of a series of Mr. S. Bourne's Indian views (12 × 10). I have often read and re-read that review, and wished to see them. Last night my wish was gratified. I saw in the album of an Anglo-Indian officer more than a hundred of them. I think I shall never forget them. All that you said of them is true. But the thing that struck me most was the clearness and cleanness of the skies. None of them were blocked out, and all of them without spot or blemish of any kind.

Now, after seven years' practice as a professional photographer, I cannot do this. I can block out neatly and print in clouds, but this is sometimes inconvenient, aud always takes a long time.

Dou you think a very weak developer would assist to prevent stains? I get clean, bright negatives, but the skies are always stained. When I saw Mr. Bourne's beautiful views I thought I would seek your advice again.—I am, yours, &c., W. G. J. A.

Northampton, September 29, 1869.

[An experienced landscape photographer says that the clear and clean skies so desiderated by our correspondent may be obtained by using as a developer an *old* solution of pyrogallic and acetic acids. It is best when it has attained a deep sherry colour. A brown (peroxidised) iron developer will, as a rule, also produce clean negatives. Some further information may be obtained from a perusal of the highly-interesting communications on photography in India, which Mr. Bourne contributed to this Journal. We look upon his pictures as exceptionally excellent.—EDS.]

LACQUER.

To the EDITORS.

GENTLEMEN,—Would you be kind enough to inform me if the hard and very durable quality of the lacquer that is put on the French optical work (and also that of many of our English makers) is due to the material composing the lacquer or in the mode of using it? A hint will be thankfully received by,—Yours, &c., S. L. J.

September 28, 1869.

[Although we are not competent to say much on this subject, we must commence by expressing our belief that, in respect of hardness, the lacquer employed by French opticians is not superior to that used by those of the craft at home. There is one peculiarity of French lacquered goods which we have noticed but have *not* observed it in English productions. The rich golden colour, after a short time, fades on exposure to air, leaving the article of a pale brass tint. Our correspondent is, doubtless, well aware of the effects of heat on lacquer. When an article coated with the ordinary lacquer is exposed to a tolerably strong heat the colour becomes of a rich brown, more or less deep in proportion to the heat employed; not only, however, is the colour changed, but it is much harder and more insoluble than before. If an ordinary lacquered article be immersed in sulphuric ether or in a boiling solution of washing soda or pearl ash, it will be immediately stripped of its gummy covering; but, after a previous exposure to heat, the insolubility of the lacquer may be so much increased that either of the above methods of removing it will prove ineffectual. We have never, however, found it to resist an immersion for a minute or two in a strong and hot solution of cyanide of potassium. This permits the film to be peeled off with ease. A very beautiful and good gold-coloured lacquer may be made as follows:—Take—

Turmeric	1 lb.
Rectified spirits of wine	2 gallons.

Macerate, strain, and add to the liquid—

Gamboge	$1\frac{1}{2}$ oz.
Shellac	$\frac{3}{4}$ lb.
Sandarac	$3\frac{1}{2}$ lbs.

When dissolved, strain, and add a quart of good turpentine varnish. —EDS.]

"MR. SUTTON'S LAST DISCOVERY.—ALKALINE METHOD."

To the EDITORS.

GENTLEMEN,—By way of reply or retort to the communication of mine, dated the 16th instant, which you did me the favour to insert in THE BRITISH JOURNAL OF PHOTOGRAPHY of the 17th instant, in reference to Mr. Sutton's last venture, that gentleman's "organ" of last week inserts this whimsical bit of padding:—

"MR. BRITISH'S LAST DISCOVERY.—ACTININE METHOD.

"SIR,—The *principle* of Mr. Sutton's alkaline method seems to be that the film at the moment of exposure should be in the camera, and this condition he produces by putting the plate in a dark slide, &c., &c. But there is no novelty in this photographic *principle*. If your readers will refer back to the first pages of the earliest work on photography, &c., &c., Mr. Sutton is several years too late; and I am afraid this 'very latest' wonder of his will assure the photographic world that the Thames will never be set on fire by your photographic contemporaries, or by—Yours, &c., "AITCHE HARDTWINGE.

"35, *Arevexed-road, Hollowbray.*"

And the editor appends this note to it:—"The above letter is, we presume, sent as a satire upon the following, which appeared in the last number of the *British*. How far it applies, we leave our readers to determine." Then follows the letter bearing my signature.

As Mr. "Hardtwinge" (whoever he is) does *not* answer, or attempt to answer, my letter, the proper plan to treat his masterstroke of genius would be to take no notice of it; and that course I should have adopted had not his letter borne as a heading, "Mr. British's Last Discovery," by which he insinuates that the letter was written, either by some one connected with THE BRITISH JOURNAL OF PHOTOGRAPHY, or in collusion with the Editors thereof for the purpose of gratifying your spite against a journal which shall be nameless (behold *my* spite!).

Let me tell Mr. "Hardtwinge" and his editor that such a supposition is a gratuitous piece of impertinence. The letter was written *bonâ fide*. I am not in any way connected with THE BRITISH JOURNAL OF PHOTOGRAPHY. I do not know its Editors. I never spoke to or, to the best of my knowledge, ever saw any of them. I am sorry that my unfortunate letter should have caused any persons to be twinged so hard that lame satire is the only means they have of showing us how much *they* are vexed.

It would have given me much pleasure to have learned that Mr. Sutton's "new" process really had some germs of novelty and improvement in it; or to have seen a manly acknowledgment from him that he had been mistaken in considering an alkaline preservative (*vel* organifier) new in principle or practice. We have his own statements that neither the collodion or "first crop" of thin crystallised silver is absolutely

requisite, and we all *know* that the developer is common enough. But, in point of fact, this "novelty" is merely another of those soap-bubbles which, from time to time, are so vigorously puffed into being by one who ought to know better.—I am, yours, &c., H. Hardinge.

September 28, 1869.

P.S.—I may say, while my pen is in hand, that I am engaged in a few experiments upon this alkaline practice. When I have arrived at anything like a *reliable* result I will communicate particulars thereof, if you think them likely to interest your readers.—H. H.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photographs Registered :—

Hugh Browning, Liverpool.—*Six Views of the Interior of St. Margaret's Church, Prince's Park-road, Liverpool;* also, *Portrait of the Rev. Charles Parnell.*

R. P. Yeo, Plymouth.—*Ruins of Sherborne Castle.—Sherborne, from the Slopes.*

P. P. Skeolan, Harrogate.—*Two Portraits of Sir Bartle Frere.*

A. E. Lesage, Dublin.—*Three Portraits of the Most Rev. Dr. O'Brien, Bishop of Waterford and Lismore; four of the Very Rev. Dr. Russell, O.P.; three of the Most Rev. Dr. Durcan, Bishop of Achonry; five of the Most Rev. Dr. Fallon, Bishop of Kilmacduagh and Kilfenora; five of the Most Rev. P. Leahy, Archbishop of Cashel and Emly; three of the Most Rev. Dr. Furlong, Bishop of Ferns; five of the Most Rev. Dr. Moriarty, Bishop of Kerry; three of the Most Rev. Dr. Butler, Bishop of Limerick; three of the Most Rev. Dr. Pius Leahy, Bishop of Dromore; two of His Grace the Right Rev. John M'Hale, Archbishop of Tuam; five of the Most Rev. Dr. Gillooly, Bishop of Elphin; three of the Most Rev. Dr. Conaty, Bishop of Kilmore; three of Sir John Gray, M.P..*

☞ *Correspondents should never write on both sides of the paper.*

In Type.—*Strictures on Mr. Winstanley's Articles on Photographic Societies.*

T. G. Perry.—Thanks for your attention.

E. B. Mounsey.—Respecting the Transparency Exchange Club we shall confer with our brother referee, and announce the result.

Buxtonian.—By writing to the Photo. Relief Company, Hereford Lodge, Gloucester Road, Brompton, W., you will obtain the information you desire

S. P.—Thanks; but we shall not at present publish your letter. The person referred to is one of those who only require, as it is said "rope enough," and this he may have, so far as we are concerned.

Subaltern (Deesa).—We have placed your respective queries in the hands of those who are both able and willing to give the information desired by your friend; but as we cannot receive the replies in time for insertion in the present number we shall give them next week, together with some notes on the subject of your own queries.

Gordon Baillie (Wellington, N.Z.)—Thanks. The prints are interesting as showing "bits" in a country of which we hear so much and (topographically) know so little. Well-taken views in New Zealand would, we believe, command a ready sale in this country; but they ought to be much larger in size than the specimens received.

Nemo. (Preston).—1. The illumination is practically equal from centre to margin under the circumstances named.—2. We cannot say what the largest stop is that will produce a picture *perfectly* sharp to the margin; but we have obtained what may be called "pictorial sharpness" by working the lens with the largest available aperture—that is, without a stop—on a plate rather larger than it is advertised to cover.—3. With a stop of an equal size the definition is *better* than we have been able to secure from a first-class single combination.—4. The foci and stops being equal in both lenses there will practically be no difference between the two in respect of rapidity. The opinion of this lens which we gave in our article at page 432 was founded upon a careful personal examination of its properties. It is a very useful instrument.

Phantasmagoria (Hendon-hill, Sunderland) writes as follows:—"I shall be glad if you can assist me as to the painting of photographic transparencies for the lantern. About a year ago you spoke highly of Newman's 'slow-drying moist colours.' I have procured some, and find they can be laid smoothly on the varnished transparency; but the colours themselves are not *translucent*—they appear misty, and have a ground-glass effect when looked through. I find another coat of varnish makes the colours perfectly clear and bright; but the under coat of varnish always 'runs,' and, carrying the paint with it, utterly ruins the picture. I have tried painting on the collodion surface, but the colours do not work at all easily; they appear to be absorbed, and dry too quickly. Any hints you can give me in your next issue as to the mode of preparing the surface for receiving the colours, &c., would oblige."——In reply to our correspondent: although the colours when thus applied may have a "ground-glass effect," they will be found to be beautifully transparent when tried by the real test—the lantern itself. We have not, ourselves, experienced such translucency with these colours, and we have used several of them for transparencies. The remedy, however, is very easy. If the picture has been varnished with the ordinary negative spirit varnish, apply the colours, and then give the whole a coat of varnish composed of Canadian balsam and gum dammar dissolved in benzole; or the last-named varnish may be applied first, and the spirit varnish last.

Royal Cornwall Polytechnic Society.—Mr. J. C. Stephens, of Falmouth, calls our attention to an error we unwittingly made in our last number in designating him as "late *Secretary*" to that Society, when his position was really assistant to the Secretary. Concerning the alleged rule by which an exhibitor who had previously received a medal was debarred from being the recipient of a similar honour, Mr. Stephens, by kindly sending us a copy of the regulations for competition, has put it in our power to publish with authority the real state of the case. These regulations are nineteen in number, three of which we publish:—"10. The judges are empowered to award prizes in money to the extent of £1 only. When medals are awarded, the converting them into money, according to the following scale, shall be at the discretion of the committee, with the exception of the special premiums:—First silver medal, £5; second ditto, £3 10s.; first bronze medal, £2; second ditto, £1 5s. * * * 13. No competitor may receive more than one medal or prize for similar subjects in the same department at the same Exhibition. (This regulation does not apply to mechanical or scientific inventions.)—14. No holder of a medal or prize may receive a prize of the same, or a lower, value for similar subjects in the same departments at the *next* two subsequent Exhibitions; but the judges will be empowered to give rewards in special cases to persons excluded by this rule." So much for the general regulations; but under the special portion which has reference to photography we find it specially mentioned that "*the tenth and fourteenth regulations for competition do not apply to this department.*" Nothing can be more definite than this, and for the sake of the future prosperity of the Exhibition we are glad that it is so. Mr. Briggs will, of course, receive from the judges the medal of which they have inadvertently deprived him. They are in honour bound to do this, and without doubt will do so, now that their attention has been directed to the oversight.

⁂ We are compelled to leave over replies to several correspondents till next week.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.

Artificial Light.—The German chemist Landsberg says that artificial light contains 90 per cent of calorific rays, while sunlight contains only 50. To the number of these rays he attributes the disagreeable sensation produced upon the eyes by artificial light. By passing it through alum or mica, the calorific rays are interrupted, and the light rendered more agreeable and less injurious.—*Chemical News.*

The Carbon Process.—Among the works shortly to be published by Messrs. Macmillan and Co. is *The History of the Life of Albert Dürer, with a Translation of his Letters and Journal, and some Account of his Works*, by Mrs. Charles Heaton. The work is to be illustrated by reproductions by the carbon process, executed by the Autotype Company. These reproductions will include numerous etchings by the artist, among which may be enumerated *Melancolia; The Knight, Death, and the Devil; St. Jerome Reading; The Prodigal Son;* the limestone carving styled *The Naming of St. John the Baptist*, &c. We believe the above is only one instance out of many in which photography will be utilised for the purposes of book illustration during the forthcoming publishing season prior to Christmas.

LONDON GAZETTE, *Friday, September* 24.

Notice of Sitting for Last Examination.

W. Bonehill, Birmingham, journeyman photographer, October 20th.

METEOROLOGICAL REPORT,

For the Week ending September 29th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Sept. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
23	30·28	67	52	55	59	WSW	0·01	Fine
24	30·19	71	57	60	61	SW	—	Dull
25	30·04	74	53	56	65	SW	—	Fine
27	30·10	65	47	53	57	WSW	—	Fine
28	29·87	66	49	55	58	SW	—	Fine
29	29·63	70	52	61	65	SW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 492. Vol. XVI.—OCTOBER 8, 1869.

ON CELLULOSE AND PYROXYLINE.

Notwithstanding the many years which have elapsed since the late Mr. Archer made his invaluable discovery of the photographic utility of what we now call collodion, comparatively little variation from the original practice has taken place. It is true that much valuable information has been acquired relative to the manufacture of varieties of soluble cotton possessing special photographic qualities, and the researches of the late Mr. Hadow and of Mr. Abel have made us familiar with some of the chemical changes taking place on treating cotton with nitric acid; but still *essentially* our practice is the same as it was just after Archer's discovery. The collodion film we have been long accustomed to regard as a very indifferent body, and one which experience has proved to be tolerably permanent.

We are accustomed to speak of "quick" and "slow" varieties of soluble cotton, but some regard these as being only more or less pure specimens of pyroxyline; that is to say, as being made up of soluble cotton *plus* some resinous matter which hastens or retards the reducing action of light on the sensitive compounds of silver. Again: we have the mechanical qualities of the film—the "tough" or the "powdery" films—which are due to a variety of causes, principally to the greater or less strength of the acids employed to act upon the cotton, and to the temperature at which the operation may have been conducted. But, whatever the variations in properties may be, photographic pyroxyline is regarded as a comparatively indifferent body possessing a constitution rather difficult of comprehension, notwithstanding the amount of care and attention that has been expended upon its investigation.

Our readers will now be not a little surprised to learn that there is good reason to believe that ordinary cellulose is a body precisely analogous in *constitution* to common vinic *alcohol*, and that the soluble cotton or photographic pyroxyline or papyroxyline corresponds to nitrous ether—a substance which, when dissolved in spirit, is largely sold in the shops as "sweet spirit of nitre," and is, as we all know, capable of producing profuse perspiration when administered in suitable doses to human beings.

The interesting points we have just referred to have been worked out with more than usual clearness in the course of the researches of MM. Schutzenberger and Naudin on some acetic derivatives of cellulose and allied substances. These chemists, in working with cellulose, have selected ordinary white filtering paper for their experiments, just as Dr. Liesegang has done in preparing his papyroxyline. MM. Schutzenberger and Naudin, in their communication to the French Academy of Sciences, state that, in preparing the acetic derivatives of cellulose, they digest the pure white Swedish filtering paper with a liquid called "acetic anhydride" or "anhydrous acetic acid." After the two bodies have reacted a solid soluble substance is obtained, which, on analysis, is found to contain the elements of the cellulose, a portion of hydrogen in which has been replaced by a substance called "acetyl"—the radicle of acetic acid. This aceto-cellulose is precisely similar to one of the varieties of pyroxyline, and, like it, when boiled with solution of caustic potash, produces acetate of potash and ordinary insoluble cellulose again.

Let us contrast this with common alcohol. When the latter is heated for some time with concentrated acetic acid acetic ether is produced, which is a liquid of agreeable odour, but of analogous constitution to the aceto-cellulose. When this acetic ether is heated with solution of caustic potash, it produces acetate of potash and ordinary alcohol again. Further: when alcohol is treated with nitric acid, nitrous ether is formed, just as pyroxyline is produced when paper is acted upon by the same acid. This nitrous ether, when heated with caustic potash, is reconverted into common alcohol, while nitrate of potash remains behind. Ordinary pyroxyline, with which collodion is manufactured, we know is decomposed in a precisely similar manner by caustic potash; that is to say, nitrite of potash and plain cellulose result from the treatment.

We thus see that the analogy between common alcohol and cellulose, so far as their chemical reactions are concerned, is very strong; and the knowledge of this close relationship in kind between two bodies so thoroughly unlike physically, may fairly stimulate investigation relative to the modification of collodion or the production of varieties of soluble paper, which shall not only serve as the basis for the picture, but shall also act as the sensitisers for the film. There are several other directions in which the foregoing information may be utilised, but these we shall probably touch upon at a future time.

TESTING THE STRENGTH OF SILVER SOLUTIONS.

In another column will be found a paper by Mr. W. H. Wilson, which contains a useful hint for the rapid testing of the strength of the nitrate of silver solutions used in photography. It is well known that the "argentometer," which acts by determining the density of the silver solution, is of comparatively little value in estimating the strength of old baths, as the amount of salts of various kinds which have accumulated in the liquid render its indications quite untrustworthy. Mr. Wilson, therefore, adopts the volumetric mode of estimating silver on nearly the same plan as that employed by Mr. Hart in his useful silver meter.

Mr. Wilson endeavours to bring the whole matter into a still more simple form by making the number of drops added to a given volume of the silver solution measure the number of grains of nitrate of silver per ounce of the liquid.

Without trying the plan ourselves, in order to ascertain how close the results may be to the truth, we would suggest that the use of "drops" delivered from any bottle, open vessel, or even pipette, is a particularly loose measure of quantity. A drop delivered from a wide-mouthed vessel will often occupy three times the bulk of a drop taken from a narrow-necked phial. In fact, a "drop" may mean anything, so far as a liquid is concerned, from the size of a coriander seed to that of a hazel nut—not to speak of the conventional "drop" of ardent spirits. We therefore suppose that when Mr. Wilson refers to a drop he means a measured "minim," delivered from a graduated minim measure.

A NEW CAMERA FOR DRY PLATES.

A SHORT time since (June 10th) a patent was applied for by Mr. Walter Cook for an invention, which is described in the Patent-office as "Apparatus for taking photographs, by which the operator can take a number of prepared sensitive plates and expose them successively without the aid of changing box or bag." In the ordinary course of events two months should have still to elapse before the invention would be laid open for public inspection; but, as we have been favoured by Mr. C. E. Elliott with an opportunity of examining one of the patented cameras or pieces of "apparatus," we lose no time in describing it for the benefit of our readers, thus anticipating the publication of the specification, which cannot take place before the middle of December next.

The camera we have examined is in the form of a neat mahogany cabinet, with a handle on the top for carrying it. It is intended for plates of the "quarter" size—that is, $4\frac{1}{4} \times 3\frac{1}{4}$ inches. The size of the cabinet is eight and a-half inches high by five inches deep and five inches wide. It is capable of containing no fewer than twenty-one sensitive dry plates, each of them being mounted in such a manner as to preclude the possibility of its sustaining harm, either from contact with its fellows during the various "ups and downs" to which it literally has to be eventually subjected, or from the admission of a stray beam of light.

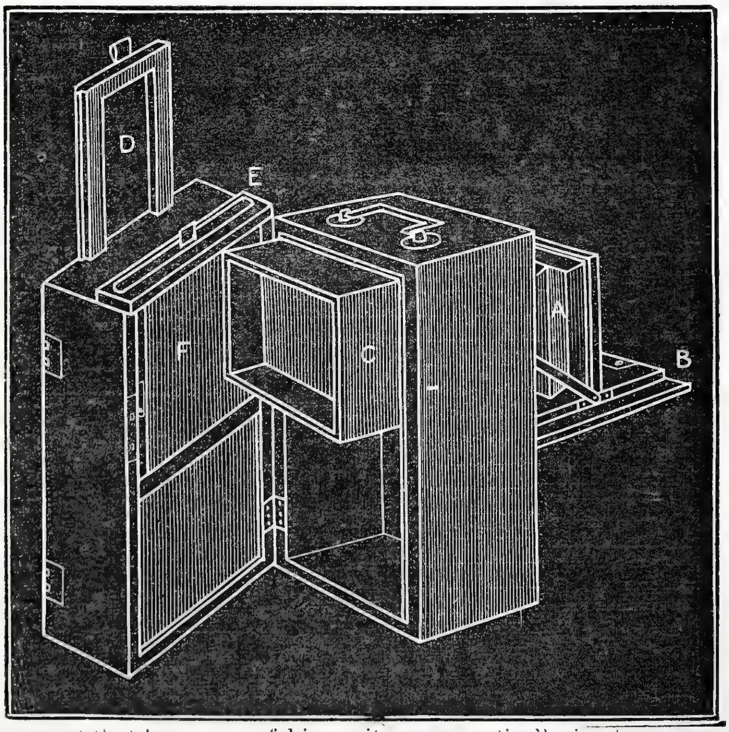
The general principle of the apparatus can be ascertained from the annexed diagram, which may be held as representing a vertical section.

3	1
4	2

From this it will be seen that the cabinet is divided into four parts: 1 represents the camera proper; 2 is a chamber in which to keep the ground glass and other "odds and ends;" 3 and 4 are filled with sensitive plates, which, as we shall hereafter describe, are packed closely together, yet without any danger of scratching or other damage accruing.

By a mechanical arrangement the plates in compartment 3 are presented in rotation to the action of the lens in the camera 1, and as soon as each one has been impressed it is, by another mechanical arrangement, transferred to compartment 4, an unimpressed plate from which is, in turn, added to the supply in the upper chamber. Thus, by the exercise of the most ordinary care and common sense on the part of the operator, each of the sensitive plates is presented in rotation, and *without fail*, to the aperture, where it will be in sharp focus, and, after exposure, consigned to the plate-box underneath.

After this statement of the general principle of action we add a diagram, which shows the instrument more in detail. It is so



arranged that by means of hinges it opens vertically in the middle, by which the portions 1 and 2 of the above sketch—or the camera and the chamber for holding the focussing glass—is divided from the posterior portion in which the plates are stored. In order, therefore, to the better understanding of the instrument we show it *open*.

In the front of the cabinet is a door the size of the whole of the upper half, and which opens downward. This "door," which is retained, by means of brass straps, in a horizontal position, forms the base-board or bottom of the camera, on which the front that carries the lens travels, the body of the camera being "bellows" fashion. This bottom board is represented at B—the camera, now expanded for use, being shown at A.

The focussing-glass C is mounted in a frame which is usually kept in the front recess below the camera, but which is "stepped" into position behind the camera, where it is now shown, and retained there by means of a spring catch. When the focussing has been effected, the ground-glass frame is put aside in its own resting-place, and the back portion brought into contact with the front by the simple act of revolving it on its hinges.

The subject having been selected, and both upper and lower receptacles charged with sensitive plates, the next operation consists in exposing them. For this purpose a slide or shutter, which is shown at E, is pulled up as far as it will go.

As there is an aperture of suitable size in its lower half, it is obvious that the light from the lens will now play full upon the front plate of the series in the upper chamber, and, when the exposure has been completed and the lens capped, the slide E, which has been up during the whole time of the exposure, is now pressed down. By this act not only is the light debarred access to the sensitive surface, but the plate which has just been exposed is carried down along with it, and is safely lodged in the lower chamber, from which no subsequent action of the front slide can again dislodge it.

But without some counteracting agency the upper chamber would soon be emptied and the lower one too densely packed to admit of any kind of free action; for, as we have remarked, both were filled at starting. To provide against this contingency there is a slide or shutter shown at D, the action of which is the very reverse of the front slide E; for, while the latter pushes the plate down but cannot take it up, the former, D, lifts up a plate from the lower compartment to the upper without having the power of again carrying it down. Thus, to ensure the harmonious working of the parts, the operator should get into the habit of always pulling up the slide D and pushing it down again before he takes a picture. During the brief period we had the camera in our possession we several times operated with these slides in the alternating manner we have described; and, although we brought each of the twenty-one plates with which it was charged to the front in rotation, in no single instance was there a hitch or miss of a successful transfer.

It now only remains to describe the manner in which the plates are "put up," so as to do without a separate frame for each.

A number of mats or frames are punched out of a sheet of ordinary card board rather thinner than that used for mounting purposes; the outside size of this mat is similar to that of the sensitive plate, and the breadth all round is about a quarter of an inch. In addition to these mats, ordinary square pieces of black paper of the thickness of writing paper are provided. These are in size so much larger than the sensitive plate as to permit their margins to be folded round the edges of the plate and pasted on the front, for which purpose one side is gummed.

To prepare the sensitive plates for use (the sensitising and drying are presumed to have been previously effected by any desirable process) a sheet of the blackened and gummed paper is laid down, and by means of a wet sponge is thoroughly moistened. On this is carefully laid down a sensitive plate, prepared side upwards. Over this again is placed one of the cardboard mats described, and the edges of the gummed paper are then bent round, by which the mat, the plate, and the paper backing are all firmly bound together. If the plate be now placed on a flat surface on its face it cannot sustain damage, because the protective edging of the card projects slightly in front; hence a number of plates so prepared may be packed up together.

From the foregoing description, the mode of construction and working of this the latest addition to our photo-mechanical resources will, we trust, be apparent to every reader; and that an invention of this kind is destined to prove serviceable to tourists we entertain no doubt whatever.

AN EASY METHOD OF TESTING THE STRENGTH OF SOLUTIONS OF NITRATE OF SILVER.*

MOST photographers will concede the importance of having the nitrate of silver bath used for sensitising paper kept at a regular strength, and there are probably few who make use of any method of ascertaining this more elaborate than that with the ordinary argentometer or hydrometer, which, although convenient, is not very reliable, as it only indicates the specific gravity of the solution and

* Read at a meeting of the Liverpool Amateur Photographic Association, September 28, 1869.

not the quantity of nitrate of silver in it. The best methods are those by volumetric analysis, based upon the theory of combining proportions. Special apparatus has been devised by various makers to suit the object in view, but usually with the slight drawback of requiring some calculation at the time of using.

But there are many photographers, and amateurs in particular, who, like myself, object for many reasons to increase their working plant, and to these I hope the following suggestions for a simple method of estimating the strength of solutions may be of service. The apparatus required has, at least, the merit of not being expensive.

Some time ago, having certain misgivings as to the strength of an old printing bath, I dipped into photographic literature in search of some simple method wherewith to satisfy myself on the point. Not meeting with what I required I had recourse to the table of equivalent numbers to help me out of the difficulty. What I required may be stated as follows:—That the number of *drops* of a solution of chloride of sodium which it took to precipitate the silver in a given quantity of nitrate solution should represent the number of *grains* of nitrate of silver to the ounce in that solution.

We first fix upon a convenient quantity of solution to be tested—say 100 drops. By a simple calculation it is found that the solution of chloride of sodium must be 34½ grains to the ounce. The question is thus stated:—As 170 : 100 :: 58.50 : 34.4; or, as the equivalent of nitrate of silver is to the number of drops to be tested so is the equivalent of chloride of sodium to the number of grains to the ounce in the test solution. As table salt will most probably be used, we may say thirty-five grains to the ounce, to allow for a slight impurity. An eight-ounce bottle of the test solution will last the most active worker for a long time. The apparatus needed is a test-tube and a pipette or dropping-tube.

Measure into the test-tube with the pipette one hundred drops of the solution to be tested. Rinse out the pipette, fill it with the chloride of sodium solution, and then drop carefully into the silver solution, counting the drops, until it is seen that no more precipitate is caused. The number of drops used—less one or two which may be deducted, as they will probably be in excess—will represent the number of grains of nitrate of silver in each ounce of solution.

Nothing can well be simpler, and very little time is needed for the operation, as the chloride of silver settles down very rapidly.

To show the necessity for occasionally testing the printing bath, my own—alluded to above—which had been strengthened from time to time by the rule of thumb with the intention of keeping it at its original strength of sixty grains, was found to be eighty-seven grains to the ounce.

W. H. Wilson.

FRACTURED NEGATIVES.

Who among photographers has not had, at some period of his experience, the misfortune to fracture a negative which could not be replaced? The misfortune is a serious one, and when it occurs it is usually under circumstances which make it impossible to obtain another. When a fractured negative is printed from without proper precautions the unsightly mark left in the proof is offensive in the extreme.

We propose in this article to describe one or two of what we believe to be the *best* methods of treating a fractured negative, so that the print produced from it shall be at least presentable, if not perfect. Previous to doing so we shall narrate an incident which bears closely on this subject.

A few years ago we had the misfortune to break in five or six pieces a valuable lantern transparency, painted on a circle of glass three and a-quarter inches in diameter. As it formed one of a series of illustrations for a lecture which was to be delivered on the following evening, there was no time to get it repainted, and hence it became necessary to have it repaired. After cogitating over the matter we had a circle of patent plate glass cut to the size of the picture, and painted over on one side with new and fluid Canadian balsam. We coated in a similar manner the face and edges of the largest fractured portion of the painting, which was then pressed closely down, the greatest care being taken to exclude even the most minute air-bubbles. Another portion of the picture was treated in a similar manner and pressed into the closest contact, both with the supporting circle of glass and especially with the fractured counterpart. By taking a due amount of care we eventually got all the pieces joined together in optical contact with each other. The superfluous balsam which had oozed through the junctions was removed by means of a bit of calico moistened with ether; and when the picture was remounted, placed in the lantern, and thrown upon the screen, in one part only could the fracture be visible, and that was so delicate as to appear like a hair accidentally stretched across the view, or, as one of the spectators observed, like a telegraph wire in the distance. The idea embodied in the above is that to which we now direct attention in its application to a fractured negative.

If there be a crack in the glass of the negative it will print a well-defined white line, especially if the printing be done in the sun. If a sheet of coarsely-ground glass be interposed between the sun and the negative the light will be so much diffused that the crack will not be offensively visible, although it will be perceptible as a sharp, thin mark.

To repair a fractured negative, obtain a plate of flat glass and give it a good coating (on one side) of a thick mucilage of gum arabic and glycerine. On this proceed to lay down the broken pieces of the negative, face upwards. The edges should be previously charged with the gum water, although as sparingly as possible, provided that they be perfectly coated. The pieces are now pressed into close contact, and a watchmaker's eye-glass should be employed to secure that perfect registration of the parts without which success can never be achieved. The portion of gum which will have oozed up through the joinings may be wiped off with a wet cloth after a certain degree of solidification has taken place.

If, instead of mounting the broken fragments of the fractured negative upon a sheet of plain glass it be done on the plain side of a sheet of *ground* glass, it will prove all the better; for, no matter how skilfully the junction of the broken pieces has been made, the resulting print is always better when it has been produced with a piece of ground glass intervening between the negative and the light. By the process we have here described prints have been obtained from fractured negatives which failed to indicate, even upon a rather close inspection, that anything had been amiss with the *cliché*.

A very successful professional photographer of our acquaintance has a fractured negative from which, at occasional intervals, he is called upon to furnish prints. This negative was "doctored" in the following way:—Some of the pigment known as "Indian red" having been rubbed down until it became very thin was carefully painted over the edges of the broken glass, which was placed face downwards on a sheet of plate glass, and each edge pressed into close contact with its legitimate *vis-à-vis*. When all the pieces had been properly put together a carefully-selected band of brown paper of close texture was thoroughly moistened with water, and when properly expanded was pasted, by means of starch, all round the margin. Before it had become dry the negative was adroitly turned round so as to present the other side up, which was secured round the margin in like manner by strong straps of brown paper similarly applied. These shrank when dry, and the fractured portions of the negative were thus kept very tightly pressed together. In the prints from this negative the fractures are represented by a delicate white hair line, which is very easily stopped out. The printing is, of course, done behind a ground glass.

Many other pigments will answer as well as Indian red; but our friend always succeeds better when an adiactinic colour is used than when he cements the edges by means of a perfectly transparent cement. In the latter case, the delicate joining visible is often represented darker than it ought to be, and, as of two evils the least should be selected, he prefers using a pigment which will, to some extent, stop the light. He has also perfectly succeeded by using China ink.

The paint should be one that will not dry rapidly, but remain moist for a sufficient length of time to permit the contractile power of the bands of paper, when drying, to force the edges in still closer contact, which could not be readily done were the pigment between the fractured portions dry and unyielding. Newman prepares slow-drying water colours, which, theoretically (we have not *tried* them for this purpose), should be more perfect than others with which we are acquainted, and we should undoubtedly employ these pigments in preference to all others. The mixture of a little glycerine with other common water colours render them better for this purpose.

Enough, we trust, has now been said to induce our readers to turn their thoughts to a subject which, perhaps, has not previously received much attention. Let this one fact be carefully noted —from a valuable negative which was broken in several pieces prints are now being obtained daily which, with scarcely any retouching, find much favour in the eyes of the picture-buying community.

PHOTOGRAPHIC SOCIETIES: STRICTURES ON THE WINSTANLEY PAPERS.

The influence exercised upon photography by means of societies, so far as expansion and popularity are concerned, is far greater than even its devotees themselves can imagine. These bodies are indi-

rectly leaders of photographic public opinion. Every photographer knows of, and can afford a hearty laugh at, the lady who, on ordering a dozen or two of *cartes* from her photographer, said to him—"I should like to have them done by some *negative* process of which I occasionally see something in the papers, and I don't mind even though it cost me a little more than if done in the usual way;" but, absurd though her speech be, it is a forcible illustration of the fact that the public does look after and take an interest in the reported transactions of photographic societies, even although that interest be not of the most intelligent or intellectual kind. Societies, therefore, may be considered as exercising an influence upon that somewhat large and important constituency—the photograph-loving and photograph-possessing public.

Fully aware of the influence exercised by a photographic society throughout the neighbourhood in which it is "located" (excuse a very convenient Yankeeism), and being a member of a society which, so far as I can see, is as good as any other, I have read with a considerable degree of care some "notions" which have been broached on this subject by Mr. Winstanley, of Manchester, and I will take occasion to make these a peg on which to hang a few observations.

First of all, there is one idea which runs through the remarks of Mr. Winstanley, and I would have been somewhat at a loss for a word by which to express it had he himself not supplied it. Between this gentleman and the Manchester Photographic Society there appears to be a strong antagonism, and his observations, although doubtless intended to be considered from an abstract point of view, are so decidedly local in their application as to lead to only one conclusion, viz., that, in virtue of the great "incompatibility" that exists between Mr. Winstanley and the gentlemen who compose the Manchester Photographic Society, the former has made his differences with or dislike of the latter body a stalking-horse on which to air certain opinions. In this persuasion I am not alone, for at page 342 I find that the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY have also adopted a similar opinion.

The articles of Mr. Winstanley *appear* to have been written by him when suffering under some real or fancied indignity imposed upon him by the Society with which he had been connected. That there is some degree of "incompatibility" existing between himself and that body I have no doubt; but whether he has evicted the Society from his fellowship, or the Society has expelled him from its communion, I care not here to inquire.

In the opening paper of the series on *Photographic Societies*, contributed by Mr. Winstanley, he gives much prominence to the alleged fact of his own "efforts at entertainment" as contrasted with the reading of only one other paper, which, according to him, "failed to excite discussion." So he says:—"Amongst not only provincial but also among metropolitan societies, both during and previous to the past session, papers have been in many instances earnestly and vainly asked for." Well, what of that? If papers are vainly asked for, what can it betoken other than this—that each of the members may be well "up" on one particular subject, very trivial in the member's own estimation, and which he may not deem of sufficient importance to expand into a "paper," but which, nevertheless, he would like to bring before his fellow-members, provided that could be done without the formality of reading a specially-prepared communication, which, from want of practice or from deficient education, the member in question may not feel himself justified in obtruding on the associated body. I know some members of societies thoroughly conversant with the practical details of the art who, if opportunity presented, could impart much information, and would willingly do so, but who would *not* respond to a specific invitation for a paper on any definite subject.

What argument against the present mode of admitting members does Mr. Winstanley draw from his own personal experience? He states that a dealer in photographic goods to whom he was known declined to give him an introduction to the Manchester Photographic Society, and eventually he was only admitted through the good offices of a gentleman to whom he was a perfect stranger! I do not think that the honest and fair inference from this would be flattering to Mr. Winstanley. Were I in such a predicament I should at once have written a letter to the Secretary, stating that I was desirous of becoming a member of the society, but, being unacquainted with any member by whom I could be proposed, request his friendly aid to enable me to accomplish the object I had at heart. Now, without claiming an extensive knowledge of the workings of societies, I venture to say that no secretary of any photographic society at present in existence would treat such an appeal with indifference.

Respecting the forms to be gone through previous to the admission of a member, it is, I think, quite necessary that there should be a proposer and seconder, and also a vote by ballot. Although I am slightly tinged with conservatism in politics, and, therefore, presumably opposed to the ballot in matters affecting the national body politic, I still think that there are occasions when such a method of electing members may be advantageously resorted to, and among these is the admission of members to a photographic society. There are photographers—aye, and journalists too, if I rightly understand public opinion—whose presence in a society would check, if not destroy, its prosperity, but who, in the absence of the ballot, might find in the easy, good-natured, but somewhat cowardly apathy of the members no bar to their election. A windy orator with an imperfect knowledge of the technicalities of the art-science, but opinionative, and possessing a fatal facility in the art of talking, would have it in his power to disgust men of sounder knowledge but fewer proclivities for speechmaking, and thus indirectly tend to seriously impede the usefulness of the society. Instances of this kind have been adduced, although happily not on our side of the border. What, in such a case, is to be done? Expulsion, I fear, is the only course to be adopted; "desperate diseases require desperate remedies."

Mr. Winstanley's knowledge of the working of the ballot is, I suspect, not so perfect as he imagines. If it be true, as he would have us believe, that in Manchester it secures the admission of those who are neither willing nor able to aid the society, nor, for the matter of that, desirous of paying their proper share of the society's expenses, I have only to say that the great cotton metropolis acts as no other town in Great Britain does. But, without meaning any offence to Mr. Winstanley, I do not think that any unprejudiced person can arrive at such a conclusion.

On the subject of reporting the meetings of societies, Mr. Winstanley's experience seems to be confined to a particular body, of which he was a member. *Ex uno disce omnes* is an excellent maxim in its way, but it will not apply to photographic societies. The utterances of the writer whose recent communications are now under review seem to be a mere record of grievances existing between himself and the body of which he was formerly a member. If he saw that he could not associate with the members in an amicable manner, his proper course was to resign. Each society has its "manners and customs," and there is scarcely one newly-admitted member who does not imagine that he can improve upon them; indeed, as a rule, those who are least conversant with the routine of societies' meetings are those who imagine they can effect the greatest changes in their constitution and modes of procedure.

I have been for a few years a member of a photographic society, and I have during that time read, somewhat critically, the reports of its meetings, and those of other societies which have appeared in the Journal; and, all things considered, I am inclined to believe that the reporting is, on the whole, well done. Mr. Winstanley advocates *verbatim* reporting with a view to terminate what I may designate advertising abuses, forgetful that it would only increase and intensify the evil of which he complains. As I have said, I think, as a rule, that the reporting of the proceedings of photographic societies' meetings is admirably done; and, in proof of this, I am glad to be able to cite an instance in which I was present at a meeting of a metropolitan society, reports of which appeared in this and another Journal, both of which agreed precisely, with slight verbal differences, and from which I obtained really a better idea of the opinions enunciated at the meeting than I had done from listening to the speakers themselves; and yet the reports were very far indeed from being *verbatim*—they rather presented a summary of what each speaker said, and I am pleased to have to record that the summary was a most admirable one.

When or where has the theological world demonstrated (according to Mr. Winstanley) the hope of reward and the fear of punishment to be the most useful instruments which can be employed among mankind for the cultivation of virtue and the suppression of vice? Low indeed must the nature be sunk who will be operated upon by such influences. "Virtue is its own reward;" and, if its fostering require the stimulus of public parade in the shape of a *verbatim* report, better that such virtue be left to "blush unseen" rather than court the "garish eye of day." If it be the idea of our author that a body of photographers can only be kept in a virtuous path by suspending over their devoted heads the threat of publishing their proceedings, he is lamentably mistaken. I am acquainted with photographers belonging to Manchester who deny *in toto* the justice of such an allegation as applied to them, and, from my own knowledge, I am equally prepared to deny it on behalf of other societies. Mr. Winstanley writes like a disappointed man—like one to whom the grapes have become sour—and, above all, like one whose experience of photographers and photographic societies is decidedly limited.

In conclusion: I think that, although it may exhibit an absence

of the customary formality, it will conduce to the benefit of a society if it be understood that in making remarks upon any given topic no member is expected to stand up. This will enable many members to offer off-hand remarks—perhaps of great value—who might object to formally standing up to do so, if, as advocated by Mr. Winstanley, the latter course were insisted on. There are numerous members of the photographic fraternity who possess a large fund of information which they would willingly place at the disposal of their fellow-members if they could do so without the ostentatious display involved in making a set speech. When the Edinburgh Photographic Society was formed it was understood that a member could make remarks while seated without showing disrespect to his fellow-members. This, I understand, is also the case in the North and South London Photographic Societies. A chairman who possesses sufficient tact will manage to "draw out" the members in making valuable observations of the unpremeditated description referred to, but who would be quite startled at the idea of standing up to utter even half-a-dozen words. I do not object to decorous formality in conducting the proceedings of a society. There is, however, an ostentatious formality which damps the spirit of every person brought within its influence, while, on the other hand, there is an apparent unforced kind of conversation which may be kept up almost without effort, but which may still be conducted with a real although not perceptible degree of punctiliousness. AN EDINBURGH PHOTO.

BI-COLOURED SLIDES FOR THE STEREOSCOPE.

WE last week made some observations on a communication on the above subject, which had been sent by Col. Sir Henry James to our contemporary, the *Athenæum.* The following has since appeared in that journal:—

COLOURED SLIDES FOR STEREOSCOPES.

MR. WILLIAM PINK, writing from Wimbledon, says—"In reply to a letter which appeared in your journal of Saturday last, respecting coloured slides for the stereoscope, I beg to say that I have one in my possession, a representation of shells coloured in the manner there described, *i.e.*, the two haloes of different hues, and which in the stereoscope blend together, which slide has been mine for the last seven years. The process mentioned by your correspondent is, therefore, no novelty."

Dr. Phipson, of the Laboratory of Analytical Chemistry, Putney, referring to Col. James's inquiry whether this is new, writes thus:—"About twelve years ago I saw, in Paris, stereoscopic slides (card slides) the images of which were vividly coloured in the various *complementary* colours. For instance, one proof, which represented a marble statue, had one of its images *red* and the other *green.* In the stereoscope these two colours disappear, and the image appears white."

Mr. Stroud L. Cocks, writing on the same subject, says—"Charming sunset and moonlight effects may be produced by simply interposing between the light and the transparent view slips of crimson or pale blue glass; fresh beauties are always apparent, especially in the views of Alpine scenery. I have also applied this mode of tinting to photographs, when exhibited in the oxycalcium lantern, and with excellent effects."

EXPERIMENTAL ILLUSTRATIONS OF THE MODES OF DETERMINING THE COMPOSITION OF THE SUN AND OTHER HEAVENLY BODIES BY THE SPECTRUM.*

By PROFESSOR W. ALLEN MILLER, F.R.S.

ONE of the most important features of the age in which we live is the rapid manner in which man's knowledge of the powers and properties of the different substances around him is being extended. We behold, on all sides, an extraordinary growth of what is called *physical science,* and we witness everywhere the increasing command which this increased knowledge gives to man over the materials of which this globe consists.

I shall devote the time which we are to spend together this evening to an illustration of some of the modes in which this mastery of mind over matter is to be obtained, and in this review shall draw my examples mainly from the striking achievements recently performed in the application of optics to chemistry, usually described under the term of spectrum analysis. Marvellous as are many of the revelations of science, it is to be noted that the methods of their discovery may generally be resolved into the application of ordinary observation to the objects to be examined. The distinction between ordinary and scientific observation is, indeed, merely in the degree of its accuracy. The man of science is perpetually contriving means to render his observations strictly accurate, and to reduce them, whenever it is practicable, to a form in which their results may be represented by weight or by measure.

* Professor Miller having carefully corrected the published report of his important lecture to the working men of Exeter, delivered during the recent meeting of the British Association in that city, has courteously handed it to us for publication.—EDS.

To take a familiar instance: there is, perhaps, no great difficulty, even to those unfamiliar with science, in believing that sound is produced by the vibratory motions of the sounding body conveyed by the air to the ear, since, when a harp string is suddenly stretched, or the cord of a piano is struck, a tremulous motion of the string is seen to accompany the sound thus produced; and as the motion becomes less visible the sound gradually dies away. It is not difficult to render these motions distinctly visible to a large audience, as I intend presently to show. What, now, is the exact distinction between a mere noise and a musical note—between harmony and discord? A noise consists of the recurrence of sounding vibrations at irregular intervals; whilst every musical note is produced by its own particular number of vibrations, which recur at perfectly equal intervals. Several contrivances exist by means of which the number of these vibrations which occur in a second of time can be counted. It has been thus ascertained that the higher or shriller the note the more frequent are the motions by which it is produced. A simple expedient will enable us to show the number of vibrations of a note—say the treble C of the piano—and to prove that this note is due to twice as many vibrations in a second as are necessary to form the middle C, or the octave immediately below it.

Here are two tuning-forks, one of which, when caused to vibrate, emits a note which is an octave higher than the other. Attached to one of the prongs of each fork is a needle which partakes of the motions of the prong. If a piece of smoked glass be drawn across the points of the needles when the forks are not sounding, the soot will be scratched off the surface of the glass in the form of two straight lines, the image of which may be thrown upon the screen by means of a strong light. But if the tuning-forks be made to sound by drawing a violin bow across them, a second piece of smoked glass will then show not two straight, but two zigzag lines; and the line produced by the shriller note will exhibit just twice as many notches as that caused by the other fork. In a similar manner it might be shown that the intermediate notes are produced by vibrations of intermediate frequency, a definite number being required for each note, as may be seen in the table which exhibits an octave of the musical scale. The curves produced by two notes sounded at the same moment may fit into each other at certain definite intervals. In such a case we may have a harmonious combination; whereas, when the curves do not so fit, a discordant combination of sounds is the result. The vibrations of a tuning-fork, or other sounding-bar, are transmitted to the ear through the air, which is thrown also into wavelike movements, the waves of sound being longer in the lower and shorter in the shriller notes. In the treble C of the piano, which is produced by 512 vibrations per second, the waves that it occasions in the air are two feet long; while in the C of the octave below the number of vibrations is 256, or just half, and the length of the aërial wave is four feet, or twice as great.

The effects produced by vibration are not limited to those of sound. The still more remarkable phenomena of light and heat are connected with movements of this kind of intense rapidity, the frequency of which is so great as almost to baffle belief, from 35,000 to 70,000 such waves being contained in the space of a single inch in the case of light.

It has been concluded from experiments, into a description of which time does not permit us to enter, that in all substances which give out light of their own—such as a piece of lime intensely heated in a jet of burning gas, or a rod of charcoal glowing in the extreme heat produced by a current of electricity excited in a powerful voltaic battery—the particles of the solid are in a state of inconceivably rapid vibration, and that these vibrations are transmitted to the eye by means of some infinitely subtle medium, termed "ether," which fills all space and the interstices of matter, and which, though not light itself, when thrown into vibration by a luminous object excites in our eyes the sensation of light, just as the air, though not itself sound, yet, when thrown into vibration by a sounding body, excites in our ears the sensation of sound.

I will now by means of the voltaic battery ignite a piece of charcoal very intensely. The light thus produced will occasion a series of intensely rapid vibrations in the portion of ether contained in this room, and these will pass off in straight lines in all directions from the white-hot charcoal. If the charcoal be enclosed in a dark lantern I can allow a portion only of its light to escape into the room, and can direct it at pleasure into any part by using a small mirror or flat polished surface. The opening by which the light escapes is, in this instance, a narrow vertical slit. You will observe the light is of a pure white. I propose now to show you another property of light, and to prove that white light consists of a mixture of several different colours. If the slice of light which issues from the lamp be allowed to fall upon a clear plate of glass with flat faces parallel to each other, the light will pass through the glass without undergoing any apparent change either in colour or its direction; but if it be allowed to fall upon one of the faces of a piece of glass cut into the form of a triangular bar or prism, we shall have a very different result. The light will be abruptly altered in its direction as it passes through the glass—it will be refracted, as it is said; and now the beam of light, instead of falling upon the screen as a slice of white light, will be spread out into a ribbon of gorgeous tints, the brilliant hues of which will graduate insensibly from red into violet. The red end of the beam of light which is least altered from its original direction is said to be the least refrangible; whilst the violet, which has experienced the greatest change, is said to possess the greatest

amount of refrangibility. As this word "refrangibility" is one which I shall have often to use, it is necessary that you should distinctly understand what it means, namely, the degree to which any ray is suddenly bent from its original direction by the action of the prism.

Such a coloured image constitutes what Sir Isaac Newton called the "prismatic spectrum." He varied this experiment in a great number of ways, and concluded that white light consists of a mixture of various colours like those of the rainbow. By recombining these colours the original white light is reproduced. This may be done by sending it through a second prism placed in the opposite direction to the first.

The action of the prism which we have just examined is to open out the colours of which the white light consists into a fan of coloured light, so that, instead of perceiving a single white image of the slit, a series of images is obtained of every shade of colour. Each image possesses its own special degree of refrangibility and its characteristic tint, whilst each overlaps its neighbour on either side, so that the whole forms a continuous and beautiful blending of harmonious hues, commencing with red and ending in the violet. What the pitch of a note is in sound, such is colour in light. The undulations of the ether are longest and slowest in the red and shortest and most rapid in the violet, with all degrees of intermediate frequency between. We may say that red is the bass and violet the treble of colours.

Few things in the progress of science are more remarkable than the manner in which discoveries in one branch of inquiry often prove of the greatest importance to the advancement of other branches of knowledge with which they appear, at first, to have no connection. A striking instance of this kind occurs in the manner in which optical science has aided the studies of the chemist. By means of chemical analysis it has been discovered that the various substances which are found upon the earth may be separated into a comparatively small number of bodies, out of each of which no other kind of matter but its own may be separated. These the chemist terms "elements," and out of these all the different substances with which we are familiar are formed. For instance, the air we breathe is composed mainly of a mixture of two such elementary bodies, viz., the gases oxygen and nitrogen. Water consists of oxygen chemically united with the gaseous element, hydrogen; and among the elements are the various metals—gold, silver, iron, copper, magnesium, sodium, and so on. These different substances the chemist distinguishes from one another by means of certain chemical tests. For instance, I may, by the addition of ammonia to this solution, find copper by the beautiful blue tinge produced. In like manner I may, by the white cloud occasioned on adding common salt to a second vessel, ascertain the presence of silver; while in a third the presence of iron is not less certainly revealed by the red colour produced on adding sulphocyanide of potassium. Within the last few years optics has come to the aid of chemistry in a manner which I must now endeavour to explain.

We have seen that this spectrum of glowing charcoal is *continuous* from end to end. Provided that the ignited material be a solid, its chemical nature has no influence upon the colour of the light which it emits. Whether, for example, the heated body consists of lime, magnesia, flint, clay, charcoal, iron, or platinum, so long as the substance is in the solid form a continuous spectrum is obtained, containing rays of every degree of refrangibility, and of every colour, from the deepest red to the extreme violet. The spectrum of an ignited cloud of solid particles, such as that produced by soot or any solid suspended matter—such as phosphoric anhydride when phosphorus is burned in oxygen gas—is also continuous. The same continuous spectrum is also produced by a white-hot liquid, such as melted copper or cast iron, and no difference dependent upon the chemical nature of the substance can be perceived in any of these cases. Such spectra, therefore, teach us nothing of the chemical composition of the bodies by which they are produced.

But the case is very different when the spectrum of a gaseous body is examined. Then we have an *interrupted* spectrum, composed of bright lines of light of certain colours only, with intervals between them more or less completely dark. Whenever an interrupted spectrum composed of bright lines is seen, we infer that we are dealing with the spectrum of a transparent gaseous body in a state of intense glowing heat. Each gas or vapour emits light of a particular kind, which is collected into a line or group of lines peculiar to itself. If the position of these lines be accurately measured, it is found that the same substance always gives rise to lines which occur invariably exactly in the same part of the spectrum; hence these lines may be made use of as tests of the particular substance by which they are produced. I showed you just now chemical tests of silver, copper, and iron. Now, let us look at the optical tests, which are not less certain. Silver, for example, when heated sufficiently to distil it in vapour, emits a brilliant green light, which is mainly concentrated into two intense green bands, the other part of the spectrum being produced by the charcoal on which the silver rests. Copper also emits a green light, but this is seen to consist of a mere complex system of bright bands. Iron, when volatilised at a still higher heat, in like manner gives a light with a system of bands still more complicated and numerous. Magnesium likewise furnishes an intense green band, which is really composed of three so closely approaching each other as to appear on the screen but one. Each metal and each chemical element has, in fact, its own special set of bands. Each when converted into vapour vibrates in a definite way, producing a special set of luminous vibrations of fixed frequency, just as when a particular tuning-fork is struck it occasions a series of waves of sound which occur with the particular frequency characteristic of its peculiar musical note. If, therefore, we can determine with accuracy the position and number of lines from the spectrum of each chemical element, we can at once recognise its presence whenever we see its light, by simply measuring the position of these lines.

Why, then, does a substance when in the solid or the liquid form not produce a spectrum like that which it furnishes in the gaseous state? Bodies when in a solid or liquid form are tied together by the attraction of their particles, and consequently their vibrations are those of the mass, not those of their constituent atoms; whereas, in the state of gas or vapour, their constituent particles are widely separated from each other, and each is free to move independently of the rest. You will now easily perceive that this optical method of analysis enlarges the field of our inquiries to an extent which is really incalculable. Not merely can we, by looking through a prism into flame, in the midst of this flame, ascertain that silver, or iron, or both, are there. If I were to carry my apparatus to the top of Halden Hill whilst you remained below, you would still be able to recognise the metal, be it what it might, which I was distilling in the voltaic arc. Nay more, look into a furnace at any distance that you please through a prism, you may interpret the chemical changes that are occurring within its flame; and the same method of observation may be extended to the outburst of a volcano, or beyond the limits of the earth, to the light of the sun, to the faint beams of the stars, and to the almost imperceptible haze of the nebulæ studded here and there through the boundless fields of space.

Do not, however, suppose that the foregoing observations comprise all that is needful to enable you to interpret all these wonders. Up to the present time I have shown you two kinds of spectra, viz., the *continuous* spectrum, characteristic of the light of a glowing solid, or liquid, or cloud, consisting of glowing solid particles, and the *interrupted* spectrum, composed of the bright lines which distinguish the spectra of glowing gases or transparent vapours. Besides these there is a third kind of spectrum more remarkable than either, consisting of a luminous spectrum crossed by black lines. The three different forms of spectrum are exhibited one under the other in the diagram to which I now direct your attention. If an intensely luminous solid be viewed through a gas less intensely heated a very singular result is obtained. The spectrum of the gas is seen as well as that of the solid behind it; but the gaseous spectrum is reversed—that is to say, the lines of which it is formed, instead of being bright, are *black*, as is shown in the third figure of the diagram, where the bright lines of sodium of magnesium are seen as black lines in exactly the same position as those occupied by the bright lines when no spectrum of the solid is behind. How are these black lines produced by thus adding light to light? Instances are not wanting in which sound added to sound produces silence, the waves interfering and neutralising each other. But the disappearance of light in these black lines is not due to this cause. In the case of these black lines it arises from the circumstance that a body which is emitting light consisting of vibrations of a definite degree of frequency can absorb those portions of the light of other bodies which possesses a corresponding rate of vibration, and can then radiate it forth anew in all directions, much in the same way as a tuning-fork produces a resonance when held opposite the mouth of a box which contains a column of air of such a length as to vibrate in unison with itself, though it produces no such resonance when held opposite a box which does not vibrate in harmony with it. The air in the resounding box first absorbs and then gives forth the vibrations of the fork with which it corresponds.

In the case of sodium, for instance, the vapour of this metal absorbs the light of that particular portion of the spectrum of the body behind it which corresponds with it in its rate of vibration, and it allows all the rest of the light behind to pass on unaffected.

If the sodium vapour is at a considerably lower temperature than the body behind, the absorbed rays will elevate the temperature of the metallic vapour somewhat, and will cause the sodium to give out a light which is a little greater than that due to the sodium alone. But it is considerably less than that which would be produced by the continuous spectrum of the body behind it, and the result is that when the combined image of the two spectra is thrown upon the screen, we obtain what appears to us as a black line; but it really is a line of low illuminating power, which, being contrasted with the intense light of the spectrum on either side, produces upon our eyes the impression of a black line. *(To be concluded in our next.)*

ACCIDENT TO A PHOTOGRAPHER'S ASSISTANT.—Emma Pack, aged 18, has been taken to St. Thomas's Hospital, suffering from frightful injuries about the head and shoulders, caused by burns. She was employed by Mr. Fawn, photographer, Walworth-road, and while engaged in cooking the dinner was seized with an epileptic fit, and fell on the fire. Her master ran to her assistance and strove to extinguish the fire, but in doing so was severely burnt about the hands and arms as to render it necessary for him to become an out-patient of St. Thomas's Hospital. The poor young woman is not expected to recover.

Contemporary Press.

THE GRAPHOTYPE.

[Art Journal.]

An article in a recent impression of *The Times* sets forth the merits of the process known as "graphotype," and discusses the certainty of its superseding wood-engraving. From the general tone of the notice it might be inferred that some great advance had been made in this art; yet it seems to have been written only under the impression that the graphotype was a late invention. It has been described more than once in these columns, and ample justice has been done to its deserts. It is one of several discoveries that have from time to time been put forward presumedly to supplant wood-engraving, but which have all turned out to be failures. In these days every means that presents a surface in relief at all available as uniting with letterpress, reproducing a design, is pressed into the service of *quasi*-illustrated literature. The embellishment of lower-class periodicals has brought forward a school of designers who have never learnt even the alphabet of art. Engravings on wood are among the most beautiful of fine-art productions, and for the accomplishment of a creditable example of this department the labours of two educated artists are necessary. The countless illustrations, so-called, that are scattered broadcast through the country offer for their utter baldness no apology either of happy invention or power of hand. We find continually in painting beautiful sentiments marred by ineffectual translation; but in the productions to which we allude, there is no grace that can be abused by unfeeling execution; the ideas are coarse and puerile, and any executive refinement would be a cruel exaggeration of their wretchednesss. Thus, the continually-increasing demand for cheap illustration has drawn largely on the ingenuity of both artists and chemists, but may not have exhausted it. Wood-engraving has been regarded as a legitimate means of book-illustration, and it is inconceivable that its delicacy and beauty will ever be transcended. In the issues of such art there will frequently be a diversity of conclusion between the designer and the engraver; but, when they agree, the former can have no more charming translation of his work than the version produced by the latter. In the *Art Journal* (March, 1866) several proposed substitutes for wood-engraving are passed in review; but, after a patient consideration of the merits of each, all were dismissed as inadequate to fulfil the uses of wood-engraving; what was especially meant was that none could represent the gradation scale of a delicately-finished drawing. One of the proposed substitutes is known as the "graphotype" process, and of its quality an example was given in the January number of 1866; but the extreme coarseness of the print gives it no place in the race with wood-engraving.

The announcement of any branch of art presuming to render into black and white, and thus multiply the essays of painters and designers, has been welcomed by us, and during the last thirty years not a few of such schemes have been noticed by us. Of these, the bulk has perished for want of the vital essentials of merit and available utility. Others have maintained an obscure and languid existence through their applicability to the rendering of coarse drawing and design, the poverty of which is the more palpable in proportion to the clearness of the reproduction. Most of them it has been our province to describe, both as to mechanical process and their probable utility; we abstain, therefore, on this occasion from a tedious recapitulation of processes productive of printing surfaces in relief. In the elaborate article which appeared in *The Times* the graphotype is spoken of as "identical in principle with the process which it more especially aims at—supplanting that of the wood-engraver. Whether it be drawn on the wood block or on a prepared surface, or on the material supplied by the Graphotyping Company, a subject is drawn upon a prepared surface, and the problem to be solved before that subject can be made available for the illustration of a book or a periodical is how to get rid of the parts of the surface that are blank, at the same time leaving the dark parts standing out in relief." This is the vulgar difficulty which stands as an obstacle to the finish of every presumed substitute for wood-engraving; and wherever the intervention of the hand is necessary to work out the lights of a drawing there can be neither tint nor gradation. In the graphotype productions which we have seen there has been a prevalence of extreme lights and extreme darks, with, necessarily, an entire absence of breadth. The writer in *The Times* asserts that the change which is coming over the world of engravers is certain, thus assuming that the graphotype will supersede wood-engraving; at the same time it is said that "for the rougher work of maps and diagrams of engines and architectural drawings, the graphotype is not only available but admirably adapted." This seems to us precisely that for which the process is suitable; it puts forth for itself no claim to the distinction conferred on it in *The Times*, wherein it is also asserted that where "force of outline makes up for delicacy nothing could be better." By this and other similar arguments the writer destroys his assumption that the graphotype will supersede wood-engraving; moreover, the fact is not understood that the process is finite; it does not appear by what means it can progress. Yet, weary though we are of recording and describing resources which do not in anywise respond to the high hopes of their inventors, we will, in order to ask one or two relevant questions, epitomise this method of reproducing drawings. It is not in *The Times* stated to be a novelty, but it seems to be considered as such. The printing surface is obtained by facing a metal plate with finely-pulverised chalk by means of a powerful hydraulic press. The action of the press imparts to the chalk a surface like that of an enamelled card, and this is rendered still more compact by a coating of size. On the plate thus faced the drawing is made with a kind of ink purposely prepared. In this there is nothing extraordinary; that which raises the process high in the scale of art-curiosities are the means by which the lights are obtained, or rather the drawing is made into relief tracery. This is simply effected by brushing away those parts of the surface on which the lines and touches of the drawing do not appear; and when the superfluous chalk has been brushed out and the tracery indurated by some chemical application, the plate is ready for its work. It does not appear that the writer in *The Times* is familiar with drawings on wood before they are cut. Of those, however, who may be accustomed to see such drawings, we ask how a delicate sky tint laid in with Indian ink, and gradated with Chinese white, would be worked out in a graphotype plate? We have seen nothing in any graphotype design presuming to approach the delicacy and softness of a carefully-finished wood-engraving. The progress that is required in graphotype work is in the direction of refinement, if its inventors really hope that it will even range up collaterally with engraving on wood. But the process is very definitely limited, and any divergence will constitute a new art or rather mechanical formula. A wood-engraving should be a product of two artists. It is not uncommon to find these two artists differ *toto cœlo* as to the subject on which they are engaged. If the draughtsman be indifferently seconded, there will naturally be the complaints we so frequently hear. But it may be that the engraver is the better artist of the two; in such case, he may take such liberties with his work as may save the reputation of his *collaborateur*. For the graphotype there are no such chances. Its proprietors describe it as a rough and ready process equal to surface-printing in certain directions, but there is no ground for the assumption that it will ever take the place of wood-engraving.

Graphotype work is admirably adapted for many classes of productions; and, employed in the proper direction, it ought to be a source of profit. But it is inconceivable that a delicate drawing can be rendered in graphotype—the more so since its last essays are no better than the first; and to those who are acquainted with the process it is not very intelligible how it can improve in delicacy.

THE NEW LIGHT.

[Scientific American.]

Our readers have been made acquainted from time to time with the progress of a light called the "oxygen light," probably for want of a better appellation. The principles upon which this light is based were stated in our report of the lecture delivered by Professor Doremus before the American Institute last winter.

To save our readers trouble, we will, however, recapitulate the features of this improvement. The well-known calcium or Drummond light was produced by directing a jet of mixed oxygen and hydrogen upon a pencil of pure lime, the gases being conveyed in separate tubes or pipes to within a very short distance from the aperture through which they were delivered, and then flowing together and mixing in very minute quantity before combustion took place. This arrangement was adopted to secure safety, as these gases being mixed in the proportion of two of hydrogen to one of oxygen—the proportions best adapted to produce good results—form a very explosive mixture; and, as their combustion does not depend upon any external substance, the flame may, upon the removal of pressure, run back through a single tube containing the mixed gases to the receptacle where they are stored and produce serious disaster.

The substitution of the common street gas for the pure hydrogen was found, while more convenient, to not greatly diminish the illuminating power. Oxygen was, however, until the discoveries of Tessie du Motay and Marechal, an expensive gas to obtain unmiexd, and the Drummond light was, therefore, only employed upon extraordinary occasions, its expense precluding its general and popular use.

The eminent scientists above named found that the salt called "manganate of soda" absorbed large quantities of oxygen under ordinary circumstances, and discharged it again when subjected to the action of superheated steam. By this means oxygen can be obtained sufficiently pure at a price, we are informed, not exceeding one dollar per thousand cubic feet.

In the attempt to render this cheap oxygen in connection with the cheap street gas available in application to popular use, it was found that something more durable than the lime pencils was necessary. Pencils of magnesia were substituted, and, subsequently, of the oxide of zirconium; and the light produced by the ignition of these materials is undoubtedly the most brilliant and powerful light ever produced at a rate which could render its popular use practicable.

The following objections have been made to this light, namely:—The increased expense of the double service-pipes required; the want of diffusiveness in the light, which, although powerful as we have stated it to be, is asserted to penetrate rather than illuminate the surrounding

space to a great distance; and, lastly, the danger which would attend the introduction of inodorous explosive gases into dwellings.

The expense of the service-pipes is by no means a serious objection, as the cheapness of the light, if we accept the statements of those best informed with regard to it, will render the introduction of the service a very profitable investment.

The want of diffusiveness is an objection which only applies to the lighting of streets, squares, and parks; and we have shown in a previous article that this most probably arose, in the trial of this light in London, from placing it too low down. Any light requires for its proper diffusion a refracting and reflecting medium, and it would be easy to show, by a diagram, that the lower a light is placed the more of its rays will reach the ground and be absorbed without the possibility of reaching to remote distances.

The objection made by the English journals in regard to the danger of introducing these gases into dwellings will be found to vanish upon even a superficial examination.

Oxygen and hydrogen mixed in the proper proportions are violently explosive; so is a mixture of common illuminating gas and air; nevertheless the gas now in general use is admitted to be the safest illuminating material ever generally adopted. But the latter has so strong an odour that it cannot escape, even in small quantities, without being detected. It would not be difficult to mingle with the oxygen some odoriferous gas which would be wholly consumed in the ordinary course of burning, and the presence of which would evidence any leak in the oxygen pipe. The street gas pipe would, as now, betray any leaks by the odour. Lastly, that any explosion may take place, both pipes must simultaneously leak at approximate points—a contingency so remote that it does not seem very frightful. We believe these gases may be carried into buildings with perfect safety, and that the increased purity of the air in rooms lighted by this method would be alone a full compensation for all its drawbacks, real and imaginary.

We were present at an exhibition of this light at the works of the Oxygen Gaslight Company, in Forty-first-street, in this city, on the evening of Sept. 15th. Several experiments were given by Prof. Doremus illustrative of the practical value of this light for public and private use. We were a little surprised and much pleased to see so complete an establishment, upon which has been already expended, we were informed, one hundred and twenty-five thousand dollars.

It appears to us that a new light is about to break upon this benighted world. Certain it is that the time has come when some advance in the method of artificial illumination is imperatively demanded, and we certainly see no valid reason why this improvement cannot be generally adopted.

Our Editorial Table.

Description of the Great Melbourne Telescope.
By T. R. Robinson, D.D., F.R.S. and Thos. Grubb, F.R.S.

This great masterpiece of optical art has been described in this Journal at various stages of its progress, and lunar photographs obtained by its means have been reviewed by us. We have now before us a complete description of the huge telescope, copiously illustrated by nine full pages of beautifully-finished engravings. This treatise is a reprint of the communication submitted to the Royal Society, under whose auspices the work was undertaken on behalf of the Government of Victoria, and it contains an accumulation of matter of the greatest possible value and interest to the physicist. In the opening observations we at once meet with a few remarks on some of the recommendations of the Council which cannot fail to interest many of our readers. For example:—

"The Committee recommend a four-feet reflector. No doubt a six-feet would be preferable; but it would be five times as expensive, and the execution of it thrice as difficult. On the other hand, two of them were familiar with what Lord Rosse's three-feet performed, and were thus able to say with confidence that an instrument of nearly twice its power would be amply sufficient for the work proposed. Two of the Committee wished for a five-feet, but some fears were entertained that it might be difficult to mount it on a thoroughly effective equatorial, and they decided on the safer course. It has, however, turned out that this caution was not necessary, for the actual mounting is strong enough to carry a five-feet, should it ever be required.

"They preferred the reflector to the achromatic; and with good reason. It is not probable than an achromatic can ever be made which shall have as much light as a four-feet reflector; and, if it could, the cost of it would be tremendous. The late M. Merz, when consulted by one of the Committee about a thirty-inch achromatic, expressed much doubt as to the possibility of making one; but added that, if it were practicable, the cost of the object-glass alone would be from £8,500 to £9,000, and that the equatorial complete would not cost less than £20,000. What would the equivalent of a four-feet cost? Erroneous, I may even say absurd, opinions are often expressed as to the relative power of these two sorts of telescopes. Thus Fraunhofer says specula reflect 'an exceedingly small quantity of light.' Even the elder Struve seems to think that the Dorpat achromatic, 9·58 inches diameter, 'may rank with the most celebrated of all reflectors, namely, Herschel's.' He cannot mean the 'most celebrated one,' that known as the forty-feet; but if we even suppose him to speak of the eighteen-inch front view, the statement is preposterous. A speculum reflects 0·64 of the incident light after being many years in use, and even the Newtonian with its double reflection gives 0·401, allowing for that intercepted by the small speculum. And the achromatic does not by any means transmit all the light that falls on it. Light is lost in it from two causes:—First, from the reflection at the four surfaces of the lenses. This can be calculated *accurately* from Fresnel's formula, which gives that for two surfaces of crown ($\mu=1·521$) the transmitted light $\varrho^2=0·9164$; for two of flint ($\mu=1·662$) $\varrho'^2=0·8842$; and for the four $\varrho^2 . \varrho'^2=0·8122$. Hence it is easily inferred that even if its glasses were perfectly transparent, the aperture of an achromatic would be to that of its equivalent Newtonian as 1 : 1·42; or, in other words, one equivalent to the four-feet Newtonian cannot be less than 33·73 inches. But it must be much more; for, secondly, all glass absorbs a portion of the light which passes through it. The law of this transmission is $I=e^{-nt}$, I being the intensity of the emergent light, t the thickness of the medium, and n a constant depending on the nature of the medium and the colour of the light. In optical glass it may be supposed the same for each ray. The form of the equation shows that the intensity diminishes very rapidly as the thickness increases; and since this last is as the diameter of the object-glass, we shall soon come to a size which will not have more light than a Newtonian of equal aperture."

Passing over the allusions to the lattice-work construction of the tube, and the class, or order, to which the telescope should belong (the Cassegrainian), we find the following remarks on the merits of speculum metal *versus* silvered glass as the material of which the great mirror should be made:—

"It was decided that the great speculum should be of metal, not silvered glass. The Committee were unwilling to risk the success of the noble work entrusted to them by venturing on an experiment whose success on so large a scale was very uncertain. All the telescopes which have been made on this latter plan are, they believe, with one exception, of which little is known, not larger than twelve or fifteen inches. When it is a question of forty-eight inches several difficulties present themselves which at present cannot be solved. Such a speculum must be of considerable thickness to keep its shape; it would be no easy matter to manufacture so large a block of glass, which must be homogeneous in structure and well annealed—the latter to prevent its breaking in working; the first because otherwise it will expand unequally and change its figure. Nor is it known whether a silver film of uniform thickness (which according to Foucault is essential) can be deposited over so large a surface. And there are two still more decided objections. Glass, though rather less than half the specific gravity of speculum metal, somehow seems more liable to abnormal flexure. One of these silvered specula, apparently of uniform thickness and consistence, has been found to give a good image with one diameter vertical and not with another; and they all require the utmost precaution in supporting them. This doubt has recently been confirmed, for one of the small specula of the Melbourne telescope, which will be described hereafter, is glass eight inches in diameter; yet even though so small it gave bad images while it was mounted as the metal ones were which acted perfectly, until its edge pressure was uniformly distributed. Secondly, there is not the great increase of light which was expected from the high reflective power of polished silver. By Jamin's experiments solid silver reflects at perpendicular incidence 0·93 of red light and 0·87 of indigo, while speculum metal gives 0·69 and 0·60. But the silver film which is deposited on the glass is much inferior. Lord Rosse, who expected considerable gain from using it as the small speculum of his six-feet, found that it only gave 0·67. Part of this deficiency may arise from its molecular condition, but more arises from its being partly transparent to the more refrangible rays of the spectrum, which it transmits so freely that Foucault proposed and used this silvered glass as a shade in solar observations; for this reason, also, the images will be tinged with red. The silver film would tarnish faster than the speculum metal; and though, on a small scale, it is easily renewed, the manipulation of a speculum of such size, and probably of five hundred weight, would present considerable difficulty. Nor is it impossible that the film might break up under considerable changes of temperature, such as occur at Melbourne, or be spotted by rain or dew."

After all the details had been decided upon, and the contract signed, the necessary preparations for the construction of this famous instrument were urged forward. An important, if not the most important, part of the contract was evidently the construction of the large specula (there being a duplicate). On the subject of the nature and composition of speculum metal employed we read as follows:—

"It is that of Lord Rosse, four equivalents of copper to one of tin; it possesses more power of resisting tarnish than those which deviate a little on either side of this proportion, and is probably as reflective as any. The liability of good speculum metal to tarnish has been much exaggerated. I have elsewhere given some proofs of this, and may add

that there is at the Armagh Observatory a six-inch Gregorian, by Short, bearing the date of 1745, which is nearly as bright as at first. As to this Mr. Lassell and Mr. Warren De la Rue are good witnesses, especially the latter; for his thirteen-inch showed no signs of tarnish, though it was for several years exposed to the influence of photographic chemicals, some of which are very bad neighbours for polished metals. Like most other brilliant metals, not excepting silver, it reflects the less refrangible rays in greater proportion than the others, which give stars a tendency towards red or orange in reflecting telescopes. This, perhaps, may not be the case with an alloy proposed by the Rev. William T. Kingsley, who adds to the above compound one-fourth of an equivalent of zinc. A small piece of this with which that gentleman favoured me is so white that, though in uncertainty as to its permanence, I did not venture to propose casting a large speculum of it. Mr. Grubb has thought so well of it that he has tried it in a duplicate small speculum of eight inches, which will test its endurance.

"From the great difference between the melting-points of copper and tin, and the great liability of the latter to oxidation, the alloy is generally formed by pouring the tin into the melted copper, stirring them, and rapidly casting into ingots. The alloy fuses at a far less heat than the copper, and the castings made from the second melting are supposed to be less porous. Pores, I believe, are never totally absent; it seems that the alloy absorbs gases at a high temperature, as is notably the case with silver and copper and, as has lately been shown in some remarkable instances by Graham, for some other metals. Copper when so charged with oxygen is brittle, and it is made marketable by 'poling'—stirring it while fluid with a pole of dry wood, the carbon and hydrogen of which combine with this oxygen as they bubble through it; and the same process has been found to lessen considerably the porousness of speculum metal. All these precautions were taken here."

After a lucid description of the casting and cooling of the speculum—the latter occupying no less a period than twenty-four days—we come next to some descriptive remarks on the polishing of the surface:—

"Difficult as it is to obtain a sound disc of good speculum metal, it is even more so to give it the figure required to form a perfect image combined with a fine polish. The accuracy of the finest cutting-tool that was ever devised falls almost infinitely short of what is wanted here, which can only be obtained by the mutual abrasion of two surfaces working in contact. Yet it is not at first evident how such abrasion can produce anything but a spherical figure, which is quite unfit for a speculum; for one might expect that the acting surfaces would wear into uniform contact and, therefore, uniform curvature. But both the speculum and its polisher are elastic, and allow the contact to continue notwithstanding a minute difference of curvature; how minute appears from this, that even at the edge of one of these four-feet specula the distance of its parabola from the circle is only 0·000106.

"This being possible, we can increase the abrasion at various parts of the surface till the desired figure is attained. For a long time it was believed that this could only be successfully done by the hand *feeling* the action; but Lord Rosse found that it could be performed as well and with more certainty by machinery. In this he has been followed by others, and though their methods differ the general principle is the same. The speculum revolves slowly on its axis, while the polisher traverses it more rapidly, describing a track which is some continuous curve, and crosses it in every possible direction, not returning to the same place till after a great number of revolutions. In Lord Rosse's machine the motion is the resultant of two nearly rectilinear and at right angles, one of less and of much slower period than the other. Latterly he reverted to an earlier plan of his own, and used a motion which is nearly elliptic. He also surrounded the speculum with water of a given temperature. Mr. Lassell and Mr. Warren De la Rue use an epicycloidal motion, given by a mechanism like that of Suardi's pen, which is very effective. Mr. Grubb, many years ago, made one which combines the power of both of these, but gave it up for the simpler one described here, which is remarkable for the precision and smoothness of its action."

The instrument has nine Huyghenian eyepieces, with powers ranging from 220 up to 1,000. Our readers are already aware that the Great Melbourne Telescope is not merely a telescope but is also a photographic instrument.

"It seemed to the Committee that the instrument would be incomplete without a photographic apparatus and a spectroscope, and they ventured to add these on their own responsibility, sanctioned by the opinion of the President and Council. Some photograms of the moon and stars taken with a temporary apparatus were considered by the highest authority in this matter, Mr. Warren De la Rue, to be of such good promise that they directed a very complete one to be provided similar to the one used by that astronomer, with only such modifications as the great bulk of the telescope makes necessary."

We had nearly omitted to state that the instrument is fitted with a spectroscope worthy of its character.

In conclusion: we trust that this noble specimen of optical work will add much to the existing store of knowledge connected with the heavenly bodies which have so wonderfully accumulated during past years, and that Mr. Grubb, its talented constructor, will be spared to hear of many achievements in astronomical science effected through its agency.

Portraits by A. E. Lesage, Dublin.

Before us lie some duplicate copies of a large collection of portraits of bishops and other men of eminence connected with the Roman Catholic church in Ireland, registration of which has been effected during the last fortnight. Mr. Lesage appears determined to form a most complete photographic gallery of living Roman Catholic ecclesiastics, the collection embracing cardinals, archbishops, and bishops, together with a few of lower degree. They are generally of large size, being 14 by 11 inches, and some of them are so fine, although apparently taken under difficult circumstances, that we have been induced to obtain from Mr. Lesage some particulars of the glass house in which they were taken.

On a careful examination of these photographs, the "difficulties" apparent are as follow:—The great majority of the church dignitaries have been taken in what we shall designate their "official" costume, and some parts of this costume is of a pure white colour. Now, every photographer knows that it is frequently very difficult to do justice to the face of a "lady fair" when there are broad masses of white about her dress. If the white draperies be adequately represented, the face generally suffers by being too dark from under-exposure; if, on the other hand, the exposure in the camera be such as to bring out the face in all that fairness which ladies desire, the details of the white drapery are apt to get lost. If this be so in the case of ladies possessing delicate complexions, how much more is it so in the case of priests, many of whose faces appear bronzed? Notwithstanding the great contrasts in respect of what we have mentioned, many of these pictures are delicate and soft.

A portrait of Dr. Gillooly, Bishop of Elphin, is a fine example of softness and harmony. Notwithstanding a liberal display of lacework and embroidery, which might be thought antagonistic to the proper rendering of the face, the eye naturally turns to the latter as the point of chief attraction, and, after scanning that, then turns to the somewhat elaborately-adorned vestments.

A still better example of the art of judiciously making some parts subordinate to others is a portrait of Dr. Furlong, Bishop of Ferns. In this case the face, which is full of fine detail, is the chief point of attraction, notwithstanding the close proximity of a large quantity of lacework, reproduced with great sharpness and also with much detail, but still holding a place subordinate to the face of the venerable bishop.

Dr. Moriarty, Bishop of Kerry, having been taken in a black sontane, affords us an opportunity of comparing bishops adorned with lace and bishops without this accessory of clerical attire. Hence we are enabled to say that, notwithstanding the skill displayed by Mr. Lesage in the portraits of the former, the latter is more pictorially graceful. Dr. Moriarty's portrait, in the plain dress referred to, is not inferior to any in the collection, and, from the simplicity of the costume, superior, in an artistic point of view, to most of them.

Mr. Lesage has also favoured us with a few *cartes* of pretty Irish girls, and which, as a matter of gallantry, we prefer to the pictures of the hierarchs. The style of these "colleens" is unmistakably French; but this is the less surprising, now that Mr. Lesage informs us that his operator has come from Reutlinger's, of Paris, to the superior quality of whose pictures we have frequently made allusion. One *carte*, a portrait of Mr. Lesage himself, attracts notice from the "texture" of the flesh, which is precisely similar to that of the portraits of M. Adam-Salomon. That the same means for producing this effect are adopted by both is the opinion of every photographer who has examined the *carte* in question.

The glass house in which these pictures have been taken differs from those generally in use, in consequence of its being glazed with *blue* glass. The size of the studio is 23½ feet long by 16 feet wide and 11 feet high. From the circumstance that both roof and sides are of blue glass we should have inferred that a somewhat long exposure would be required—much longer, certainly, than if the ordinary colourless crown glass had been used. We are informed, notwithstanding, that so quickly may work be done that portraits of children are often taken instantaneously. The gallery, however, has a south-west exposure, and hence the necessity for blue glass and the secret of the rapidity of the exposure. The curtains used for shading of and managing the light are also of a blue colour.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 14th	South London	City of London College.
,, 14th	Manchester (Ann. Meet.)......	Memorial Hall, Albert-square.
,, 14th	Pho. Sec. Lit. & Ph. Soc., Man.	Rooms, 36, George-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting of this Association was held on Tuesday evening, the 28th ult.,—the President, Mr. O. R. Green, occupying the chair.

The minutes of the former meeting were read and passed.

Mr. Guyton exhibited a specimen of the Alberttype, and read from the *Photographic News* the remarks upon the process.

There were likewise shown a number of 8 × 5 transparencies, by Mr. Phipps; sundry recently-taken prints, by Mr. Guyton; a specimen of the eburneum process, by Mr. Hogg, shown by Mr. Murray; and views in Wales, size 12 × 10, by Mr. Tyrer.

The Rev. T. B. BANNER stated that, in a recent visit to the English lakes, he had taken twenty-one plates of the Liverpool Company's preparation, and had brought back twenty-one negatives, prints from which, beautifully mounted and bound in a handsome volume, he exhibited.

Mr. Walmsley showed some negatives by the coffee process, and one on which gum tragacanth had been employed as the preservative.

Mr. Adin, the Secretary of the Manchester Photographic Society, who was present, exhibited an enamel portrait.

The President exhibited some stereo. and 12 × 10 views, one of which was the picture of the tomb of Sir David Brewster, at Melrose Abbey. He also exhibited some stereoscopic views printed on Durand's sensitive paper.

Mr. W. H. Wilson next read a short paper on *An Easy Method of Testing the Strength of Solutions of Nitrate of Silver* [see page 480], for which he received a vote of thanks.

A final excursion for the year was talked over, and the arrangement left to the Secretary.

The Chairman announced that the presentation prints for the present year were finished, and would be ready for delivery at the last meeting of the year, in November.

This concluded the business of the evening, after which the meeting adjourned.

Correspondence.

Foreign.

St. Gervais, Upper Savoy (2,000 feet above the Sea), Oct. 1, 1869.

THE BRITISH JOURNAL OF PHOTOGRAPHY has found me out in this secluded and romantic village, the rural postman delivering two copies a few mornings since, which had travelled here *via* Geneva. Before alluding to any of their contents or attempting to induce your readers to come here with their portable cameras, I cannot resist giving a short account of one of the most remarkable literary frauds of modern times; indeed it is doubtful if ever such a hoax was before perpetrated. It is interesting to photographers, as it was by means of their art that the deception was discovered.

Early in July, 1867, more than two years ago, M. Chasles communicated to the French Academy of Sciences certain documents which "proved" that Pascal knew of the nature and existence of the laws of gravitation before Newton, and that he even had correspondence with the "young" English philosopher on the subject. M. Chasles had had these documents in his possession for six years before he brought them before the notice of the scientific and literary world. He acted, as he says, with caution and without precipitation. Of course the partisans of Newton were in arms against these alleged facts, and the disputes in the Academy were always warm whenever the topic was introduced. In August, 1867, the French "Astronomer Royal," M. Le Verrier, asked M. Chasles from whom or from whence he obtained these remarkable documents. M. Chasles refused to divulge the source from whence they came, fearing that by so doing the collection of which they were supposed to form a part would be so eagerly sought after that it would be spoiled by being subdivided. Objections soon came in from abroad as to the authenticity of these documents, and, in reply, M. Chasles sent photographs, or the originals in some cases, in proof of his assertions. "Could I have done more?" says M. Chasles; "besides, the large number of these documents, the names of their authors, the variety of scientific, literary, and historic matter of which they treated, and the perfect concordance between them, left no doubt upon my mind as to their authenticity."

This precious collection contained letters and notes of Julius Cæsar, the Apostles, Charlemagne, &c., to say nothing of quantities by Christopher Columbus, Copernicus, Shakespeare, Galileo, Calvin, Tasso, Agnes Sorel, &c., &c. Well, these documents were presented from time to time to the Academy till about two months ago, when M. Chasles allowed a ray of suspicion to fall on his mind. He had sent to Florence a photograph of a letter said to have been written by Galileo in 1639, and the observations made upon it by the Florentine *savans* aroused the attention of M. Chasles, and he began to think for the first time for eight years, and after he had spent some £6,000, that he had better take certain precautionary measures to assure himself that all was right. He had never been to the residence of the vendor of these documents; the fellow always went to the house of M. Chasles between eleven and twelve in the morning or five and six in the evening. So disquieted was M. Chasles that he communicated with the police, and on the 18th of last August the manufacturer of these letters, autographs, and documents was found out. Nothing was discovered in his lodging but a few sheets of paper, some pens and ink, &c. He declared that he had manufactured more than 20,000 since 1861, all of which he had sold to M. Chasles.

It is still a mystery how one man could compose all these writings, treating of so many different matters, of such varied epochs, and of numerous authors, and this man ignorant of Latin, Italian, mathematics, and the other sciences which are written upon so freely. "There is still a mystery to penetrate," says the unfortunate M. Chasles. I was glad to observe that the illustrious chemist and senator, M. Dumas, during one of the recent sittings of the Academy, expressed his opinion that it was not only part of the duty of M. Chasles to give a full account of his cruel deception, but that he should likewise clear the memory of the great Newton from any stain which his delusions had been the means of inflicting.

Without wishing to connect the subject of this huge literary delusion too nearly with the matter of the letter of "A. B. C.," in your number of Sept. 24, and which is headed—incorrectly, it seems to me, for there is no allusion to the subject in the letter—*Can a Spirit be Photographed?* I must not let it pass unnoticed. I do not intend to discuss in these pages any other branch of "spiritualism" than that which properly belongs to them, "Can a spirit be photographed?" and, therefore, I leave entirely the remarks about the appearance of angels in former times. I protest, too, against being misquoted, for neither I, nor a friend to whom I have given my letter of the 14th to read, can find that I say "I have a *notion* that spirits are thus constituted." I have not expressed any "notion" as to the constitution of spirits, but I have said, and I repeat it as I wrote it, "I advance here, subject to correction, the opinion that everything that is *seen*, or that, in other words, produces an effect upon the retina which is called vision, must be *material*. If material it is not spiritual; if spiritual it is not seen." And I add that by "not seen" I mean that the retina of the eye is not impressed with the image of the appearance, as if that appearance were a material thing, such as a mountain. I appealed to the collodion plate as a test of this, and I call on "A. B. C." as a witness to confirm this belief, from deductions from his own assertions or kind wishes for me. He hopes that I may "wake up some night and find a host of departed relatives sitting round my bed." Well, supposing I do wake up in a pitch dark night, when not an object in the room is visible, and supposing I have the vision which appears to be the desire of "A. B. C.," am I to believe that *I see* the vision in the ordinary mode of vision when I can see nothing else? I say I am not bound to believe that. I would rather believe that my own spirit was in such a peculiar condition that it saw without the use of material eyes. If so, that vision would not be capable of being photographed, I believe. Hence I repeat, "if material it is not spiritual, and if spiritual it is not seen." Let me not be misunderstood, and let the discussion in these pages be kept as closely as possible to the subject, "Can a spirit be photographed?"

Where to go with the camera must be the text of my next letter, and the subject a sketch of a lovely trip from Paris to Paris, by means of a circular tourist's ticket. R. J. FOWLER.

Home.

CONCENTRATING A SILVER BATH.

To the EDITORS.

GENTLEMEN,—I have about thirty ounces of old negative bath, ten grains to the ounce. I want it thirty, but do not wish to add fresh silver, the bath not being in good order. I shall be glad if you will tell me the best way to proceed—

1. To bring it to thirty grains.
2. To recover the silver from it to go towards a new bath.—I am, yours, &c., W. H. GORDON.

Liverpool, October 6, 1869.

[A simple way to concentrate the bath is to place it in a large flat vessel and allow it to evaporate. Another way is to put the solution in an open and thin glass vessel, and surround it by a "freezing"

mixture, such as two parts of pounded ice and one part of common salt; or, nitrate of ammonia one part, carbonate of soda one part, water one part. When the silver solution begins to freeze, pick out the water crystals with horn pincers or forceps, and the remainder will be concentrated in proportion to the water thus removed. To recover the silver, precipitate it as a chloride, a carbonate, or a metal.—EDS.]

LACQUER FOR BRASS WORK.—PROTECTING GILT FRAMES.

To the EDITORS.

GENTLEMEN,—Referring to the lacquer query which appeared in the last number of your Journal, and your reply to the same, I beg to say that the best lacquer for the purpose that I have ever tried is photographic negative varnish.

I was induced to try it four years ago, and like it so well that I should not think of trying again the ordinary lacquer sold by the varnish makers. Ordinary lacquer requires a considerable degree of heat before it dries bright, and this heat is often fatal to the production of a smooth and sightly job in inexperienced hands.

Now, the best kinds of photographic varnish—for example, the "Diamond," Sœhnée's, &c.—requires such a very small increase in the temperature of the article to be coated that it does not demand the exercise of so much skill and care in laying it on as in the case of common lacquer, while it dries very bright, becomes very hard, and adheres well.

Any good durable colour may be added to it without impairing its usefulness. It is now more than a year since I varnished several brass and gilt ornaments in my reception-room with negative varnish, applying it quite cold. It chilled a little at first, but, after a few hours, became bright, and it has remained so ever since.

By the way, and while I have my pen in hand, have any of your readers tried the effect of giving a coating of negative varnish to ordinary carved gilt frames? I did so upwards of a year since, and find that it has protected them in a wonderful degree. Two which were thus coated are qnite as good as when first done, while all the others in my reception room are unmistakably dingier than they were at the time stated. At that period they were all alike; for that matter, they were all made at the same time and by the one man. Now, the two that I varnished are *much* brighter and newer-looking than any of the others, and I consider I am justified in attributing it to the varnish.

If there be anything in the above calculated to be useful to any fellow-reader it is at his and your service.—I am, yours, &c.,

Birmingham. Oct. 4, 1869. ANTIPHANES.

Miscellanea.

GAS IN LIGHTHOUSES.—Among recent applications of science we may mention the use of gas in the lighthouse of Howth, Ireland, which has proved so successful that it will probably lead to the employment of gas in all lighthouses to which it can be furnished. Some small works established close to the tower at Howth supply the lamps with cannel gas, and a far superior light is obtained at very much less cost than when oil is used. The burner, which is the invention of Mr. Wigham, of Dublin, consists primarily of three concentric rings, which carry twenty-eight fishtail jets. These alone give a light two and a-half times more powerful than the four-wicked oil lamps previously in use at Howth, and generally employed, we believe, in our lighthouses. Supposing, however, the two lights to be only equal, the saving in cost is over twenty-five per cent. But, in addition to what we have called the primary burner of twenty-eight jets, Mr. Wigham's apparatus can bring into action several more rings, carrying twenty burners each, until the light of 108 is furnished. Thus the light can be graduated according as the weather is clear or thick, which was impossible with the old oil lamp. The testimony of all who navigate Dublin Bay, and of the captains of the Irish mail boats, is conclusive as to the superiority of the gas light.

TESTING ACETIC ACID.—The value of commercial acetic acid can be estimated by ascertaining how much soda, or carbonate of soda, a given weight can neutralise. Inorganic acids, if present, would also neutralise the alkali; they must be tested for separately, or the determination corroborated, by evaporating the neutralised liquor to dryness, and calcining it at a red heat. All the acetate of soda is then converted into carbonate, the quantity of which may be dosed by the test acid; if it corresponds in quantity with the alkali first required to neutralise the acid there is no mineral acid present; if it falls short the difference may be ascribed to some mineral acid, the soda-salt of which is not decomposed by red heat. Good commercial acetic acid contains from 18 to 22 per cent of anhydrous acetic acid, and traces only of sulphates and chlorides. When 100 grains of acetic acid neutralise 62 grains of crystallised soda, the acid contains 23 per cent of anhydrous acetic acid. Acetic acid should be tested for lead and copper, for sulphuric, hydrochloric, and nitric acids should be entirely volatile on being boiled, and, when concentrated, its vapour should readily ignite on being approached by any flame. The strength of vinegar can also be determined by the same means as indicated for acetic acid. When acetic acid or vinegar are evaporated to dryness on a water bath, after addition thereto of a few drops of a strong clear solution of loaf-sugar, there should not ensue a deep brownish or black colouration on the residue becoming dry, which would indicate the presence of sulphuric or hydrochloric acids. Vinegar always contains sulphates and chlorides, and, if deeply coloured, also organic matter; the presence of the salts just named is due to the water applied in making the vinegar. Acetic acid should be free from tarry matters and aceton; they will be discovered on gently evaporating, and also on saturation, best with pure carbonate of lime—*Chemical News.*

THE SUN'S "GLORY."—The conclusions of the American astronomers as to the nature of the brilliant protuberances and the aureole which surround the sun on the occasions when it is eclipsed are not allowed to pass unquestioned by French *savants.* At the last meeting of the Académie des Sciences, M. Faye called the attention of the members to the results of the observations made on the occasion of the last eclipse. He said that M. l'Abbé Moigno had placed the photographs of the sun, taken by the American mission, at his disposal. After remarking on the peculiar appearances presented by the protuberances, one of which he likened to the masses of vapour that are sometimes seen floating over water, another to a whale with an enormous tail, he said of the latter:—"This protuberance was 70,000 miles in length; its total volume, making all allowances, would be 50,880,000,000 cubical miles." As those protuberances could now be examined at leisure, the chief interest was centred in the golden ring which surrounds the black disc of the moon during an eclipse. Professor Young's conjecture that the brilliant rays which constitute this ring are a permanent aurora borealis, the result of incessant electrical discharges similar to those seen in the Arctic regions, is disputed by M. Faye, who thinks the conclusion is not warranted by what is known of the constitution of the sun. As for Mr. Pickering's statement that the solar crown gave no trace of polarisation, the same learned *savant,* who has made the sun his peculiar study for many years past, conceives that Mr. Pickering is mistaken in his opinion on this matter; and he brings in support of the opposite supposition (for it is difficult to call it by any other name when the contradiction between scientific observers is so absolute) the observations made by M. Mauvais in 1852, and by M. Prozmowski in 1860. It is asserted, apparently for the purpose of explaining how Mr. Pickering fell into the error imputed to him—if error it be—that he used an instrument for making his observation which destroyed the polarisation. Seemingly with the view of appeasing any pain that the discussion might cause to the susceptibilities of the American observers, they are congratulated on having enriched science with photographs of fleeting phenomena most valuable for present study and future comparison.—*The Times.*

PHOTO-ENGRAVING ON COPPER.—Dr. Jacobsen says that several processes have recently been brought forward for preparing, by means of photography, engravings upon copper, from which prints may be obtained in the printing press. In the Prussian State printing-office in Berlin the following method is used, among other purposes, for printing upon bank notes the royal arms, and a notice referring to the punishment of forgers; the former being produced from a deeply-etched metal plate, as in copperplate printing, and the latter from a relief by means of ordinary type printing. Well-polished copperplates are used for the purpose, and these are covered with an even coating of asphalte, and exposed to light, either under a negative or positive *cliché.* The asphalte best suited for the purpose is that which yields a highly-brilliant fracture. This material is broken into small fragments, dissolved in turpentine, and the solution diluted with collodion. The insoluble particles are allowed to subside, and are separated by filtration through cotton wool, the solution having the consistence of ordinary collodion. This is applied to the copper plates, and allowed to dry at a gentle temperature. It is very necessary to see that no insoluble particles are deposited upon the plate. The exposure of the prepared plates takes place in diffused daylight, and continues for three to five days, although, by modifying the asphalte solution by the addition of certain substances, the period of exposure may be reduced from four to six hours. The *cliché* for printing from should be composed of a thick, permanent collodion, and, if possible, should be separated under water from its glass support, and laid alone upon the asphalte surface. By exposure to light the unsheltered parts of asphalte become insoluble, while the other portions retain their solubility. The collodion film is now removed by washing in water, and the plate then treated with a mixture of turpentine and water, which washes away the asphalte, and bares the copper surface wherever the light has not acted upon the surface. The operation of etching is next proceeded with. The reverse side of the copper plate having been coated with asphalte, it is placed in dilute muriatic acid, and the asphalte afterwards removed. The design is now obtained, engraved in the copper plate. The operation of etching requires considerable skill on the part of the operator, which can be only acquired after much experience. Engraved designs obtained in this manner may, if it is necessary, be reversed by means of the electrotype process.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

I will exchange a splendid little view lens, covers 9 × 7, and a locket lens, for a pair of damask curtains.—Address, H. M., New Wandsworth Station, Surrey.

A gentleman's silver hunter lever watch, jewelled in ten holes, engraved cases, and enamelled dial, good timekeeper, will be exchanged for photo. apparatus, or dissolving view apparatus, or lantern transparencies.—Address, C. M., Winsham, Chard.

A convenient satchel camera, focussing from three to six inches, with box for nine plates quarter size, and light stand, will be exchanged for Dallmeyer's No. 2 wide-angle landscape lens, or an 8 × 5 camera or other useful article.—Address, B. Wyles, Bourne.

I will exchange a quarter-plate camera, a 10 × 8 and two other printing-frames, three baths, two dishes, a head-rest, and side slip, with other things, for a cabinet or card lens, a velocipede, or any other article of equal value.—Address, Geo. Ward, photographer, High-street, Ringwood.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

Photograph Registered During the Past Week.—
H. Kennerley, Llandudno.—*Two Portraits of the Rev. Newman Hall.*

☞ *Correspondents should never write on both sides of the paper.*

J. G. (Brechin.)—The person named still resides at the same place.

Amateur (Preston).—The journal required may be obtained from our publishing office.

Kappa.—You will find an article on repairing fractured negatives in the present number.

A Provincial Amateur.—You will find the information you require at page 32 of the present volume.

B. W.—The process you describe is the "eburneum." It was introduced by Mr. Burgess, of Norwich.

Novice.—The paper is quite worthless for photographic printing, and the best thing you can do is to use it for writing purposes.

A Professional.—Registration of a view photographed from a particular spot cannot prevent another person going to that very same spot and taking a similar view.

Inquirer.—Several methods have been published in our Journal during the present and past year. If you spend half-an-hour in looking over the back numbers your search will be amply rewarded.

Hibernicus.—The amount of washing to which you have subjected your plates is quite insufficient. It might have answered had it been your intention to use them the same day, but they certainly would not keep for three days.

R. Verity.—For your purpose the effect of ground glass may be extemporised by rubbing the panes over with a roll of glaziers' putty. It will answer your purpose quite as well, and save all the mess consequent upon a removal of the old glass and a substitution of ground-glass panes.

"A Stupid Artist."—Dissolve a little iodide of potassium in water, and then add some iodine. Apply this solution to the silver stain, and then follow with the cyanide of potassium. Or, to a strong solution of cyanide add a little iodine, and then apply it by means of a camel's-hair pencil.

A. Hewitt.—By employing nitric acid you will be able to remove the old crusts of collodion from your bottles. Pour a sufficient quantity into the first bottle, shake it well up until the crusts become loose, then pour it into the second bottle, and proceed in a similar manner with the whole of them.

B. Wyles.—Some of the *cartes* sent indicate that your lighting is at present very excellent. The worst one is defective rather on account of the chemicals than the lighting. We have not yet had time to study the details and probable effect of the alterations you propose to make, but shall do so as soon as convenient.

J. T. B. S.—To succeed well with the negative process on paper you must use a silver bath that contains a much larger proportion of acetic acid than would be advisable to employ in a bath for collodion plates. The same remark also applies to the albumen negative process. The want of this acid is the reason why you have obtained such dingy-looking pictures.

Vero.—1. Although we have not seen any of the coloured pictures to which allusion has been made, we have no doubt that the colouring is effected by means of ordinary water-colours, to which a little gum may probably have been added.—2. Dunse is a town in the South-East of Scotland, and a letter addressed to Mr. Bruce, as directed, will be certain to find him.

G. Frederick Johnstone writes to thank us for having permitted such a complete ventilation in our columns of the subject of markings on the film. For a long period he had been annoyed by them; but, having read the various communications respecting them that have appeared of late in our pages, he has adopted some of the remedial measures suggested, and is now entirely free from such markings.

Lades.—A solder which will answer may be composed of tin and lead melted together in equal proportions. Its fusibility will be very much increased by the addition of a small proportion of bismuth.

F. R. S.—There is nothing whatever paradoxical in the matter, and the principle of polarisation by reflection is the same whether the glass prism or the bundle of plates be used; but the effect is certainly much better when the former is employed. A few evenings since we examined some salicene in Mr. Reade's microscope, the light being polarised by reflection from the surface of a glass prism; the effect was exceedingly good.

G. T. (Cardiff).—You ought not to have employed such paste as you have been using. Bookbinders' paste very frequently contains alum, which will, eventually, prove very deleterious. The pictures in Mr. Fox Talbot's *Pencil of Nature* faded in consequence of that description of paste having been employed in mounting them. This is proved by the fact that the prints were attached to the card mount by the margin, and it is only in the margin where the fading has taken place, the middle of the prints being now as good as they were when first mounted.

T. N. (Bristol).—There are several methods by which positives can be converted into negatives. The change merely implies the conferring of such a degree of actinic density as to enable it to stop the light more effectually than it did formerly. Bichloride of mercury affords a ready means of doing this. Make a solution of this salt in hydrochloric acid and dilute with water. When this is applied to the collodion picture it will darken it to a considerable extent, but it is better to allow it to remain on until the deposit assumes a bluish-white colour. Now wash thoroughly, and apply a diluted solution of sulphide of ammonium, when the colour will immediately become deep brown. A solution of chloride of gold will also darken a positive.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.

The Netherlands Exhibition.—Among those to whom medals have been awarded at this Exhibition we perceive the name of Mr. J. Solomon, of Red Lion Square.

Alkaline Development and Photographic Polemics.—Mr. Dawson has sent us a letter rebutting the statement of Mr. M. Carey Lea, at page 468, in which the latter gentleman expresses his opinion that some of the statements of the former respecting development with a variety of alkaline solutions and other matters are erroneous, and such as he will hereafter regret having made. Mr. Dawson, in reply, reiterates his former opinions, and says:—"I do not '*regret*' to say that I *have* ventured to call in question two of his most unqualified and energetically-expressed assertions, namely, that pyroxyline made in cold acids is better for photographic purposes than that made in moderately hot acids (say 150° Fahrenheit, or thereabouts), and secondly, that no carbonates save those of ammonia are effective in alkaline development." Mr. Dawson considers that he has adduced proofs to the contrary effect, and adds:—"If I have succeeded, as I have done, in satisfactorily developing plates by the alkaline method with a great variety of alkalies and alkaline carbonates, how can Mr. Lea assert (see page 468) that 'my statements are obviously erroneous,' and that my experiments were 'superficially and carelessly made?' Would it not rather strike a philosophic mind like Mr. Lea's, or even the commonest judgment of everyday life, that the man who succeeded in his experiments was the expert, and the other who was unsuccessful was the 'careless' experimenter?" We have not published Mr. Dawson's letter *in extenso*, because literary contentions of this kind not only do not interest general readers, but they also sometimes cause regret to the writer for having allowed himself to retort with more force than on calmer consideration he would think desirable.

METEOROLOGICAL REPORT,

For the Week ending October 6th, 1869.
Observations taken at 406, Strand, by J. H. Steward, Optician.
These Observations are Taken at 8.30 a.m.

Sept. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
30	29·69	70	60	60	64	SSW	0·50	Dull
Oct.								
1	29·83	66	52	58	61	SSE	1·12	Fine
2	29·99	64	53	55	57	SSW	1·18	Dull
4	30 17	64	50	54	56	WNW	—	Dull
5	30·20	59	46	50	51	NNW	—	Fog
6	30 25	—	48	52	53	E	—	Fog

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 493. Vol. XVI.—OCTOBER 15, 1869.

ON FORMULÆ FOR BROMO-IODISERS.

For some time past we have contemplated making a careful contrast between the several iodising or, more truly, bromo-iodising formulæ which have been proposed from time to time since bromine has been employed to any considerable extent in photography. We have done this with a view to ascertain the direction in which the experience of years is tending to improve the bromo-iodising formula for negative collodion, our chief attention being confined for the present to the determination of the ratio of total iodine to bromine in any given formula.

Some of our readers have no doubt made a similar comparison for themselves ere this, but the queries which we constantly receive show that there is a very wide-spread feeling amongst photographers that no definite relation exists between the proportions of iodine and bromine in most collodions; in fact, that it is a "rule of thumb" affair altogether. We wish now to show, by discussing good recipes, that experience has led to the gradual adoption of formula for bromo-iodisers, the constituent salts of which are so balanced that the sum of the quantities of iodine and of bromine present in a particular collodion shall be to each other in the proportion of one atom of the former to one atom of the latter. Further: we shall show by examples that the proportion has undergone steady alteration from a comparatively early date, when the proportion was three atoms of iodide to one of bromide, until it has reached the present standard.

We will now examine some of the best-known formulæ, and will begin with the average bromo-iodiser described by Hardwich in the sixth edition of his well-known manual. At page 277 we find the following recipe for making ten ounces of a bromo-iodiser:—

Formula No. 1.

Iodide of ammonium	90 grains.
Iodide of cadmium	90 ,,
Bromide of ammonium	40 ,,
Alcohol	10 ounces.

When the amounts of iodine in the iodides of cadmium and ammonium respectively are added together we get the number (excluding decimals) 141 as the number of grains of iodine present, while the bromide of cadmium contains 32 grains of bromine. As the atomic weights of bromine and of iodine are respectively 80 and 127, we easily ascertain that the above numbers are in the proportion of *one* atom of bromine to nearly *three* of iodine, and, as a consequence of this, the sensitive film would contain bromide and iodide of silver nearly in the proportion of one atom, or 188 parts, of the former to three atoms, or 705 parts, of the latter.

As experience of the use of the bromide in the collodion accumulated, it was found that better results could be obtained with a larger share of bromide; and, as indicating the next stage in the progress towards the present standard, we may give Dr. Monckhoven's recipe:—

Formula 2.

Iodide of cadmium	25 grains.
Iodide of ammonium	25 ,,
Bromide of ammonium	12½ ,,
Pyroxyline	50 ,,
Alcohol and ether mixture	7 ounces.

When this formula is discussed in the same way as the last, we find that the total amount of iodine present in proportion to the bromine is very nearly in the ratio of two to one, so that the sensitised film would now carry bromide and iodide of silver in the proportion of 188 parts of the former to 470 of the latter—a wide variation from the first example.

We now come to the two formulæ recommended in Mr. M. Carey Lea's *Manual of Photography*, and we take these as the type of modern recipes, since the work referred to is probably the most recent on the subject:—

Formula 3.

Bromide of ammonium	1 grain.
Bromide of cadmium	2 grains.
Iodide of cadmium	5 ,,
Alcohol and ether mixture	1 ounce.
Pyroxyline	6 grains.

Formula 4.

Bromide of ammonium	2 grains.
Bromide of cadmium	1 grain.
Iodide of cadmium	5 grains.
Alcohol and ether mixture	1 ounce.
Pyroxyline	6 grains.

On discussing these proportions in the usual way, it is found that in Formula 3 the iodine and bromine are present very nearly atom for atom. In 3 there is a slight excess of iodine, whereas in 4 there is rather less than one atom of iodine present for one atom of bromine; the difference, however, is very trifling. Either of these collodions will, therefore, yield a sensitive film carrying bromide and iodide of silver in the proportion of 188 parts of the former to 235 of the latter.

It should be remarked that the differences in all these cases is too great to be accidental; but it is evident that careful experiment has led to the gradual increase in the proportion of bromine to iodine in collodion, until the present ratio of atom for atom has been reached. But it is now well known that any material increase in the proportion of bromide beyond that just stated tends to deficient contrast in the negative—Mr. Lea says too great contrast. It would appear, then, that the ordinary wet film is in its best condition when iodide and bromide of silver are present atom for atom—in fact, that it is in a state of unstable equilibrium under these circumstances, and, so nicely adjusted is the balance, that any material preponderance of one salt over the other tends to interfere with their harmonious action.

We have been long familiar with the fact that the addition of a small quantity of a chloride to a bromo-iodised collodion is attended with some advantage—not so much in the matter of increased sensitiveness as in the more delicate gradation of tone observable in the negatives. We know that for some years past this addition to the collodion has been occasionally tried with success; but the best working formula we have seen is that given by Mr. W. H. Davies, in the description of his dry process published in The British Journal Photographic Almanac for 1868. The following is Mr. Davies's recipe:—

Formula 5.

Iodide of cadmium	$2\frac{1}{2}$ grains.
Iodide of ammonium	$\frac{1}{2}$ grain.
Iodide of potassium	1 ,,
Bromide of potassium	$2\frac{1}{2}$ grains.
Chloride of calcium	$1\frac{1}{2}$,,

For one ounce.

When we discuss this formula in the usual way we find that it contains one atom of bromine, one atom of iodine, and rather more than one atom of chlorine. It is, then, not a little remarkable that the proportions which practice has proved to be most suitable are essentially atom for atom of the three chief substances.

It may be noted that we have not dwelt upon the nature of the base or bases in combination with the bromine, iodine, or chlorine. The influence of different metals is a subject already well understood in the manufacture of collodion; but the proper adjustment of the proportions of total bromine to iodine in any given sample is so little appreciated that we hope the few remarks we have here made will tend to clear the subject of any difficulties which may have hitherto surrounded the question.

SO-CALLED "FLUORESCENCE" OF LIGHT.

In a recent number of The British Journal of Photography Mr. Marlow has given some ingenious speculations and experiments on the action of quinine upon light. He criticises severely the existing opinions on the subject without, I think, having completely understood them, as is evident by his saying that "one of the peculiarities as shown by all the illustrations is extraordinary refractive power," &c. It is true that some of the more popular writers on optics have expressed themselves vaguely and obscurely on this subject. Perhaps, therefore, a brief exposition of the present doctrine of "fluorescence" may be not unacceptable, especially as there is not a particle of doubt as to its correctness. *That* has been demonstrated to an absolute certainty by the younger Becquerel.

Let us suppose that in a room, otherwise absolutely dark, a pencil of rays falls upon an object before us. That object then becomes visible to us by virtue of an irregular reflection of the incident rays. If we now cut off the illuminating pencil, the object will, in all ordinary cases, cease to be visible.

But if the object be of a *phosphorescent* nature—if it be, for example, Baldwin's or Canton's phosphorus—and the light fall on it for a sufficient time, then, after it has been cut off, the object will show itself to be *self-luminous*, and will glow for a certain time.

We see, then, that in some cases bodies may become sources of light in the entire absence of combustion. Having been once thrown into a state of vibration by light, this vibration continues (in these cases) after its cause has been removed.

In the case of the phosphori, this glowing emission of light may continue for a considerable time. Other substances may emit light in precisely the same way for a shorter time, and this time may, in some cases, be contracted to an almost infinitesimal part of a second, as is demonstrated by an ingenious apparatus contrived by Becquerel.

Under all circumstances of refraction and reflection the *refrangibility* of a ray remains unchanged. No refraction can alter the refrangibility of a ray; this is its most characteristic property, and of which it is impossible to deprive it. But if a ray of light of one refrangibility provokes in any object those vibrations which produce light, such vibrations constitute a new impulse, and the light so produced may have a very different refrangibility from that of the light which produced it. This is an important fact, and the key to the phenomena is "fluorescence." It has, however, a remarkable limit: the new rays of light must have a refrangibility *less than*, or, at most, *equal to* (never greater than), the original rays.

Let us now apply these general principles to the case of sulphate of quinine. A pencil of light containing rays of high refrangibility falls upon a solution of the sulphate of quinine; the quinine immediately becomes self-luminous. It is rendered so by the highly refrangible rays, and emits light which, although of great refrangibility, is less so than than the rays that excited the luminosity; thus, invisible light, so to speak, has been rendered visible. Chemical rays, invisible to the eye, have set the particles of the sulphate of quinine in motion, and this motion has become, in its turn, a source of light.

This property is illustrated by a very simple and well-known experiment. A spectrum produced by a pencil of light passing through a narrow slit or falling upon a common prism is received upon a white wall. A piece of white paper is immersed in a strong solution of sulphate of quinine, to which solution a little sulphuric, or, better, tartaric acid has been added, is held just beyond the violet end of the spectrum; thereupon the part previously dark immediately glows with a beautiful purplish light.

"Fluorescence," then, is absolutely the same as *phosphorescence*, and the former term might very well be discarded altogether. Becquerel has done so, and calls the property of quinine and certain other bodies, æsculine, &c., "phosphorence." Most English writers have retained the term "fluorescence," as being a convenient expression for phosphorescence as exhibited by those bodies.

An admirable description of all these phenomena will be found in Becquerel's *La Lumière*. The article in Watts's *Dictionary of Chemistry* on the same subject is rendered somewhat obscure by the writer having frequently spoken of a "change in the refrangibility of the ray," as if such a thing were possible. That he, however, adheres to the view above expressed is sufficiently evident from such expressions as the following:—"The vibrations of the ether in the incident ray appear to excite disturbances within the complex molecules of the fluorescent medium, whereby new vibrations are excited in the ether, differing in period from those of the incident ray. The portion of light which has produced this molecular disturbance is used up or *absorbed*, and thereby lost to visual perception, just as heat is converted into mechanical work. It is probable that the absorption of light always takes place in this manner. The well-known fact of the conversion of luminous rays into invisible calorific rays is, as already observed, a striking influence of diminution of refrangibility accompanied by absorption."—Vol. iii. p. 634. This article is also defective in not adverting to the identity of fluorescence with phosphorescence. In Becquerel's work, already mentioned, the subject will be found discussed at length and in a most complete manner.

M. Carey Lea.

ALKALINE DEVELOPMENT OF DRY PLATES.

"Where doctors differ, who shall decide?" I had decided to remain silent, but, on further consideration, believe that it is better for the general interest that the question in dispute between Mr. Dawson and Mr. M. Carey Lea should be fully cleared up. No amount of asseveration or strong statement on either side can do good, but, on the contrary, is more likely to do harm, by changing men from patient experimentalists into more or less bitter partisans. In the following remarks I wish it to be distinctly understood that I am taking neither side, but simply stating the results of my practice.

During the past summer I have prepared and developed a very considerable number of dry plates mainly by two processes—the collodio-bromide without a bath and the method with a bath, and the more common dry-plate method of employing a bromo-iodised collodion and silver bath, using as the preservative or sensitiser my favourite one of one ounce of albumen, ten of sweet ale, and sixteen grains of gallic acid—the whole shaken well up and filtered. In development, I have proceeded according to the following practice:—If a full exposure has been possible, the alkaline mode of development is not resorted to, as in my hands it is not so perfectly under control as is the method of using plain pyro. to develope, and acid pyro. and silver to increase the density and colour.

In working the alkaline method, after an exhaustive series of trials of the alkaline carbonates, and also of liquor ammonia diluted to various strengths, I have arrived at the conclusion that carbonate of soda gives (in my hands) the best and most reliable results, rarely necessitating the resort to the use of bromide of potassium for the prevention of fog; and thus, to that extent, my practice is in harmony with the results stated by Mr. Dawson.

I have not observed much difference in results between the two modes of preparing collodio-bromide plates—viz., with and without a bath—save that the method of mixing the silver with the collodion is quicker in the preparation of plates, but hardly so perfect in the resulting negative; but on this branch of the subject I do not care to speak at present.

In the method of development may lie all the difference, as Mr. Lea prefers to use his solutions warm, thus increasing in a considerable degree, by rapid evaporation, the quantity of volatile alkali in the atmosphere, to what might be a somewhat disagreeable or even unbearable extent if large plates and a number of them were being operated on.

Like Mr. Lea I prefer to use trays for development, using a rather weak solution of pyro. (but cold, not hot, as I have not been searching for rapidity), say from one and a-half to two grains per ounce, or even less, if I have not time to watch the development closely; and when used so weak the plates may be left without fear of fogging

or injury for hours. When the batch of plates is fully developed the pyro. need not be thrown away, as, by adding the proper proportion of citric acid to it, it may be used precisely the same as if fresh acid were employed for intensification of wet plates. This will be found a very easy and simple mode of procedure.

It may be that the difference of effect of the volatile and non-volatile alkalies on development may lie with the peculiar preservative. Has Mr. Lea ever tried the one I have indicated? If not, it is worth trying as a further experiment in this direction.

I had, unfortunately, an opportunity a few weeks since of comparison on the same plate of three different methods of development, which may be worth recital. The plate was 11 × 9, and had been accidentally broken into three pieces after exposure. The subject was the dense foliage on a river bank, with distant mountains; exposure, ten minutes; time, early morning; lens, a Ross's doublet, smallest stop.

One of these pieces I developed with plain pyro., three grains per ounce of water; and, when well out—which occupied about seven minutes—I intensified with acid pyro. and silver. The most minute details of the foliage were fully brought out, the morning being absolutely without a breath of wind, and the leaves consequently motionless.

The second piece was developed with the same plain pyro., to which were added a few drops of a solution of carbonate of soda- four grains to each ounce of water. The development was much quicker, coming up quite as rapidly as a well-exposed wet plate would do, and, when finished, the result was extremely similar to the first, save a slight difference in point of colour; in all respects it was perfect.

The third and last piece was developed with the same solution of pyro., to which was added a few drops of a solution of liquor ammonia fort., one minim; water, ten minims. This developed very rapidly also, but with a certain greyness of deposit and general fogginess of appearance which looked quite wretched beside the clearly-defined, sharp images of the two first developed pieces.

It may be that the exposure was rather protracted for the latter method of development; but that is beside the question, which is not as to comparative rapidity, but as to the quality of negative produced by the volatile and non-volatile alkalies. I may add that I have not found the carbonate of potash so good as the carbonate of ammonia, although it is quite possible to produce a fine negative with it; but between the latter and carbonate of soda I have given the preference to the sodium compound, as combining all the requisites for the production of a perfect negative. W. H. Davies.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER X.—THE PANORAMIC LENS.

In the course of some correspondence which has arisen out of these articles we have been asked not to overlook describing the means employed for taking panoramic pictures. Although this will properly be a subject to come under the heading of *Cameras and other Apparatus*—to which we purpose devoting a series of articles as soon as the present series is terminated—still it is fitting that, so far as the optical means of obtaining panoramic pictures are concerned, the subject should find a place in this series of articles.

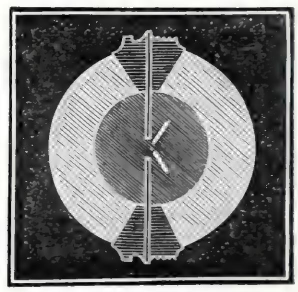
Although any lens which includes a wide angle may, in a certain sense, be called a panoramic lens, still it is not correct to so designate it. A wide-angle lens will project its picture according to plane perspective, and it will merely be a picture embracing a wide angle of view. On the other hand, a panorama proper must be obtained under the following circumstances:—Each portion of the picture should be produced by the axial rays passing through the lens, and these rays must fall upon a surface presented at a right angle to them.

A "wide-angle" lens does not supply the foregoing conditions, for the great value of a lens of this class consists in its transmitting in a very perfect manner a ray as far removed as possible from that which passes through the axis; and, further, the oblique pencils—those from the sides of the picture—are projected on a plane which forms an angle more or less acute with the transmitted ray in proportion as it is distant from the axis. In a wide-angle photograph it is necessary, in order to its being correctly seen, that the eye be placed at a distance from the picture corresponding to the focus of the lens by which it was taken; hence, when viewing a *large* picture of this description, the spectator who is sitting directly opposite to its centre must examine the sides without moving his eyes opposite to that part under examination—in other words, he must view it obliquely. The axis of his eyes must bear the same relation to the part of the picture looked at as did the rays from the lens when producing it. In a panoramic picture the case is different. In order to examine any particular portion it should be brought directly opposite to the eye and form a right angle with its axis. If a knowledge of its effect as a whole be desired the picture should be bent in a radius of which the eye is the centre. These remarks will serve to clear the ground for what is to follow.

Although several panoramic cameras (which will be noticed in our next series of articles) have been made, only one panoramic lens, properly so called, has been produced. In conjunction with its accompanying apparatus it fulfils all the conditions which we have stated to be requisite in obtaining a panoramic picture. All the rays which are transmitted through this lens are axial, no matter from what part of the view they come. This lens was invented by Mr. Sutton (then residing in Jersey) in 1859, and contains so many features of originality that our articles on lenses would be incomplete did we fail to direct attention to it.

Suppose that one were looking through a perfectly spherical globe of glass filled with water, no matter in what direction it were looked through one view would be exactly equal to the other. A shell of glass filled with a fluid is a lens, but it is not an achromatic one. In order to that the glass shell must have the outer and inner curved surfaces so adjusted—their respective radii must be such—that the aqueous sphere which fills up the middle shall be a lens subject to the correcting influences of its shell, and both of which, acting in concert, must transmit to a focus, visually and chemically agreeing, any rays which are transmitted. The calculation of this is by no means such an easy matter as one might imagine, for there is another condition of perfection in a photographic lens, viz., the removal of spherical aberration, which must be looked after as well as the correction of chromatic aberration. The accompanying diagram shows the lens.

The outer thick shell, which is lightly shaded, represents the portion made of glass, the inside being filled with water. A blackened brass diaphragm divides the lens in two, the aperture being exactly in the centre. The view here given is that which would be obtained by looking down upon the lens—a horizontal section; and the two projecting pieces, like the wings of a butterfly, close to the aperture in the stop, is an ingenious arrangement for preventing the pencil transmitted centrally through the lens from being larger than the oblique pencils. Although in some points of unimportant detail—*e.g.*, the mounting—the diagram differs slightly from the original in our possession, and which was made by Ross, we believe that a good and accurate idea of the optical construction of the lens may be gained from the diagram here given.



From the above it will be seen that the panoramic lens differs from every other previously introduced. Mr. Sutton himself says, in *Photographic Notes* of December 15, 1859:—

"I feel it due to myself to state that this invention is in every particular and detail entirely my own, and that I have not received the remotest hint from any human being respecting it. I feel it right to state this emphatically, because there are ill-natured people in the world who are always ready to decry any new invention—to assert roundly that it was known before—to vilify any inventor, and endeavour to oppose and thwart him in any possible way for their own selfish amusement."

As Mr. Sutton by this time is aware that *we* never either "oppose" or "thwart" him except when we know him to be in error, he will the more readily perceive that we are quite in earnest when we say that the invention before us is a really genuine and good one, notwithstanding that it has not come into general use, and from the introduction of Johnson's pantascopic camera is not now likely to do so. Not only do we believe it to be original, but we also believe it to display a great deal of ingenuity. Mr. Sutton thus describes his invention of the lens:—

"Some three or four years ago, on my return from a visit to M. Blanquart-Evrard, at Lille, I passed through Paris. Of course I was obliged to take home a present for Mrs. Sutton. Fancy going home from Paris without a present for one's wife! But what should I buy? That was the rub. I had already spent some francs in Valenciennes lace at Lille, and I thought to vary the thing a little, and not buy any articles of dress at Paris, because I hate French fashions. Do not the crinoline, and the little bonnets, and the swallow-tail coats, and all the other absurdities in dress come from Paris? Mr. Eustace is quite right. French taste in dress is an abomination. Surely a Frenchman does not look an artistic being with his imperial, and his whiskers shaved off, and his long moustachios twisted to fine points, looking like a sprit-sail-

yard under his nose. Depend upon it no man is to be trusted who twiddles his moustachios to a fine point. But what to buy as a present for my wife—who emphatically told me at parting, 'Mind you bring me something from Paris.' Nothing did I see in the Rue St.-Honoré or the Palais Royal that I thought a suitable present; so, at last, in a state of despair, I bought, in a back street—what do my fair readers think?—a glass sphere filled with water, and having in the middle a ship tied to the bottom with a string, and which, when you turn it upside down, is enveloped in a shower of snow. Truly an absurd present for a man to buy for his wife, and a shout of derision it was received with; and but for the lace I should have had my ears pulled no doubt. Well, this globe of water was put upon the mantle-shelf in the room where I write, exactly opposite to the window, and the image of the window is, of course, thrown upon the wall behind it; and, in the evening, when there are two candles upon the table (I hate a moderator) the two images of the candles are thrown in the same way upon the wall. My glass globe is, in fact, a panoramic lens in embryo, and, after observing daily for about three years the images which it forms upon the wall, the happy idea struck me that a lens of that kind might be turned to account in photography. So one day I took it into another room where there are *two* windows, and by bending a piece of paper round the lens at a little distance from it, and standing in a dark corner of the room, there were the two images of the windows, sure enough, thrown upon the paper at a distance of 120° or more apart, and equally perfect.

"This was the first crude idea of my panoramic lens; and then came the difficulties of achromatising the globe of water, and inventing an equalising stop. These for a long time seemed insurmountable, because the only way which I could at first imagine for achromatising a sphere of water was to introduce a large double concave lens of glass into the centre of it. But this would, of course, destroy the symmetry of the lens, and introduce oblique incidences of the marginal pencils upon the hollow surfaces of the glass. Thus I was beaten for some time, until the following happy accident suggested a solution of the difficulty:—I was one day holding up against the light a round glass tumbler, half full of water, and I observed that the objects seen through the water were magnified, while those seen through the empty glass at the top of the tumbler were diminished. Then it occurred to me that a shell of glass, having concentric inner and outer surfaces, acts as a concave lens; so, in order to achromatise my sphere of water, I perceived that I had only to make the outer shell of glass *thick* enough, and fill the internal spherical cavity with water, and the thing would be done; and there would be no oblique incidences of the marginal pencils, because the lens would still be symmetrical. This idea was ecstatic, and I set to work to carry it out.

"Calling x the unknown radius of the inner sphere, F the focal length of the achromatic sphere, and *unity* the radius of the outer sphere, and introducing as constants the known refractive indices of glass and water for RED rays, I obtained an equation in which F is given in terms of x and the above constants. Next, by changing the constants into the known refractive indices of glass and water for VIOLET rays, I obtained an equation in which F is given in terms of x and these latter constants. But, since the lens is achromatic, these two values of F must be equal; therefore, by equating them, an equation is obtained involving x as the unknown quantity. This equation is a cubic, having one possible and two impossible roots, and the possible root gives $x = \frac{1}{2}$ very nearly; that is to say, the inner sphere of water must be one-half the diameter of the outer shell of glass. And in making this arrangement the focus of the achromatic sphere, measured from the back glass, becomes nearly three times as long as it was before; which is a very fortunate circumstance, because it reduces the size and cost of the panoramic lens to reasonable bounds."

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"On trying the four-inch achromatic sphere of glass and water, with a central aperture of one-inch, which admits a parallel pencil of one and a-half inches diameter upon the front lens, Mr. Cox found the focus perfectly sharp. With this aperture, and a focus of four and three-quarter inches measured from the back lens, the case is parallel to that of a quarter-plate portrait lens with full aperture; so that the correction for colour also reduces spherical aberration, and the panoramic lens becomes far superior in defining power to any view lens now in existence.

"I would observe that any convex lens of glass has its focus lengthened by achromatising it. Take, for instance, a plano-convex lens of crown, and achromatise it by cutting out of the front a plano-concave lens, and supplying the hollow thus made by a plano-concave lens of flint; the compound lens will then have its focus lengthened. Or, take a plano-convex lens of flint, and achromatise it by cutting out of the back a double convex lens, and supplying the gap by an equal double convex of crown, the focus will then be lengthened. It is not surprising, therefore, that a sphere of water should have its focus more than trebled in length by being achromatised with a pair of glass concave lenses which displace an equal bulk of the water."

When a lens and camera constructed on these principles were brought before the London Photographic Society, in April, 1860, a gentleman, whose name is well known to our readers as that of a successful professional photographer, committed the blunder of trying to damn the lens and camera by stating (we quote the words of the report of the meeting of the Society) that "they had had a comic English Grammar, a comic History of England, and now the photographic world was to be treated with a comic camera—a camera constructed upon principles which utterly ignored all focussing," and so on. Now, although we seldom overlook calling attention to any of Mr. Sutton's errors which we really believe to be such, we must here protest against the blunder of his censor, which really arose from the latter speaking upon a subject which he did not comprehend very clearly. The gentleman alluded to was a *portrait* photographer, and from his point of view he considered it absolutely necessary that each sitter should be not only posed but focussed; the panoramic camera, on the contrary, dealt with landscapes, and every intelligent and well-informed landscape photographer knows full well that, in photographing such subjects, when once the proper relationship between the lens and the ground glass has been established *no focussing is required in the future*. The fallacy of such a course of reasoning as that we here condemn has been repeatedly shown by us in various articles on the subject of focussing landscapes. It would be going over old ground to again discuss the subject of focussing landscapes, or, to put it in more scientific language, the proper relationship of the conjugate foci of a lens. Every practical landscape photographer is perfectly aware that when the subjects to be photographed are beyond a certain distance from the camera the distance between the lens and the sensitive plate is always the same, although the subjects may be of a character altogether different from each other; and this is the kind of knowledge of which the censor who so unwisely criticised the camera in question appears to have been ignorant.

Respecting the working of the panoramic lens, the plate, to give the most correct projection, should be curved like a bowl; but in practice it proved sufficient that each surface was curved as a horizontal band rather than as a bowl or portion of a sphere. It was, however, sufficiently annoying that a bent plate of glass had to be employed, because when away from the sources whence these curved plates could be procured the photographer was quite helpless. One of the conditions of popular photography is the using of *flat* plates, which may be procured everywhere. Curved plates of glass of a certain size and degree of curvature implied difficulties. With an abundant supply of such plates, however, all difficulties were at an end, because it has been proved that the manipulations consequent upon the employment of a curved plate are, to an expert photographer, not more difficult than when a perfectly flat plate is employed.

It may here be stated that if a bowl be the correct form of glass plate on which to depict the negative, a plate of glass curved only in one direction like a riband will not reproduce the picture correctly, seeing that, although it is correctly curved *horizontally*, it is not so vertically. This, to some extent, is true; and it would be a fatal objection were the subject to be reproduced a perfectly flat one. But in a view from nature some parts are nearer than others, and in the nearest parts—the foregrounds—the back conjugate focus is farther from the lens than the central or more distant parts; and hence, according to some laws of the conjugate focus which we laid down not very long ago, the foreground may be projected, in its optical image, so far behind the lens as to be on the same vertical plane as the more distant parts. This, in practice, is really the case. If the distant portions or horizon of the view be depicted on the centre of the plate, the foreground will, by the law of conjugate foci, be represented, practically, in sharp focus.

We have, while we write, a lens of the kind described lying on the table before us. It is a very beautiful specimen of the work of the optician by whom it was made, and also equally reflects credit upon its inventor. We much admire and appreciate the ingenuity which called it into existence, and have a sort of lurking regret that the march of progress in panoramic or "pantascopic" instruments has led to its being superseded A picture may be taken upon a bowl with the utmost sharpness, but, before it can be utilised, it must be copied upon a flat surface, and, somehow or other, the photographers of the present day will not be perplexed with this operation.

MEMORANDUM ON SILVER RESIDUES.

NOW-A-DAYS, when photographers must economise in all directions, in order to enable them to eke out their scanty earnings, it would be superfluous for me to recommend them to save up carefully their silver residues. Every one has an eye to this source of revenue, and, I believe, regularly practises economy, but probably few are aware of how much can really be saved in this direction. A short time ago a celebrated photographer, who prints on a large scale, in-

formed me that a great proportion of his profits now arises from the proceeds of his gold and silver residues, which, in the earlier days of his photographic career, were allowed, literally, to go to waste. This statement is very credible—nay, probable—when we bear in mind the small margin of profit now derived from the sale of photographic reproductions—a state of things which has evidently arisen from excessive competition and a want of co-operation among photographers themselves.

With a view to gaining a tolerably accurate idea of the actual quantity of metallic silver that can be recovered from the washings, &c., of photographic prints, on a small scale, I determined at the beginning of October of last year, when the autumnal session at King's College began, to test the matter more strictly than I had hitherto done; but I did not intend to complicate matters by introducing into my waste jar any silver except that derived strictly from the printing department of my laboratories. These residues consisted —

1. Of washings from the prints before toning, and from the exciting dishes and funnels.
2. Burnt filters and clippings from the edges of prints, the ashes of both being thrown into the waste chloride jar.
3. Droppings from the sensitised paper when hung up to dry. If, by mishap, any drops fell on the floor or table they were wiped up at once with a bunch of cotton wool kept for the purpose, and finally added to the other residues.
4. The sensitising solution remaining on the 2nd of October of this year was thrown into the waste jar.

The silver derivable from the fixing solutions of hyposulphite of soda was not taken into account, for this reason—that after a few trials, although I found the silver thus saved would amply remunerate the trouble and expense of recovering it, the nuisance of sulphurous smells about the premises, and sometimes wafted into the dark rooms, was far from pleasant, and these fumes were, obviously, more or less prejudicial when operating in the negative processes. There can be no question, however, that if the silver-containing hyposulphite could be conveniently removed to a considerable distance from the operating rooms, and in such a position as not to be offensive to the organ of smell, and be then treated with liver of sulphur, the result would be a considerable augmentation of the residues, which would be well worth preserving.

I may add that I was throughout the year constantly in the habit of using a rather strong sensitising solution ranging from about sixty to seventy grains of nitrate of silver to the ounce of water. A weaker bath would have served all purposes, because my albumenised paper was not highly salted, but I preferred the stronger solution, as it saved time in sensitising and in printing from strong negatives.

The net balance sheet of my year's experiment stands thus:—

Expended in Nitrate of Silver.			
58 ounces of nitrate of silver, at 3s. 6d. per ounce	£10	3	0
Recovered from Residues.			
29 ounces 5 dwts. metallic silver, at 5s. 3d...	£7	13	6
Charge for reduction	0	5	0
Total received from refiner	£7	8	6

It would appear, therefore, that no more than £2 9s. 6d. worth of silver was expended on the prints; but there was not even so much as that, for the hyposulphite fixing solutions have not been included in the estimate. This item, I have reason to believe, would have at least added twenty shillings more of value to the recovered residues. Again: the value of the metallic silver in each ounce of the nitrate should be represented as nearly as may be by 3s. 4d. instead of 3s. 6d., the price of the nitrate. Taking into consideration the latter disturbing cause, which can be accurately estimated, there remains excessively little silver which has been utilised in forming the prints, while more than four-fifths of the whole can be actually recovered with but little trouble and at a trifling expense.

These are somewhat startling results, which I confess rather surprised myself; for, although I have for a long time been aware of the large recoverable proportion of silver necessarily used in photography, I was not aware that the percentage reached so high. Let those photographers, therefore, who are careless of their residues (I hope for their own sakes there are few such amongst us) take these facts and inferences to heart and become wiser men for the future.

For some years past I have abandoned the practice of reducing the photographic wastes from the chloride, &c., in my own laboratory. On one occasion, I recollect, a cry was got up in one of the journals against the alleged tampering of the refiners with the value of the materials sent them for reduction. I did not join in that cry, but, to test the matter, I sent, anonymously, to a well-known refiner, who advertises in your columns, one-half, by weight, of well-dried and mixed residues of chloride, &c., to be smelted; the other half I reduced myself, but the refiner's estimate was more than four per cent. over mine, and that, too, after deducting his charge for smelting. Since then I have found it less troublesome and more profitable to entrust my wastes to the same refiner, for it stands to reason that an experienced assayer, furnished with the most perfect apparatus and daily at work, would be more accurate in his estimate, and be able to recover a higher percentage of silver than an occasional worker with less perfect tools. Without himself testing the value of his residues (and few are able to do that reliably) the photographer, it is true, has no check on the honesty of the refiner, but, it strikes me, the respectable character of well-known firms is a sufficient guarantee. *They cannot afford to be dishonest*, even supposing their moral principles to be very weak.

Coincidently with the above experiment, and extending over the same time, I have thrown down the unappropriated gold from all my old toning baths, but I have not yet collected the crude material for assay. The results, however, cannot be very reliable, nor convey much information, as, on some occasions, I purchased chloride of gold, which, as the readers of the Journal may be aware, is a very uncertain sort of compound in the commercial world.

Next week I hope to have some space in these columns for a short article on how to economise, to the best behoof, the nitrate and chloride of silver which do not actually enter into the composition of the picture. I believe some such information is much needed by a class of photographers who are in the habit of mixing up all their photographic wastes together, no matter from what source they may be derived—and by others who are extremely lax, through ignorance, in apparently small matters, but which are really of great moment, at least to themselves. GEORGE DAWSON, M.A., Ph.D.

SPIRIT OF THE AMERICAN JOURNALS.

NOBERT'S BAND TEST-PLATE.—A CLOUD DIAPHRAGM.—ENLARGEMENTS ON CANVAS.—THE ALBERT PRINTS.—A NEW KIND OF WASHING MACHINE.

NOBERT'S NINETEEN-BAND TEST.—"What on earth is this?" the merely photographic reader will be inclined to ask. By means o delicate mechanism M. Nobert has succeeded in ruling, by a diamond, plates of glass with bands of lines—each group of bands so close together as to present as a whole the appearance of a strip across the plate. Each band is composed of a number of lines, but one band differs from the other with respect to the distance at which these lines are apart from each other. Some of them are so closely ruled that they have *never yet been seen*, and up to a recent date what is known as the "nineteenth band" was also in this category. It was known that these lines existed, and such is the delicacy of the instrument by which they are ruled that the distance between the lines is accurately known. Their real existence, however, was a matter of faith rather than of sight; for in several of them the optical means under the control of microscopists have as yet rendered only some of them visible. Indeed, there were broached theoretical reasons, based on the undulations of light, to the effect that the band in question could *not* be resolved. The one-fiftieth of an inch objective of a celebrated English firm quite failed to resolve Nobert's sixteenth band; but by the aid of a new kind of "immersion" lens both this and the four higher bands have been not only distinctly seen, but photographed by Drs. J. J. Woodward and Curtis, of the U.S. army.

The first intimation we had of this important optical feat was about a fortnight since, when we were favoured by a visit from Dr. Maddox, who enjoys the reputation of standing at the head of the list of micro-photographers, and who was naturally somewhat enthusiastic over this the latest achievement in his favourite department of science. The photographs themselves we have been permitted by Messrs. Powell and Lealand, the makers of the objective, to examine; and the subject formed the topic of consideration at the Royal Microscopical Society on the evening on which this notice was written. In the meantime, the paper by Dr. Woodward, which was read on Wednesday evening last, has been received by us from America as a contribution to the *American Journal of Science and Arts;* and from the following extract it will be seen that M. Nobert himself considered that his fifteenth band was the limit of possible microscopic vision:—

"In a former paper I gave an account of certain observations made on the new nineteen-band test plate of Nobert with various lenses.

The general result of these observations was, that with the $\frac{1}{25}$th of Powell and Lealand, with which lens I secured the best definition, the lines of the fifteenth band were distinctly resolved. In the higher bands spurious lines, fewer in number than the real ones, were seen. The nature of these lines was conclusively shown by a count. With the paper I sent to the editors a series of photographs, taken by Brevet Major E. Curtis at the Army Medical Museum, which showed in a satisfactory manner precisely what had been done. Upon the basis of these experiments and photographs, I expressed the opinion that those who had previously supposed they had seen the true lines in higher bands than the fifteenth had been misled by the spurious lines described—an opinion which has been still further strengthened by subsequent experiments with lenses by the maker whose objectives were supposed to have been successful.

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"I found, nevertheless, that the $\frac{1}{25}$th of Powell and Lealand would go no further on this than on the former plate, and their $\frac{1}{50}$th gave the same result; it would not resolve the sixteenth band.

"With a new immersion $\frac{1}{16}$th, just made for the Museum by these makers, however, I had the satisfaction of distinctly resolving the four refractory bands, and Dr. Curtis has prepared for me photographs of them, which accompany this paper. With the same lens, also, I satisfied myself more positively about the real number of lines in the fifteenth band. The counts I obtained were as follow:—Fifteenth band 45 lines, sixteenth band 48 lines, seventeenth band 51 lines, eighteenth band 54 lines, nineteenth band 57 lines. The photographs of Dr. Curtis were taken without an eyepiece, and with such a distance that the immersion $\frac{1}{16}$th gave 1,000 diameters. The illumination was by sunlight passed through the ammonio-sulphate of copper, a $\frac{1}{5}$th objective of 148° angle of aperture being used as the condenser, without diaphragm or stop, and obliquity of light obtained by means of the centering screws of the secondary stage.

"I send two prints on glass, of which the first shows the 16th, 17th, and 18th bands, satisfactorily resolved. The second shows satisfactorily the 19th band only. These pictures should be studied under a power of from two to six diameters. In counting the lines on them some doubt might arise, especially in the case of the 18th and 19th band, as to the real number of lines; for certain spurious lines, which are interference-phenomena, may be seen on the margin of the bands, and it is not always easy to tell which is the last real and which is the first spurious line. A comparison of several glass positives from different negatives with each other and with the bands as seen in the microscope, where a change of focus materially aids in the determination, has led me to adopt the count above given.

"Besides the prints on glass, I send some paper prints enlarged to two thousand diameters. These show the lines very well to the naked eye; but the loss of definition, inevitable in enlarged paper prints, leaves so little difference in appearance between the real lines and the spurious ones, on the edges of the bands, that they cannot be used for a count.

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"Returning now to this immersion $\frac{1}{16}$th, it may be remarked that the work just done with it has an important bearing on the question of the real limits of microscopic vision. Nobert, in sending me the plate above described, wrote me that in his opinion the fifteenth band was the limit of possible microscopic vision. He based this opinion upon Fraunhöfer's formula with regard to the spectra of gratings, and upon the known wave-length of light undulations. Dr. Barnard, of Columbia College, New York, after reading Nobert's letter, writes me that in his opinion Fraunhöfer's formula does not apply to the visibility of fine lines when observed with a modern microscope of high power, since the great angle of aperture of the objective permits oblique rays to reach the eye, and Fraunhöfer's formula applies only when the eye is perpendicular to the grating. Dr. Barnard is therefore of the opinion that the limit suggested by Nobert has no real existence. In his letter, which I should mention was written before he was aware that I had satisfactorily resolved any of the bands beyond the fifteenth, he proposed that a trial should be made, to resolve the test-plate with monochromatic light, of colours having longer wave-lengths than the violet which I had been using. Accordingly, obtaining monochromatic light by a prism on which a ray of sunlight was thrown, I succeeded, after some trials, in satisfactorily resolving the nineteenth band with each of the colours of the spectrum, from the violet to the red. It may, therefore, be concluded that the present limit to microscopic vision is simply the goodness of the objective, and the rapidity of recent improvements may well lead us to hope for a still further advance."

A Cloud Diaphragm.—We confess to some feeling of surprise that such an astute writer as Professor Towler should have fallen into the error of recommending that the diaphragm of a lens should be of a triangular shape, in order to get a greater amount of light thrown upon the foreground of a picture than upon the sky. It is an old notion which was long ago brought up in connection with what were called bottle-shaped diaphragms, but which has been repeatedly refuted, and has now become exploded. If Professor Towler will turn to our volume for last year he will, at page 589, see, illustrated by a diagram, what we consider to be a complete refutation of the idea which he, along with one or two others, appears to have entertained. But although we dissent from Dr. Towler's recommendation, we allow him to speak for himself, and accordingly we extract his article from the current number of the *Philadelphia Photographer*:—

"A very great defect in landscape photography is the want of clouds, which enliven the scene, when present, almost as much as living animals. An exposure sufficiently long to impress actinically the green foliage and yellow and orange-coloured flowers would be altogether too long for the beautiful white masses of clouds in the sky. Several expedients have been adopted to remedy this evil. One expedient is to take two negatives—one for the clouds by an instantaneous exposure, and the other for the landscape by a much more protracted exposure. This mode entails the labour of double-printing and great accuracy in cutting out the blind-mats. With some landscapes this system would be almost impossible. Another plan is to regulate the influx of light into the camera by means of a folding door in front of or within the camera, something like the door of a stock camera for the globe lens. This helps to remedy the evil only partially; besides this, it cuts off the light too abruptly, and is apt to form a line or division where greater intensity takes place. The method which I here present has been tried very successfully—so much so that it becomes an earnest recommendation to the lens makers to supply, with their lenses, a set of diaphragms that assist in producing this good effect.

"Instead of having a round aperture in each stop, let it be of a triangular shape; that is, a circumscribed equilateral triangle, with the apex upwards.

"It is evident, from the shape of the aperture, that the sky sends through the lens the smallest quantity of light, whilst the landscape transmits the most; the increase of light, too, from above downwards, is gradual, thus producing no harsh line between the sky and the landscape."

Enlargements on Canvas.—Mr. Simpson, in the same journal, describes a method of producing enlargements which he has seen in successful operation in a photographic establishment. An enlarged transparency, of the full size required, is made by means of collodion in the usual way. The collodion must be tough and good, containing not less than ten or twelve grains of pyroxyline to the ounce. Five or six grains of pyroxyline added to the ounce of good ordinary collodion makes a mixture which was successfully employed. The size of plate used on the occasion referred to was 22 × 18—a flat dish being requisite for the sensitising. After the transparency was developed, it was fixed and toned with mercury and hyposulphite of soda. Of course any method of producing the transparency and of toning may be employed. We now quote from the author's description:—

"A good transparent positive on collodion having been obtained, the transfer to prepared canvas is the next operation.

"The prepared canvas, as sold ready for the painter, is employed. The somewhat greasy and repellent or waterproof surface requires, first of all, to be removed. This is effected by means of a warm solution of common carbonate of soda, applied with a piece of flannel. After well scouring with this solution, until clean water flows freely over the surface, it is thoroughly well rinsed and allowed to dry. The glazed surface of the prepared canvas will now have acquired a matt texture of a slightly absorbent character. This is then treated with a weak, warm solution of gelatine, containing from ten to twenty grains to an ounce of water, applied with a sponge, and suffered to dry. The canvas prepared in this way may be kept ready for use.

"Let us now return to the collodion enlargement, which has been fixed, toned, and washed. It is now placed on a levelling-stand, and a strong solution of citric acid in water—the exact strength is unimportant, say thirty grains to an ounce—is poured over it, and allowed to remain a few minutes. The action of the citric acid is two-fold: it restores the toughness of the film, which has become somewhat powdery in character from the action of the mecurial solution, and it loosens the film from the glass. After a few minutes, the citric acid solution is poured off the plate and preserved for subsequent use. The film is now very thoroughly washed under a tap for five or ten minutes, during which time it will have become completely loosened from the glass, upon which it will readily slide about. Should it not become loose during the washing, it must be again treated with the citric acid solution, and again washed. If a tardiness to loosen be noticed, the edge of the film may be lifted, and a gentle stream of water suffered to run underneath, and the plate may be moved gently about until it is seen that the film rests loosely on the glass without adhesion at any point.

"The next step is to get it on the canvas. To effect this, a sheet of tracing-paper the size of the plate is taken and placed upon the film. If two persons can be engaged in the operation, some little trouble in subsequent operations will be saved if the tracing-paper is first wet and suffered to expand; each person then taking hold of two corners, the tracing-paper is gently laid upon the film. If one person only is engaged in the operation, the tracing-paper is more easily managed dry in the first instance, as there is less difficulty in handling it so as to get it down flat on the film when a large plate is used. One edge of the collodion

film is then turned over the tracing paper, and the whole, paper and film adhering, lifted by a sliding motion of the glass, and placed, film down, on the prepared canvas. It is then covered with blotting-paper and thoroughly well rubbed down, the tracing-paper—which has simply served as an aid in lifting the film, and, by its transparency, permitted the position of the image to be seen in placing it on the canvas—is then lifted away, and the transferred film left to dry.

"When dry, this film adheres so perfectly to the prepared canvas that it cannot even be scraped away without injuring the surface of the canvas. It cannot be removed without scouring with hot water or a hot solution of soda. In no instance has it chipped or exfoliated, or in any way shown any tendency to leave the canvas, except in an experimental case, in which the prepared surface of the canvas had not been treated with a soda solution in the way I have described. So far as can be judged, the adhesion is perfect, and the result in every way satisfactory.

"As will readily be understood, the head and such other portions of the figure as may be desirable can be thus transferred to the canvas, and such other portions as may be required can easily be painted in by the artist. In the example I have been describing, a life-sized head and portion of the bust filled a 22 × 18 inches plate, and this, transferred to a canvas 24 + 20 inches, gave more space for background and figure.

"Taking the balance of advantages and disadvantages of this and other processes for securing photographic enlargements on canvas, this appears, undoubtedly, most simple and easy, and, of all silver processes, the most promising, I think, as regards permanency, inasmuch as the canvas—the final basis of the picture—never comes into contact with silver solutions or fixing solutions, difficult to eradicate from a substance like painters' prepared canvas when once its surface has been impregnated or saturated with the various chemical preparations."

The Albert Prints Compared with those by the Woodbury and other Processes.—From the German correspondence of Dr. Vogel, who supplies a monthly letter to our Philadelphia contemporary, we find some observations on the Albert process of printing:—

"The new process of Albert continues to be the theme of conversation. Much has been written on this subject; I am afraid almost too much. This is, perhaps, the reason why the pictures which were sent to America did not come up to the general expectation, although every one must admit that, in the rendering of half-tones, Albert has done more than any one else, Woodbury alone, perhaps, excepted. The results of processes you will find in my journal, *Photographische Mittheilungen*, in the August and September numbers, and the comparison of the two processes is highly instructive. With regard to the price of Albert's prints I am still without definite information.

"When we institute a comparison of the results of the two processes, we find that the Woodbury print excels in the vigour of the blacks, and in this respect is fully equal to a silver print, while Albert's prints show more purity in the lights. Albert can make pictures that are graduated in tone. The durability of both pictures is about equal. Woodbury employs gelatine ink, while Albert uses fatty inks. Apparently, the Woodbury prints are not injured by moisture, while a wet sponge will injure Albert's pictures; but this circumstance is not of so much account in judging of the merits of the two processes, as a slight covering with a waxy substance will, for both, secure the necessary protection.

"Much more important is the paper. Albert has sent me a whole assortment of pictures printed on different kinds of paper.

"The prints on chalk-paper are, generally speaking, sharper and more brilliant—that is, deeper in the shadows and whiter in the lights; but these prints show a slight grain. The impressions on ordinary Steinbach or Rives paper are homogeneous, but less brilliant and sharp. The most brilliant of all was an impression on wax paper, which, in fact, was full equal to a silver print. Whether the production of pictures on wax paper be an easy matter is a question which I am unble to solve.

"The pictures intended for my journal, 1300 in all, are printed on plain Saxe paper, and Albert writes to me that they are all printed from the same form—in fact, 2000 impressions had been taken from the form previously. As regards the production of quantities, little difficulty need to be apprehended. The prints are somewhat uneven in brilliancy and sharpness; but Albert himself excuses this with the want of experienced printers—an excuse which is not very inviting for others to practise the proeess, for every one who will practise the method will have to work with less experienced hands than Albert can command.

"How is it now with silver printing? Are its days numbered once more, and will this process take its place? To judge from the many different samples before me, I think that the reproduction of Kaulbach's cartoons, which Albert has made by his process, cannot be excelled, and that the process is especially adapted to the reproduction of hand-drawings in the manner of cartoons. Likewise it would suffice for technical drawings, but how would it do for portraiture? This is just the point that is of most importance. In portraiture we make the largest demands in regard to sharpness, vigour, delicacy of half-tone; and when we place an Albert print, like the enclosed one, for instance, alongside a silver print, we must confess that in all the points which we have enumerated above the silver print will excel.

"To make a general comparison, the Albert prints are about as good as prints on salted plain paper, or developed prints on plain paper; but, if Albert's prints should prove to be very cheap, it would still be possible that, in spite of their inferior quality, they would obtain the support of the public; for if in the future the public could obtain a hundred pictures after Albert's process for the same price which they now pay for a dozen silver prints, it is quite likely that the generality of persons would give Albert the preference.

"Likewise, it is quite evident that Albert's process is preferable to the ordinary lithograph or woodcut, and that, generally speaking, the preference will be given to his process for illustrating books, pamphlets, and magazines, or where it becomes necessary to produce pictures in large quantities. Our publishers have already an eye on it, and Bruckmann intends to employ a similar process for the reproduction of his publications. The ordinary negatives, as I have already stated in previous letters, are not suitable for the process, as right and left are reversed."

An Oscillating Washing Machine.—The same writer, in his German correspondence, describes a washing trough which is kept in motion by galvanic agency, the object being to prevent the prints from adhering together, as they are occasionally apt to do:—

"The box or trough containing the water is placed on a kind of prism, on which it will easily move from side to side. The oscillating motion is produced by an electro-magnet, which is placed under the box, and which attracts a piece of iron attached to the latter. At the moment when, in consequence of this attraction, the box tilts to one side, the connection with the battery is broken by means of an instrument called a circuit breaker or commutator, well known to every telegraph operator. The box returns to its original position, makes again connection with the battery, and the same operation repeats itself.

"The arrangement is easily made. A battery of two elements has sufficient strength to produce from 200 to 500 oscillations per minute, and the motion which is communicated to the water is so energetic, and extends so thoroughly to every particle, that prints which stick tightly ogether will separate in a few moments."

EXPERIMENTAL ILLUSTRATIONS OF THE MODES OF DETERMINING THE COMPOSITION OF THE SUN AND OTHER HEAVENLY BODIES BY THE SPECTRUM.*

By Professor W. Allen Miller, F.R.S.

If the sodium be raised in temperature until it acquires the same degree as that of the body behind it, the light which falls upon the sodium flame will still be absorbed as before; but now, as the intensity of the sodium light is equal to that of the spectrum behind it, no sensible effect will be produced upon the screen. But if, on the other hand, the sodium flame be still hotter than the body behind it, it will be more intensely luminous, and instead of a black line we shall have a bright line crossing the spectrum at this point.

The vapour of sodium, according to its temperature, may, therefore, give rise to three different effects:—1. It may produce a black line when the temperature of the sodium is low. 2. It may produce no sensible effect, in which case the temperature and the light of the sodium are equal to those of the body behind it. 3. It may produce a bright line, but, in this case, the temperature of the sodium and its light must be considerably higher than those of the glowing body behind it. What is true of the vapour of sodium is true also of other vapours.

The light of the sun affords us a remarkable instance of a case in which the first condition is realised. The spectrum of the sun's light is not continuous but is crossed by a multitude of fine black lines, a few of which are represented upon the diagram now projected upon the screen. These lines, you will observe, vary in number, in blackness, and in definiteness in different parts of the spectrum.

The fact of the existence of these lines was first noticed between sixty and seventy years ago by Dr. Wollaston, and any one may easily observe a few of the principal lines by proceeding as he did, placing himself in a darkened room, allowing a beam of daylight to come in through a chink of about a twentieth of an inch wide, like that formed by the edge of a nearly-closed door, and then at a distance of ten or twelve feet viewing this line of light through a glass prism held close to the eye, with its edge parallel to the line of light. Little, however, was it imagined when these lines were first seen that in them lay the means of ascertaining the chemical components of the sun. Many among you, from what I have already said, will, however, see how this knowledge is obtainable.

The sun itself is not a mere globe of glowing iron. It consists of a central, intensely-heated nucleus, above which is an atmosphere filled apparently with white-hot solid particles distributed in the form of vast clouds over the whole surface, and outside this powerfully luminous atmosphere is another less heated gaseous stratum containing the vapours of a variety of bodies, most of them metallic in their nature.

The black lines which we see in the solar spectrum are the effects produced by these cooler but still intensely-heated metallic vapours, upon the light emitted by the cloud-like luminous surface of the sun.

* Concluded from page 484.

How are we to learn what the bodies are in the sun by which these black lines are formed. The first thing to be done is to measure their position accurately, and to make a map of them. Fraunhöfer, a working optician, of Munich, was the first person who attempted this, and they have bean called Fraunhöfer's lines. In order to do this he viewed the sun's light through a prism placed in the focus of a small telescope provided with micrometer screws for measurement.

Still this does not explain the meaning of the particular lines. The map itself needs interpretation. For this explanation, and for the mode of experiment required, we are indebted to Professor Kirchhoff. If we take two wires of any metal, such, for instance, as magnesium, and by means of a strong heat, such as that of the electric spark, convert a portion of the metal into a luminous gas, and place the spark given opposite the slit of Fraunhöfer's apparatus, which, in its present improved form, is called a spectroscope, we shall see the bright lines characteristic of magnesium. Suppose that over one-half of the slit of the spectroscope a small reflector is placed, and that by means of this reflector a beam of the sun's light is reflected into the tube, then transmitted through the prism, and afterwards through the telescope into the eye of the observer, and at the same time the electric sparks are made to pass between the magnesium wires, two spectra will then be seen one over the other, edge to edge, just as is represented in the diagram. By means of this second diagram the general arrangement of the apparatus will be understood.

By thus comparing the spectra of the different elementary bodies with that of the sun, not only was magnesium found to be present, inasmuch as the bright lines of magnesium coincide with certain dark lines in the solar spectrum, but sodium, iron, calcium, hydrogen, and eleven other elements—sixteen in all—as enumerated in the following table, are present in the atmosphere of the sun, viz.:—Aluminum, barium, cadmium, calcium, chromium, cobalt, copper, hydrogen, iron, magnesium, manganese, nickel, sodium, strontium, titanium, zinc.

I shall not dilate further upon this part of the subject, which has recently been studied with so much success by Mr. Lockyer, who will himself give an account of his results on Monday.

By concentrating the light of the brightest fixed stars with a powerful telescope, a point of light of sufficient intensity may be obtained to enable its spectrum to be examined. It is necessary first to open out this point into a narrow line of light; and this is effected by the use of a cylindrical lens, which spreads the light out in one plane only. The telescope must be made to follow exactly the apparent motion of the star in the heavens; and in the telescope, exactly at the focus of the object glass, a narrow slit, not wider than a fine hair, is placed. The light of the star must be kept perfectly steady on this slit, and then be examined through a small spectroscope, which is attached to the telescope and follows its movements. A special apparatus is also connected with the instrument for producing sparks from the particular metals which it is desired to compare with the lines in the star spectrum. The diagram to which I now call your attention represents the star spectroscope employed by Mr. Huggins and myself in these difficult and fatiguing observations. Only the brighter stars have as yet been examined—eight or ten pretty fully, others less perfectly. It is, of course, impossible to render such observations visible to more than one person at a time, and then only under particularly favourable circumstances, and when the star is in a suitable position in the heavens. I have, however, here some photographs of careful drawings which will give the appearance of two or three of such stars. Each star has a different series of lines in its spectrum; but each is found to contain several of the chemical elements which are met with upon the earth. I show you spectra of the bright star Aldebaran, in the constellation Taurus; of Betelgeus, the bright star in the shoulder of Orion, and of Sirius, the most brilliant of the stars visible to us in this country. Many of the metals found in these stars are of comparatively rare occurrence, while others are abundant. For instance, in *Aldebaran*, sodium, magnesium, calcium, iron, bismuth, hydrogen, tellurium, antimony, mercury; in *Betelgeus*, sodium, magnesium, calcium, iron, bismuth, thallium; in *Sirius*, sodium, magnesium, hydrogen, iron.

Several of the substances found in these stars appear to be absent from our sun.

The fixed stars vary in colour, and they each have their own peculiar spectrum, yet they are formed upon a plan which these observations show is analogous to that of our sun, viz., an intensely heated nucleus or kernel surrounded by a less hot but still prodigiously heated atmosphere, containing various metallic and other vapours, many of which are identical with the elements which occur in the earth. In the spectra both of the sun and of the fixed stars there are, however, numerous lines which we have not as yet been able to refer to their constituent materials. This arises probably in great measure from our imperfect acquaintance with the spectra of the elements at present known. It arises in part also from our ignorance of some of the elements which compose our earth itself. Within the last eight years no fewer than four elementary bodies, viz., cæsium, rubidium, thallium, and indium have been discovered by the special character of their spectra. Thallium, for instance, produces a magnificent green line unlike that of any other element. Cæsium shows two remarkable bands in the blue.

Another reason why we have not yet interpreted all these lines is probably that many of them are the results of compounds formed in the outer and cooler part of the sun's atmosphere, where ordinary chemical attraction again exerts itself. In the intense focus of the nucleus of the sun the heat is so fierce that all chemical combinations are destroyed, and the elements occur in a state of mixture with each other, as they do in the intense heat of the voltaic arc.

But the revelations of the spectroscope do not end here. From time to time stars blaze forth in the heavens with great brilliancy, and then as speedily fade and dwindle away. Marvellous changes are seen in such cases to be going on. In May, 1866, a star suddenly burst forth in the constellation of the northern crown. On examining its spectrum a wonderful condition of things was rendered visible, which will be most easily made intelligible if I project a drawing of the spectrum of this star, T coronæ as it is called, upon the screen. This star exhibits three different spectra. Two of them resemble the spectra of the stars in general, consisting, that is, of the continuous spectrum of the nucleus, crossed by the spectrum of dark lines produced by the gaseous bodies contained in its outer atmosphere. But in addition to these is another spectrum, composed of four or, perhaps, five bright lines. This is the spectrum of a gaseous body in a state of intense incandescence, or glowing heat; and the position of the principal bright lines shows that one of the luminous gases is hydrogen. The great brightness of these lines shows, too, that the gas is hotter than the body of the star itself. These facts, taken in connection with the suddenness of the outburst of light and its very rapid decline in brightness (from the second magnitude to the eighth magnitude in twelve days)—that is to say, from a bright star to one invisible without the aid of the telescope—suggests the startling probability that the star had become suddenly enwrapt in the flame of hydrogen which was burning around the star and combining with some other element. As the hydrogen gradually became exhausted the flames diminished in intensity, and the brightness of the star declined in a corresponding proportion.

I must yet mention one more of the class of objects which occur in the heavens, still more enigmatical than any which I have at present described, and respecting which spectrum observations have furnished an unexpected amount of information—I mean the *nebulæ*. When the eye is aided by a telescope of moderate power a large number of faintly-luminous patches and spots are distinguished in the sky, which differ entirely in appearance from the defined brilliant points of light formed by the stars. Many of these singular objects, when viewed by the most powerful telescopes, still resemble mere shining clouds. These objects have been a standing puzzle to astronomers, and the interest connected with their nature has been increased by the suggestion of Sir W. Herschel that they were possibly portions of the original material out of which existing suns and stars have been formed, and that probably in these nebulæ we may actually watch some of the stages through which suns and planets pass before they take their final shape.

Spectrum analysis, if it could be applied to these excessively faint objects, would immediately show whether they had a constitution like that of ordinary stars or not. Certain of these bodies when thus examined give no continuous spectrum, but one consisting of bright lines only. I project upon the screen one or two drawings, by Lord Rosse, of nebulæ, afterwards examined by Mr. Huggins, and a representation of the spectra which he observed, and which prove that these particular nebulæ consist of glowing gas without any central solid or liquid nucleus. About twenty out of sixty nebulæ examined by Mr. Huggins formed spectra composed of bright lines only. Of the rest, most give a faint continuous spectrum, as though these were really in a more advanced state of condensation than the gaseous nebulæ. In all these spectra a bright line coincident with one of the bright lines of nitrogen occurs, so that they appear all to have a common character, and contain the same elementary substance. In a few of the brighter nebulæ three or even four lines have been observed, but the position of each of these lines is in all cases the same, when compared with the spectra of other nebulæ. The position of the third line coincides with that of the most prominent line in the spectrum of hydrogen, so that there can be little doubt that the elementary gases, hydrogen and nitrogen, in a state of high ignition, are the chief components of these remarkable bodies.

And now let us endeavour to form some notion of the distances of these bodies whose constitution and chemical nature have thus in part been made known to us.

The diameter of the earth on which we live is nearly 8,000 miles, and the moon is at about thirty times this distance from us, while the sun is 380 times as far off as the moon. How can we in any way picture to ourselves these immense distances? Suppose that the sun were represented by a globe two feet in diameter, the earth would then be of the size of a pea, and it would then be placed at a distance of 215 feet from it, or about twice as far off as I am from the wall of this room in front of me, and the moon would be of the size of a mustard seed placed seven inches from the pea, which represents the earth, whilst Neptune, the most distant of the planets, would be the size of a large plum, and would be placed at a mile and a quarter from the two-feet globe supposed to represent the sun.

Well, Sirius, the brightest of the fixed stars, if measured by this scale would be 40,000 miles away from us, or at a distance five times as great as that which now separates us in a straight line from New Zealand. There is no doubt that many of the minute telescopic stars are several hundred times as distant from us as Sirius. Astronomical

observations upon the eclipses of Jupiter's satellites have shown that it requires rather more than eight minutes for the light of the sun to reach the earth; it would take not less than twenty-three years for the light of Sirius to traverse the distance between that star and the earth if it travelled at the same rate. And of the distances of the nebulæ we have no means of forming any calculation.

How amazing the thought that throughout the whole of this unbounded range of space matter is to be found of the same kind! Aggregated into masses which, though differing from one another in composition, like the various veins of ore which occur in mines upon the surface of our globe, yet all are evidently of common origin, all obey the same laws, and all possess a chemical nature similar in kind. Surely one is tempted to think if the discovery of such marvels, if the measurement of such distances, the estimate of the mass and the magnitude, the calculation of the velocity of these bodies in space, and from the determination of their chemical composition at distances the accurate conception of which transcends even the ability of imagination—if these, I say, be not beyond the power of man, it may well be supposed that there is no limit to the discoveries which are within his reach.

In one sense this is true. The visible works of God are laid open to our investigation to an extent which is really unlimited; and one of the noblest occupations in which man can be engaged is in thus tracing the footprints of his Creator, and in discovering the laws which He has imposed upon matter, and by which suns and systems are controlled. But, if there be a spiritual as well as a material universe, we must not the less have our material upon which to work before we can attempt its investigation. It is just for the purpose of supplying this material, and instructing us in this most important of all knowledge that the Bible professes to have been given, since it is knowledge which we might for ever seek in vain, in meditating on the works of creation, however successful in unveiling its secrets by scientific investigation.

While, then, we explore in admiration and delight the wonders of nature, as they are commonly termed, or, as they truly are, the works of Him who is the author of nature, let none of us forget with equal diligence to study that volume which alone can reveal to us the spiritual, the unseen, and the eternal—a study which, to be effectual, must be approached in the spirit of prayer for the guidance which is promised to everyone who asks in the belief that so asking he shall receive.

Contemporary Press.

A WORD ON CLEANLINESS.

[Philadelphia Photographer.]

Nothing, it is probable, balks the beginner in photography more frequently than the mishaps that arise from neglect of the precaution of keeping his materials absolutely apart from one another; and even older hands not rarely suffer from the same cause.

It chances that most of the substances which the photographer deals with are colourless and make colourless solutions. Such are nitrate of silver, hyposulphite of sodium, cyanide of potassium, bicarbonate of sodium, chloride and acetate of sodium, &c. When these bodies are dissolved in water such solutions cannot be distinguished from clear water. If emptied from vessels, unless great care be taken in washing, some portion may remain, and prove extremely pernicious in connection with the next use to be made of the vessel.

Especially, drops may adhere to the upper part of the vessel, not reached in a careless, half purification, and so a very appreciable quantity of the previous material may be introduced into the next. The following instance shows this in a very striking manner:—

Some solution of nitrate of silver was emptied from a phial, and, on a sudden emergency, the phial was to be used to contain some medicine. It was especially directed that the phial should be cleaned by shaking successive portions of water in it. The cleaning was, nevertheless, insufficient, and the patient to whom the medicine was administered was rendered extremely sick. As the medicine itself had no such tendency, and as the patient was at once relieved by swallowing table-salt, there could be no doubt that nitrate of silver had been left in the phial, doubtless adhering to the sides above the portion which had been washed.

Where, as in photography, a certain round of technical operations is constantly to be followed, it is a great safeguard to appropriate absolutely certain vessels to a single exclusive use for each, so that the need of cleaning may be reduced to the lowest point, and the danger of doing it insufficiently may be in a great measure got rid of.

A great source of danger lies in using vessels that are not labelled. Colourless solutions in such are always liable to be mistaken for each other, or for pure water. In this last way many lamentable accidents have occurred. Even where no personal injury happens, regrettable losses may result. I once saw a large batch of good prints ruined by being placed in what was supposed to be pure water for washing, but which was in reality contaminated with traces of hypo. washing, and turned the prints black.

In cleaning vessels, there are two very effectual methods, mechanical and chemical. A mixture of shot and sand, with a little water, is excellent for cleaning. Bristle brushes, sold under the rather odd name of "sash tools," are very useful, and should be always at hand. In cleaning by chemical means, nothing is comparable with a mixture of bichromate solution and sulphuric acid. In some cases, however, especially where salts of iron are to be removed, *binoxalate of potash* is excellent; and, for removing stains on clothing, especially white, the hypochlorite of sodium, sold under the name of "chloride of soda," or "eau de Javelle," is most useful.

Finally: I may remark that the more carefully and observantly that one operates the more one is led to conclude that time is never lost in careful cleaning, but that, on the contrary, this is the truest and most certain economy. M. Carey Lea.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 20th	Edinburgh	Hall, 5, St. Andrew-square.

EDINBURGH PHOTOGRAPHIC SOCIETY.

During the past summer this Society has held three of its meetings out of doors and in the country.

The first was held at Cramond, which was attended by comparatively few of the members, but which, in consequence of the fine weather and the geniality of those present, was passed in a very enjoyable manner.

The second was held at Borthwick Castle, which is situated about twelve miles from the city, and is in the midst of some very fine scenery, including the fine old pile itself, which is one of the most perfect of the ancient Scottish castles, and, although not one of the most picturesque, is still a grand ruin. The day the meeting was held was one of the finest of the season, and many good pictures were obtained. The forms of meeting were gone through on arrival at the ground, and after the day's work had been accomplished tea was provided through the active efforts of the sub-committee, Messrs. Lothian and Sinclair. The drive home in the cool of the evening completed one of the pleasantest days ever spent by those who had the good fortune to be present.

The third and last out-of-door meeting was held on the 29th Sept. last, at Arniston, the seat of Mr. Dundas, one of the members of the Society. After the notices were issued the weather became very bad, and fears were entertained that this, the last meeting of the season, would prove a failure, the previous day, Tuesday, the 28th, being very wet and stormy; but the morning of Wednesday, the 29th, turned out very fine and promising, and those who had the pleasure of being present and the courage to risk it were rewarded with a very fine day, it being mild, genial, and still, in addition to being bright and sunny.

One of the most attractive features connected with these meetings has been the commingling of the working and the amateur members—the latter designation including those who do not care to trouble themselves with cameras and other apparatus, but who, while quite able to do so, yet prefer to help those more enthusiastic members who take their instruments with them. A good many fine pictures will, no doubt, be the result of the last meeting.

After a group of the party had been taken by Mr. Lothian, and tea provided and enjoyed in a truly rustic fashion, followed by many good wishes from Mr. and Mrs. Dundas for a renewal of the visit, the party started homewards, the drive out and home being one of the very agreeable features of the excursion.

Thus has been completed the summer campaign of the Edinburgh Photographic Society, the more serious winter work of which body now remains to be taken up on the third Wednesday of the present month.

Correspondence.

Foreign.

Paris, October 12, 1869.

In my last I proposed to give some account of a short trip I have made into Switzerland, in the hope that personal experience might benefit some of your readers who may at some time contemplate such an excursion.

I availed myself of one of the circular tickets issued by the Paris, Lyons, and Mediterranean Railway Co., by which I was enabled to occupy a month in visiting the following places, at a total cost in railway fares of 84 francs 40 centimes, or about £3 7s. 6d. sterling. Had I gone to all these places, and taken the ordinary tickets from station to station, the cost would have been about 25s. extra. No fear need be entertained respecting the discomfort of travelling in second-class carriages. Even for long journeys, on the lines of railway upon which these tickets are available, the comfort and conveniences of the carriages leave nothing to be desired, and surpass, in many cases, the first-class upon English railways. In Switzerland the saloon carriage is very common.

The only inconvenience of a second-class ticket is that the quick trains, as a rule, have only first-class carriages attached to them, and it *sometimes* happens that the loss of time in not being able to get over some portion of the journey quickly is annoying. However, those who wish for a first-class tourist's ticket for the same route, and extending over the same time, can obtain it by paying £4 11s.

The towns at which passengers are allowed to stop as long as they please are—Fontainebleau, Dijon, Mâcon, Culoz, Geneva, Lausanne, Fribourg, Berne, Bienne, Neuchâtel, Pontarlier, Dôle, Dijon, Fontainebleau, and Paris again. If passengers prefer to enter Switzerland by Dijon, Dôle, Pontarlier, and Neuchâtel, they are at liberty to do so; but in this case they must return by Geneva, Culoz, Mâcon, and Dijon. The route must be decided upon before the tickets are purchased. Of course the passenger is not compelled to stop at every town, and if he simply wanted to go from Paris to Geneva and back he would effect a saving in money in taking this circular ticket, although he would have more travelling than if he went direct there and back again.

At Fontainebleau there is plenty to occupy a visitor for one or two days, and the vast forest offers many beautiful points for the photographer's camera. Mr. W. Harrison, a former correspondent of THE BRITISH JOURNAL OF PHOTOGRAPHY, has well explored the photographic sites of the district. Many of his published views are now to be seen in the Exhibition of Photographs in the Champs Elysées, and can be obtained from a printseller in the Rue de la Paix, Paris.

In passing the country between Dijon and Mâcon, the tourist is in the midst of the finest vineyards of France, where the grand wines of Burgundy are produced; and the names of the stations—Chambertin, Vougeot, Nints, Beaune, Meursault—will doubtless recall the varieties of red and white which are famed on the *cartes* of hotels and in the cellars of connoisseurs.

From Mâcon to Geneva, after passing the station of Ambérieux, the scenery is of the most magnificent description, and I think the railway ride cannot be excelled anywhere for wild picturesque beauty. As the traveller can stop at Culoz I should recommend all photographers who are desirous of obtaining memorials of this part of the Jura range and Rhone valley to put up here and make excursions in the neighbourhood. I believe that the railway ride between Dresden and Prague is considered one of the finest in Europe for scenery, but it does not equal, in my opinion, that I have just described.

After leaving Culoz the railway passes through a long tunnel, upon emerging from which the Swiss Alps become visible, and upon a clear day some of the peaks of Mont Blanc may be seen. The day we arrived at Geneva was that following two national *fête* days, and the town was still decorated with innumerable flags, banners, triumphal arches, and all the usual accompaniments of town rejoicings. The occasion of these *fêtes* was the inauguration of a monument of two colossal figures in bronze, representing the unity of the Swiss Confederation and the Republic of Geneva in 1814. A great deal of enthusiasm was got up by the Swiss, and during the *fête* days repasts were organised in different parts of the town, of which anyone could partake and assist in drinking the patriotic toast of the *fête*. I have often seen "rejoicings" in Paris, but the Parisians do not take the real trouble which the Swiss had taken to decorate their city. Here all is got up rapidly by means of decorations, &c., kept ready for any occasion, and it appears tame and "made to order." In Geneva the effect was different; all seems spontaneous and done with a will. The *Journal des Etrangers* came out with a flourishing leader upon the date and the *fête*:—

"From door to roof the houses of Geneva are only a pretext for floating something of red, yellow, blue, green, &c. Which of the colours of the rainbow has not figured in this patriotic exhibition? Nothing here moves; it is well—the rainbow is content. No leaven of jealousy will upset the eternal order of the solar spectrum, and everyone ought to felicitate himself in seeing the luminous ether associate itself with the sentiments of the Genevese people. And this is because it concerns a *fête* eminently national," &c., &c.

Of course, my eye was attracted, in looking over the newspaper, by the words "spectrum" and "luminous ether," and I was much amused at the use the enthusiastic editor had made of them.

There is no dearth of photographs and photographers in Geneva, and very pretty pictures of all descriptions are taken of the view of Mont Blanc as seen across the lake from the Quai des Bergnes, or thereabouts. The *carte-de-visite* pictures are sold for half-a-franc each, and long panoramic views, about four inches wide, for from three to four francs each. There are some very good views also, size 10 × 8. I noticed some beautiful copies of engravings, taken by A. Reymond, and it was not till I had examined them closely that I assured myself they were obtained by photography. Two subjects which struck me were pictures of *The Grutli* and the *Prisoner at Chillon*.

In almost every shop window I observed photographs of Swiss peasants, showing the numerous costumes of the country. Those of the *carte* size were the most numerous, and the cabinet size the most attractive. I knew they must be the work of some clever photographer, and I soon found out they were from the camera of M. Braun, of Dornach. These were the photographs of this artist of which I saw most in my trip. I observed a few large landscapes; but in this branch, I think, our countryman, Mr. England, was equally well represented.

It was not till we arrived at Berne that the "originals" of the costumes were much noticed; but in this quaint city it seems as though every woman was dressed in some different and picturesque costume. The natives of the various districts can be known by their dresses. In this city, too, I saw the photographs of Braun coloured, and, for once, I think the subjects were improved by the process, as colour goes for so much in a picturesque dress. In Geneva some good portraits of children were shown in the case of M. Boissonnas, who announced that he would only operate upon such subjects from 9 to 1 in the forenoons.

From Geneva there are first-class diligences running daily in the season to Chamouni; the medium fare is about seventeen shillings, and the time occupied in the journey about nine or ten hours. For some hours before arriving at Sallanches—a town from whence the best general views of Mont Blanc are to be seen—the road passes through beautiful valleys closed in by high mountains, down the sides of which several lovely, fairy-like cascades descend in fantastic jets of sparks of water. Here there is plenty of food for the camera; but the tourist had better push on for St. Gervais—a little village nearly 3000 feet high—the next resting-place to Sallanches, where he can "rest and be thankful," and enjoy his camera to his heart's content.

Every description of scenery can be had here—snow-clad mountains, rugged glaciers, bleak mountain peaks rearing themselves up in irregular shapes against a sky in which float the most exquisite cloud scenes sometimes, verdure-covered hills, chalets, panoramic views, dells, glens, gorges, torrents, rivulets, pine forests, vineyards, and the most irreconcileable, angry, cruel, irresistible cascade I ever met with. This is the Cascade de Crepin, and a person who had seen Niagara assured us that this impetuous, boiling waterfall gave a better idea of unconquerable force than its vaster brother. A rainbow is often seen playing about its spray, and if a photographer could do justice to the wild, rushing beauty of this fall, his reputation would be sure for the production of instantaneous pictures.

Here I must leave the tourist till next week, but, before ending this letter, must just revert to the frightful tragedy which has recently been enacted here. Yesterday I saw the photographs of the bodies of the poor mother and her five children, they were taken by order of the police, and exposed in the window of the photographer. A more horrible, ghastly picture I never saw. May our gentle art be never more required to perpetuate such a frightful crime! Neither photographs nor pictures of any kind can be sold here in the streets without the permission of the authorities, and many persons hoping to reap a harvest from the sale of photographs representing something or somebody connected with the crime have been arrested and punished. The genuineness of the portraits of the murderer sold, and doubtless exported, may be judged from the indignation of a Polish count at seeing his likeness hawked about as the "correct card" of Traupmann. Traupmann, it is reported, refuses to allow his portrait to be taken unless he receives some 10,000 francs for it. R. J. FOWLER.

Home.

SPIRIT PHOTOGRAPHS.

To the EDITORS.

GENTLEMEN,—Mr. Fowler has now come to exactly the same views as the spiritualists. He says that when spirits are seen he believes that a change takes place in the observing individual. This is exactly what spiritualists believe of seeing mediums—that their spiritual eyes are opened; in short, that some of their spiritual faculties are developed before passing through the process called death. There is much on this subject in Mrs. De Morgan's book, *From Matter to Spirit*, with a preface by Prof. De Morgan, President of the Mathematical Society of London.

What a seeing medium perceives is evidence to himself, but not to others. For this reason the spirits, when the necessary conditions are supplied to them by those on earth, are able to materialise portions of their bodies or objects which they form, so that the said formations may be seen by everybody at the spirit circle. This is how the face of Mr. S. C. Hall's departed sister was made visible to himself and eight witnesses at the same time, so palpably that the nine observers think that the appearance might have been photographed. Mr. Hall did not say that his sister was blind in spirit life, as Mr. Fowler asserted—she only shut her eyes that she might be more easily recognised.

Here is another instance of how spirits sometimes at circles make material things which may be seen and handled, consequently photographed. The quotation is from a portion of the evidence given a few weeks ago before the Dialectical Society, by Miss Anna Blackwell, 160 *bis*, Avenue d'Eylau, Paris:—

"I will relate what occurred at Mr. S. C. Hall's before several persons. The spirits said—'Now, pay attention, and we will show you how we can make things out of the air!' They watched, and presently they saw the air become thick—foglike—in one spot. Then it became solidified into cloth. That cloth was passed around, examined, pulled, and was seen to be such a piece of cloth as might be sewn on trousers. It was then put down, and the spirits said that they had made it so as to retain its tangibility for a very short time only. It went into the foglike spot, and then faded into air just as it had come. The spirits tell us that solid matter is only the condensation of the various materials contained in other states in the atmosphere of the planet."

Does Mr. Fowler think that a piece of cloth which he can pull and sew in his trousers can be photographed—provided always, as the

lawyers say, that he presents himself before the camera in good time, before the melting process begins?

Now, as to Mr. Mumler's photographs. Of this photographer I know nothing, except that Judge Edmonds and Mr. Livermore, the banker, both eminent spiritualists and thoroughly honest men, have witnessed his operations, and pronounce him to be a real medium and not an impostor. Nor could all the photographers in New York prove the contrary, though they tried hard in a court of law. In Mumler's operations the spirits really stood by the sitter, because when seeing mediums were present they saw them there, but they were not visible to others. Mumler always stood near the camera, so that the real work of impressing the plate with the image was done inside the camera—how, I do not know.

In this letter I have kept closely to the subject of the photographing of spirits. Mr. Fowler first quitted the subject by calling Mr. S. C. Hall "impious," and so forth. I simply showed that the assertions of Mr. S. C. Hall and his eight witnesses are amply corroborated by the experience of others. In short, when the physical facts of spiritualism are supported by the testimony of some millions of witnesses, by a literature (principally American) of some hundreds of volumes, and by a good many periodicals of long standing, I say now, as I said at first, it ought to be investigated. Such investigation is likely to throw light on the molecular physics of photography.

One of your contemporaries has reprinted my last letter, and written a two-page article about it. Spiritual phenomena have as yet been investigated only by the higher and more educated members of society, which fact accounts for your youngest contemporary knowing nothing about the subject.—I am, yours, &c., A. B. C.

London, October 12th, 1869.

[This subject has been discussed sufficiently in these pages, which, we must remind our correspondent, "A. B. C.," are not those of a spiritualist journal. From such indications as may be gathered from the correspondence already published, the subject might be made exceedingly prolific of indefinite arguments; and as we have received indubitable proofs that the discussion has survived the interest taken in it by our readers, it cannot be further prolonged. The controversy must here close so far as our columns are concerned.—Eds.]

METAL TANKS.

To the Editors.

Gentlemen,—Will the putting of hypo., after fixing prints (and treating it with sulphide of potassium), into an iron tank be injurious to either tank or silver? or would a slate one be better?—I am, yours, &c.,

Ross, October 9, 1869. W. H. Warner.

[A slate tank will be *much* better than one of iron, which ought not to be employed for this purpose.—Eds.]

Photographic Societies.—In reply to the strictures of an "Edinburgh Photo." in our last, Mr. Winstanley has sent us a letter of such considerable length as to render it impossible for us to print it *in extenso*. After meeting the charge of making his differences with the Manchester Photographic Society "a stalking horse on which to air certain opinions," and showing that his censor has been doing the same thing with himself, gives what must be considered a very satisfactory account of a matter which was liable to be misinterpreted, viz., his admission to the society named:—

"Your contributor, where he refers to the inference to be drawn from the fact that a gentleman who knew me declined to introduce me to the society to which I gained admittance through the kind offices of a stranger, makes a decided point and makes it well. The inference, which is, that being known I am denied what unknown I obtain, is certainly not in my favour, and for this inference I have only myself to blame. You will allow me, however, to state the facts. The gentleman in question 'kindly promised' me an introduction, told me subsequently he had proposed me, and that I had been unanimously 'blackballed,' to his disgrace, because I pursued photography professionally. The sequel showed that he never proposed me at all, that I never was 'blackballed,' and, when elected, was received with kindness because somewhat known in photography, and not objected to because I endeavour to obtain my livelihood by his legitimate pursuit."

Mr. Winstanley puts the argument against the ballotting of members pertinently:—

"If, as your correspondent asserts, strangers are always courteously admitted to societies, the existence of an election seems supremely absurd, because it certainly leads them to another impression. I am of opinion that the exceptional cases of incompatibility, whether they arise from a man's profession, appearance, or temperament, should be met by the exceptional course of expulsion, which might, perhaps, but occupy an hour in a few years, and not by a regular course, which devours an hour on each evening, and still leaves work for the exceptional course to do."

He denies that he has advocated *verbatim* reporting, and considers, with his censor, that a summary of what each speaker says is best, and this, he adds, he has all along advocated in language about which there can be no misapprehension. He concludes by giving the reasons which led him and several others to withdraw from the society of which they had previously been members.

Miscellanea.

A Novel Announcement.—In the window of a photographic gallery in Railway-street, Beverley, is the following announcement, name and address omitted—"Wanted, Mr. ——, groom, of ——, to call and pay for his portraits. N.B.—This notice will remain here till the portraits are paid for." Attached to the notice is a *carte de visite* of the unlucky creditor.

The Photographer and the Artist.—At the Hammersmith Police Court, on Wednesday last, Mr. Robert Faulkner, photographer, of 46, Kensington Gardens-square, was summoned for assaulting Mr. Robert Clothier, an artist, of 28, Chepstow-place, Bayswater, on Monday, the 27th of September. Mr. Scaife appeared for complainant, and Mr. Macmullen for defendant. In opening the case Mr. Scaife said that the defendant had been guilty of a cowardly attack upon the complainant in his own house. There had been some business transactions between the parties and an unsettled account was due from Mr. Faulkner to Mr. Clothier, and a dispute arose between them respecting a lay figure which Mr. Clothier asserted had been lent him by Mr. Faulkner, but which the latter gentleman said had been purchased by the complainant, and wrote him a letter to that effect. To this letter Mr. Clothier replied, denying the purchase, and using words which Mr. Faulkner considered offensive. He accordingly went to complainant's house and demanded an apology. This Mr. Clothier refused, stating that his words were only a repetition of defendant's to him on many occasions, and were not intended to be offensive. Some angry words ensued, when Mr. Clothier ordered Mr. Faulkner to leave his house, instead of which he closed the room door, and when behind Mr. Clothier struck him a violent blow on the temple which partially stunned him; the blow was instantly followed by another in the mouth, which knocked him down and rendered him partially insensible. This statement was deposed to by complainant. Eliza Kingsbury (a servant in complainant's employ) was called, and said that hearing her master call "murder" she ran into the room and found him lying on the ground, Mr. Faulkner leaning over, and beating him abont the head with all his force; the blood was coming from her master's mouth. She seized hold of Mr. Faulkner and dragged him off. Her mistress came into the room dreadfully frightened, and she (the witness) was sent for a policeman but could not find one. Mr. Macmullen replied, and said that an apology had been offered to Mr. Clothier, but he refused to accept it. Mr. Ingham (the magistrate) said, upon reading the letter, that it might be a very christian and friendly way to give advice, but had such a letter been sent to him he should have considered it an insult; but though the words were offensive it did not justify the assault proved. He should therefore fine the defendant 20s. and 2s. costs. The fine was immediately paid.

Radbruch's Dry Process. —A correspondent of the *Philadelphia Photographer* sends to that journal the following description of a dry process successfully practised by him:—

No. 1.—Collodion.

Plain collodion	1 ounce.
Equal parts of alcohol and ether.	
Iodide of sodium	4 grains.
Bromide of cadmium	3 ,,

The salts dissolved in alcohol, and added to the collodion.—

No. 2.

Ether	1 ounce.
Gum resin	½ ,,

Dissolve, and add half-an-ounce of balsam of cappavia. Shake well and put it aside to clear up, which will take about two or three days. To the ounce of collodion add five drops of No. 2; shake well and let it stand for about three days. The collodion will then be ready for use.

Silver Bath.

Nitrate of silver	1 ounce.
Distilled water	11 ounces.
Nitric acid	3 drops.

Developer.

Sulphate of iron	1¼ ounce.
Epsom salts	1¼ ,,
Water	32 ounces.
Acetic acid	1½ ounce.
Alcohol	1 ,,

The negative plates have to be albumenised with about one ounce of albumen to seven ounces of water, else the film will peel off. After the plate has been sensitised wash it well with the purest water that can be obtained, and put it away to dry. When dry, the plate is ready for use. Expose not longer than wet plates. I took my negatives with the front lens of a half-size C. C. Harrison's instrument, with a diaphragm of ⅜-inch diameter, and exposed from ten to twenty-five seconds. With wet plates it took the same time. Before developing, wet the plate with distilled water, and pour over it a solution of—

Water	1 ounce.
Nitrate of silver	20 grains.
Acetic acid	10 drops.

Then develope in the usual way. If the exposure is long enough the image will appear almost immediately, looking very intense. If the shadows do not appear dense enough, wash the plate and redevelope in

the same way as before. Fix with a weak solution of cyanide, and examine the negative in the light. *It will keep the same intensity* when dry and varnished as it then has. If not intense enough, wash it very clean and redevelope in the same way as before. This way of redeveloping I prefer to any other, because it gives the softest picture, especially in the dry process. Hoping that every photographer will give this process a fair trial, and succeed as well as I did, I close these lines with a remark that one drop of No. 1 added to one ounce of any collodion keeps the collodion for a year and longer in good working order.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Herbert.—Your half-plate lens will answer quite well for cabinet portraits.

X. Y. Z.—Gelatine will answer much better than isinglass. The Publisher will attend to the other matter.

F. S. C.—The portrait you enclosed, and which we have returned in your envelope, is not that of Sir David Brewster, but of Professor Sir J. Simpson.

"Auld Reekie."—The author is the second person on your list of names. Thanks for your promised picture, which, for various reasons, we shall esteem a treasure.

M.D. (Reigate).—Try either the *Bulletin* of the Society or the *Moniteur*. The *Bulletin Belge* may suit you better. Any one of these publications may be obtained through a foreign bookseller.

Adolph.—We are quite well acquainted with the pretensions of Dr. Grusselbach. He may be right, but it is just as probable—if not more probable—that he may be quite wrong. It is a subject for a medical journal.

An Old Friend.—We would rather decline tendering any advice respecting the purchase of a business. Use your own discretion in the matter, and consult some friend acquainted with the transfer and purchase of businesses.

G. D. (White Horse, Leeds).—A liquid cement for fastening together two pieces of leather so as to resist the action of water, may be made by dissolving shellac in methylated spirits of wine. Another cement may be found in a solution of gutta-percha in sulphide of carbon; or in India-rubber dissolved in benzole or other solvent.

A Photo-Microscopist.—You err in commencing with such difficult subjects; it would be much better to try such an object as *Pleurosigma littorale*, which contains twenty-four thousand lines to the inch, than the *P. macrum*, which contains eighty-five thousand, and would require an objective of one-twelfth of an inch to show the markings. The former is within the range of a good quarter-inch power, the latter could not be seen by it.

R. Bell.—The paper marked No. 1 contains acetate of soda, No. 2 iodide of potassium, No. 4 bromide of cadmium. The contents of No. 3 fell to the ground when we opened the packet, and they were not recovered in sufficient quantity to enable us to examine them. We cannot undertake to examine samples of unknown chemicals which you may happen to pick up at sales. Take them to an analytical chemist, or learn to test them yourself or to recognise them when placed under a microscope by polarised light.

An Old M.D.—You may reverse the position of the triple achromatic lens without producing any evil result, but you cannot do so with the portrait combination. In that objective the back lens must always be next to the sensitive plate when the object to be photographed is at a farther distance from the lens, and next to the object when it is nearer to the lens, than the sensitive surface, as in the case of producing enlargements. If an object is to be copied on the same scale as the original, a portrait lens will not answer so well as a triple lens or cemented doublet.

George Ross (Hamilton).—1. We are glad to hear of your safe arrival in Canada, and of your good prospects. If you have occasion to go as far as Woodstock, call upon Mr. Stark, who will give you a friendly welcome.—2. You do well not to forget your old and first love; the camera we described in our last number will prove as useful as any other for you in your perigrinations.—3. What you inquire about is *sel d'or*, made by mixing together solutions of hyposulphite of soda and chloride of gold.—4. The person you name died about three weeks after you left this country.

Victor Smith.—The defect in your pictures is a very old one, and your conjecture respecting the cause of the defect is that of the majority of inexperienced photographers; but it is, nevertheless, quite erroneous. The lens must not be blamed; the fault lies in your own want of care. You tilt up the camera, and are then surprised to find that the building which you have photographed, instead of being square, with its sides vertical, converges towards the top. Suppose that you were photographing a house from the top storey of an adjoining and higher house, you would point the camera downwards, and you would get *di*verging instead of *con*verging parallels. Remedy: Keep your camera level, or do not tilt it unless it has a swing back, with the manner of using which you have made yourself acquainted.

Appeal on Behalf of Mrs. Pearson, of Bristol.—We have to acknowledge the receipt of a cheque for a guinea from Mr. Arthur Debenham, of the Arcade, Ryde, which sum we have handed over to Mr. Beattie, who, some time since, directed public attention to this case.

An Edinburgh Photo.—Your second article received, but with the insertion of an abstract of Mr. Winstanley's reply to your first article, we close the discussion. Were we to publish your present communication, in which is introduced much new matter of a controversial character, we should be inundated with rejoinders from all quarters. Hence, as the societies are about to resume their meetings for the winter session, it will, we think, be better to let them and their management alone for the present, and next summer you may sum up in one article their practical doings during the winter.

B. Wyles.—Ground glass in the sides of a studio will permit a greater amount of light to be admitted than plain glass, if the studio be surrounded by houses, trees, or other dark-coloured media. The following experiment would at once prove whether in a particular instance it will be of value:—Place side by side a ground glass and a plain one; then, from the place where the sitter's position is intended to be, take a photograph of both, and the one that yields the densest negative is that which transmits most light. The interiors are admirable specimens of what the lens can perform. The "bronzing" of brass work is accomplished by immersing the brass, previously made quite clean, in a solution composed by dissolving the black scales known as smithy ashes in hydrochloric acid. After a few minutes the brass will become black. It is then coated with green-coloured lacquer. Previous to the lacquer being applied it is customary to polish the blackened metal with plumbago. In London the bronzing liquid may be purchased ready prepared at the varnish shops.

C. M.—By exposing the negative in its unfixed condition to light it will, in the course of a day or two, become very much darker than it originally was. This is on the assumption that you have intensified it with pyro. in the usual way; if you have not, then you might, perhaps, obtain by the latter means all the density required. If the picture has been fixed, and it possess full detail without, however, the required density, two methods of procedure are open to you:—The first method is to take from the thin negative a transparency, which, in turn, will yield a second negative, and which, if you develope it properly, will possess *any degree of intensity* you choose. The second way is to chlorise the picture by applying a weak solution of bichromate of potash to which has been added a few drops of hydrochloric acid. After the picture has become white, wash it well, and apply a weak solution of sulphantimoniate of sodium, by which it will be converted into an intense scarlet colour, and thus a high degree of actinic density will be conferred. Of these two methods we should certainly try the former.

Photo-engraver.—The finest photo-engravings, without doubt, that we have ever seen are those produced by M. Placet. We do not know all the details of his process, but can give you an outline of it. It is of a threefold nature, the first being as follows:—Make a solution of bitumen, and apply it, as you would do varnish, to the collodion side of a transparency on glass. When dry expose the glass side to the light, and then remove to the dark room and immerse in a bath of benzole, which, by dissolving away the bitumen unacted on, will give a picture in relief. From this surface a cast in copper is taken by the electrotype process, from which the prints are obtained by the ordinary method of copperplate printing. The second process of M. Placet consists in substituting for the asphaltum some gelatine and bichromate of potash, developing with water instead of benzole, but otherwise proceeding as before mentioned. The third process involves the use of a separate transparent film, such as collodion or talc. On this the sensitive mixture is spread, and, when dry, it is placed in contact with the transparency, the talc next the picture, and, after exposure, is developed either by benzole or water, according to the nature of the sensitive surface. By this last process the transparency runs no risk of being damaged.

Received.—Professor Piazzi Smyth; W. H. Harrison. In our next.

LONDON GAZETTE, *Friday, October* 8.

Bankrupt.

Cotnam Townsend, photographer, Doncaster.—October 20, at Sheffield.

METEOROLOGICAL REPORT,

For the Week ending October 13*th*, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Oct. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
7	30·26	63	48	54	57	SE	—	Fine
8	30·13	73	53	56	58	SW	—	Cloudy
9	30 23	—	54	57	58	SE	—	Fog
10	—	74	—	—	—	—	—	—
11	30 22	72	52	57	59	ESE	—	Fine
12	30·20	70	47	53	55	SW	—	Overcast
13	30 7	—	55	57	58	WSW	—	Raining

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 494. Vol. XVI.—OCTOBER 22, 1869.

EASY REDUCTION OF SILVER FROM OLD BATHS.

A simple mode of reducing silver from old baths has been used by us within the last few days, and, as it is extremely simple in operation and satisfactory in result, we will describe the plan pursued. We have often given descriptions of processes for the reduction of silver from various solutions of the metal, and much information on this subject will be found in the previous volumes of this Journal; but at the present season, when photographers have finished their work for the summer, and now turn to the different classes of winter operations, it is just as well to know how far the residues from the summer campaign can be pressed into service again under other and purer forms. Old negative baths will bear reduction, and, when properly treated, economise the expenditure of silver in printing solutions, while old printing baths themselves are often the better for complete reduction and starting *de novo* with pure silver solution.

The principle of the plan we have adopted may be stated in the following terms:—Sulphurous acid easily combines with silver to form sulphite of silver, which, when boiled under favourable conditions, splits up in great part into metallic silver and sulphuric acid, and by strongly heating the residue the decomposition is rendered complete.

An old nitrate of silver bath is taken and placed in a tall vessel, and caustic ammonia solution is now added cautiously until the brown precipitate first formed has been completely redissolved; if not quite clear it is well to filter so as to get rid of a little iodide of silver which may remain behind. The clear liquid is then ready for treatment. A common Florence oil-flask is now obtained, and fitted with a good cork and a piece of glass tube bent twice at right angles, so that the tube shall not only penetrate the cork of the flask, but its free end shall be long enough to enable it to reach to the bottom of the vessel containing the ammoniacal silver solution to be reduced.

We next powder an ounce or so of wood charcoal and pour it into the flask, and make the powder into a paste with oil of vitriol by pouring sufficient of the latter over the contents of the flask. The apparatus is then ready for work, after the cork and delivery tube have been adjusted to the flask, and the latter supported in such a way that it can be heated in any convenient manner.

We now apply the heat of a spirit lamp or a gas flame to the bottom of the flask; a quantity of gas is soon given off on cautiously regulating the heat, and as each bubble of gas passes through the liquid a white substance is seen to be produced. As the current of gas continues the amount of the white substance is seen to increase, and the current of gas must be continued until the liquid gives off an odour similar to that observed on burning a piece of sulphur or a sulphur match. When this point has been reached the current of gas may be stopped and the flask removed.

The liquid is now found to be acid, and an abundant precipitate has made its appearance. This is at first white, but speedily becomes grey; and, in order to hasten this change and make it complete, the liquid is boiled for a short time. The result of this treatment is that the precipitate assumes the ordinary dirty-white appearance of a deposit of reduced silver. When thrown on a filter the metal is caught, and can be washed with several changes of hot water, in order to free it from any impurities with which it may have become mixed in the course of the preceding treatment.

The metal as obtained may be further purified by drying it well and heating strongly in any suitable vessel—a little crucible, for instance—until the organic matter that might have been carried down with the metal shall have been burnt off. The metal may then be dissolved with great facility by digesting the residue of this treatment with nitric acid diluted with twice its volume of water. When the solution is evaporated to dryness, and the residue fused in a small porcelain dish, a pure and good sample of nitrate of silver is obtained, which can be most advantageously used in the preparation of a new printing bath.

This plan of reduction is so easily carried out, and without the aid of a high temperature, that we have little doubt it will be used with advantage in operations on the small scale, when no more than thirty or forty ounces of a bath have to be reduced. With larger quantities of solution it is more convenient to precipitate the silver as chloride and send the compound to the reducer, so avoiding any further trouble with it. As Mr. Dawson truly said last week, this is always the better and more profitable course, if we send our sample to a respectable house; but, when the quantities of silver compounds which require reduction are very small, this is scarcely a good plan, as we have often found that amateurs set an unusually high value on their waste products, and, in consequence, sometimes give respectable smelters a great deal of unnecessary trouble and even annoyance.

The special process we have just described is one that can be carried out with such ease that there need be no difficulty in obtaining the silver from any old negative or printing bath with great ease and in a pure state.

Since the above was written, an excellent article on the recovery of silver waste, by Mr. Dawson, has come to hand. This will be found in another column. It will be seen at once that the statement of the process for recovery which we have just described does not trench on the position taken up by Mr. Dawson, as our plan for converting "an old bath into a new one" is only adapted for operations on a very small scale, and therefore quite unsuited for use in a large establishment.

There are two points, however, in which our experience is not quite in accord with the statement of Mr. Dawson. In one place he says "it is imperative to notice that the water in the cask be well loaded with common salt." A careless operator might take this literally, and think he could scarcely add too much common salt; but the result of this treatment would be the solution of a considerable proportion of the chloride of silver originally precipitated, and consequent loss of valuable material. It is, therefore, necessary to avoid adding too great an excess of the common salt. No doubt Mr. Dawson is quite as well aware of this as we are; but anyone might misunderstand the directions he gives.

Again: it is in every way better to avoid mixing the sulphide of silver precipitate from the fixing bath with the other residues, as the sulphide of silver requires rather different treatment from the chloride or ashes. It is well always to keep it separated, and send to the refiner with a proper statement of its nature.

RANDOM THOUGHTS ON INTERNATIONAL PROGRESS.

In another page a comparison is instituted between the position of the artist and the photographer, and also between photography in England and photography in Paris. On the latter subject we desire to make a few impromptu remarks.

Parisian photographers are, without doubt, men of taste. We intend this remark to apply to the leading photographers; the "riffraff" are neither better nor worse than the lowest representative of the art-science in London, Liverpool, Manchester, Edinburgh, or Glasgow. A very few men of cultivated art taste, who are also unexceptional manipulators and good business men, have given to Paris a certain degree of *eclat*, which we do not grudge. But because in this country æsthetic or technical skill is not so thoroughly combined with business tact, are we as a nation, therefore, to yield the palm to our Gallic friends? In matters of taste we suppose it must be so—at least for a short time; in technical skill we have not yet been surpassed. But in those things in which pure taste is concerned they do, somehow or other, "manage these things better in France." Never mind, some day—soon, let us hope—English photographers will possess as refined taste as those of France.

It is, meanwhile, both curious and instructive to know that the greatest patrons of the French photographic artists are the English. There is an old Scotch proverb which comes in here quite *apropos*—"Far awa' birds hae fair feathers"—the meaning of which, in the present application, is that if we get our photographs taken by Parisian artists they must necessarily be better than if taken at home.

It is an acknowledged fact that many in this country imagine that foreign art-productions are superior to those of our own land; and, if they desire what in their opinion may be a photograph of a high class, they prefer having it taken in Paris, even though the pecuniary expenditure incurred is, in consequence, much greater. John Bull has, in some recent numbers of our comic serials, been represented as a man who, when abroad, must have the very best of everything, no matter what the cost is, but who, when he returns home, finds the bailiffs in possession because he has neglected to pay his tradesman's account. This is doubtless an exaggerated picture; but it will be found that there is a certain amount of truth in it, from the fact that the "Englishman abroad" has usually a full supply of the circulating medium in his pocket with the intention of spending it.

That typical Englishman, Mr. John Bull, professes to know little or nothing of art, and prides himself upon this want of knowledge; therefore, in a country proverbially artistic, and for works professedly artistic, he spends his money freely. Hence it is said, with what truth we do not care here to inquire, that Englishmen are the great patrons of photographic art in Paris. Brown, Jones, or Robinson they know, or at least they think they are acquainted with; but "far awa' birds hae fair feathers," and therefore they prefer Paris.

Some of the ablest of the Parisian artists have from time to time settled in this country, which, according to reputation, abounds in gold. Some years ago we knew of the talented M. Silvy, and more recently of the equally accomplished M. Disderi, as Parisian artists of the highest reputation who had condescended to open establishments in London, and preside over them personally; but where are those gentlemen now? We advise Parisian artists to stay at home, and not venture to compete with us on our own ground; for, if they do, despite the æsthetic taste which we frankly admit they possess, they will find that when at home Englishmen are exceedingly prone to estimate things at their true pecuniary value, and in doing so to arrive at the conclusion that, after all, there is less difference between English and foreign photographs than they at one time imagined.

While we unhesitatingly admit the high position deservedly assigned to *Parisian* artists, we by no means are inclined to do the same with French artists generally. It is universally conceded that out of Paris France cannot for a moment compare with our own country, in whose provinces photographic knowledge and artistic taste are quite equal to those of the metropolis; while, as compared with the artists of Paris, French provincial photographers are very inferior. The result of the whole seems to be—that two or three photographic artists in Paris produce works which both æsthetically and artistically are of the highest class, but that the great mass of French photographers is immeasurably inferior; while our artists may, as a whole, be subordinate to the *élite* of the profession in Paris, they are superior to the body of their brethren scattered throughout that empire, and, we might add, throughout the world.

HOW TO COLLECT AND ECONOMISE SILVER RESIDUES.

In my *Memorandum on Silver Residues*, in last week's Journal, I promised to give a few practical hints on a method of economising these to the best advantage. But before redeeming my pledge I should like to preface my remarks with an authentic anecdote, in the shape of a new version of *A Tale of a Tub*.

About seven years ago I was consulted by a photographer in a rather extensive way of business on the best means of saving his silver residues. My advice was given and was to be acted on immediately. In consequence a large butt was erected in the garden, and furnished with a tap about half-way up, to draw off the exhausted liquid. Instructions also were given to the assistants to keep this tank well and regularly supplied with common salt, to turn into it all the print washings, &c., &c. All these instructions, it appears, were faithfully carried out under the eyes of the head of the establishment. Many a fog-inducing negative nitrate bath, too, was poured into that receptacle; for in those palmier days than now of photography it was not by some magnates considered worth while to attempt to correct a disordered negative bath. So this great experimental tank of savings went on being filled, and half the supposed silverless liquor daily drawn off for about twelve months, when I was invited to come and assist at the opening of this great El Dorado mine of anticipated wealth. Speculation and expectation ran high on the chances of a great discovery of found money, and several persons were there to watch the issue; but, alas! when the cask was emptied of its liquid contents by a syphon, nothing remained at the bottom save a dirty-looking and thin stratum of useless rubbish, and a blackened silver spoon which had got there by mistake, or had been thrown in for luck. Long faces and disappointed looks, with some sneers about a philosopher's advice, and sundry kicks at the empty cask, were freely displayed and given for the next few minutes.

Of course I instantly saw that something was wrong in the management of the "waste jar," or that some trick was being played on me; but the evidently unassumed chagrin of the photographer soon dispelled the latter supposition. On pushing my inquiries I ascertained that our photographer, in the course of his "saving" experience, had read in one of the journals an account of the large quantity of silver which could be recovered from the fixing solutions of hyposulphite of soda; *so these were also added to the contents of the butt of chloride.*

The reason for the absence of silver was now clear. The precipitated chloride was dissolved by the hyposulphite as soon as they were mixed, and the silver was run off into the ground in the *supposed silverless* clear liquor.

When I pointed out this fact, which my client should have known but had overlooked, he was somewhat dismayed, but not in the least daunted. Another ingenious resource, he seriously argued, was still open to him for the recovery of his silver. "The silver," he urged, "must still be in the ground, somewhere underneath the tap" (there was no sink or drain to convey the water away); "let us dig up a cubic yard of the earth—a cart will hold all—and send it to the refiner. Perhaps from the richness of the argentiferous sample of my ground he may be induced to purchase and cart away my whole garden, so that I can still be a great gainer." I convinced him of the futility of such an attempt by assuring him that the heavy winter rains must have washed away the greater portion of his silver solutions, and distributed them widely apart.

From the value of the nitrate of silver expended by this photographer in the course of that year, I calculate that he ran to earth or lost, through the hyposulphite inadvertence, considerably over £100, which otherwise might have been saved.

I shall not give this luckless man an unenviable notoriety by divulging his name. He knows better now how to preserve his residues, and can afford to laugh heartily when quaintly reciting to a few friends his dearly-bought experience. But to my subject.

As a matter of *final expense* it does not seem to me to be of much consequence whether we use weak or strong silver solutions in photographic printing. Only a certain definite amount of silver can in either case enter into the composition of the picture, while nearly all the rest ought to be recovered. When I make this assertion I allude solely to the printing department, which is the one to which I wish at present to draw attention.

The list of printing economies may be catalogued under various headings.

1. The nitrate of silver bought from the chemist or manufacturer when brought into your own laboratory should be re-weighed in your own correct scales, and that without the wrapping paper by which I have often seen the balance turned in the mercantile charge for weight On a few occasions I have seen another plan resorted to. When the

weight of silver has nearly reached the counterpoise, a few particles are thrown with force into the scale, and these, momentarily, disturb the equilibrium apparently in the purchaser's favour. At that instant, and before the beam can return to the horizontal position and above the fulcrum, the silver is withdrawn and the "deed" is cleverly done. According to my experience, if you purchase nitrate of silver exclusively from the manufacturers, there will be nothing to complain of in the shape of short weight, nor, I may add, will you have occasion to rejoice at getting too much. See, then, to this preliminary expenditure as carefully as you can.

2. When the nitrate is not put into solution directly in the stock bottle, rinse the vessel in which it has been dissolved and the stirring rod into the waste jar. Likewise, on all occasions, when the nitrate solution is transferred from one vessel into another, throw the washings of the empty one into the same jar. In short, use up, in this way, the washings of all non-absorbent bodies with which the silver has come in contact.

3. After sensitising a batch of paper on a nitrate solution of about sixty fluid ounces used for the first time, I put into the stock bottle about two tablespoonfuls of kaolin, shake up the contents of the bottle, and never filter till the kaolin has entirely subsided. The same kaolin will serve for a long time to keep the solution clear, however often the latter may be used, provided not more than about three-fourths of the liquid is filtered out into the sensitising dish. The same filter also can be used many times, if the pores have not been clogged with kaolin or other insoluble matter. When the filter gets used up, dry it, and put it in the "waste bag;" and, when the stock bottle of sensitising solution requires replenishing or strengthening put into it *quant. suff.* of crystals of nitrate of silver and water. This saves the trouble and possible loss occasioned by using separate vessels.

4. When about to sensitise paper, filter a portion of the nitrate solution directly into the sensitising dish, using a retort stand to support the funnel. Then place the funnel in the neck of the bottle, and catch in it all the drippings that may fall from the first sheet of paper till the next is ready for removal from the sensitising bath. Take about a square inch of blotting-paper, and attach it to the lower corner of the first sensitised sheet. This will absorb the remainder of the drainage. Repeat the same programme with all the other sheets. If a drop should fall on the table, wipe it up at once with a cotton rag kept for this purpose; but no silver should be lost by drainage if the precaution be adopted of taking the receiving funnel to the paper and carrying both to the hanging line. The absorbent paper attached to the corners of the sheet and the saturated wiping rag should, when dry, be also placed in the savings' bag.

5. After printing, clip off all the black edges of the prints before washing or toning. The principal object for doing so is to save gold, for a small margin of blackened silver will take up more gold from the toning bath than the whole picture. Put these clippings into the savings' bag, likewise all prints which are not worth toning, and the odds and ends of waste sensitive paper.

6. The above are the main savings which can be made from photographic printing; but, if you have no objection to nasty smells on your own premises, or, if you have, can find a convenient place some distance away, a considerable amount of silver can be rescued from the hyposulphite used in fixing the prints, by throwing into these wastes a quantity of liver of sulphur or sulphide of potassium. This is the least troublesome mode of recovering such residues. The product of the decomposition in your jar will be an impure sulphide of silver.

My promised short article has extended into a long one; but I cannot close it without a few more observations.

That which I have designated the "waste jar" should receive into it only the washings from prints, dishes, &c., and, if convenient, the ashes of all other substances containing free nitrate or chloride of silver. The object being to convert all these into insoluble chloride of silver, it is imperative to notice that the water in the cask be well loaded with common salt. To test when it is safe to draw the clear liquid off, drop into it a little solution of table salt; if no cloudiness appear the liquor is devoid of silver, and *vice versâ*. Sometimes the chloride takes a long time to subside. In that case add a little acid of any kind, and stir up well with a cane or glass rod for a few minutes.

An iron or zinc jar should on no account be used, because there occurs a decomposition which space will not allow me to particularise and explain.

The jar I use was made for me some years ago, from my own design, by the Portobello Pottery Company. It is shaped like a barrel, has a capacity of about twelve gallons, and is fitted with a tap about one-third of its height from the bottom. A common wooden cask similarly fitted will answer very well. The collected precipitate in the waste jar should be dried on the top of a stove or by the fire in a large porcelain evaporating dish, or in one of those *enamelled* iron pots which can now be purchased at most of the ironmongers' shops.

The contents of the "waste bag" have to be burned and added to the previous lot of residues. The burning may be done in an ordinary grate. First clear out all the ashes from the fireplace, fill the grate with the clippings, filters, &c., and *set fire from the top.* If ignition take place from the bottom, the chances are that the draught will be immoderately strong and waft up the chimney some of your carefully-hoarded residues. Throw on all the papers, little by little, till they are consumed; carefully sweep up the ashes, and add them to your dried chloride or throw them into the waste jar.

The precipitate from the hyposulphite fixing solution may be collected, dried, and added to the rest; but on no account should it be mixed with them while in a moist state, else the experience of my photographic client might be repeated.

Finally: send the whole package to the refiner for reduction, and, if you do not recover something like about ninety per cent. of the metallic silver used in your photographic printing operations, all I can say is, that there has been carelessness or mistakes somewhere.

George Dawson, M.A., Ph.D.

P.S.—Since I wrote last week I find, on analysing a portion of my gold residues from inert toning baths, that they contain silver in nearly equal proportions to the gold. For this there must be some good reason which I shall endeavour to find out. In the meantime the fact leads me to suppose that I have understated, in my estimate of last week, the actual weight of silver that may be recovered from printing residues.—G. D.

"DUST" PROCESSES.

Some remarks on experiments on dry plates, by Major Russell, have just come under my notice, wherein he states that the best results are obtained when the operator gains sufficient experience to use a large quantity of bromide of cadmium combined with a small proportion of pyroxyline in the collodion. The bromide of silver in the finished dry plate is precipitated solid matter, held in suspension in a dried, transparent skin. Major Russell's experience, therefore, amounts to this, namely, that the thinner the skin in question, and the greater the preponderance of solid matter sensitive to light, the better is the finished plate.

This is only another fact drawn from large experience, supporting the view started by me a long time ago in an article on *The Rigidity of Collodion*, published in these columns. That idea is that a new order of dry processes will rise up in the future, wherein collodion will be abolished. Collodion in the wet process is in a soft, pulpy state all the way through the manipulations, so that, when waves of light set up molecular disturbance in the solid bromide of silver precipitate, the surrounding pulpy film *yields*, and offers little resistance to the action. But the dried film of a dry plate is more like skin than pulp; hence resistance to the molecular disturbance is the result, making the process slower and more uncertain. This is why, when the proportion of pyroxyline is reduced and that of the silver precipitate increased, Major Russell gets better results. There is less resistance to the molecular disturbance.

But Major Russell has found out another curious fact about this transparent skin. He tried what staining it yellow would do, in order, no doubt, to prevent white light from passing through the glass plate, and blurring the picture by reflection from the back surface. The result was that it prevented photographic action upon the bromide of silver, just as yellow glass in front of the film would have done. This experiment shows clearly the dual nature of a dry-plate film, and how the constitution of the transparent film and the solid precipitate imbedded therein ought to be studied separately in the attempts of photographers to simplify dry-plate processes. The condition of the solid precipitate itself also influences the results, for the plates are less sensitive when left in the bath long enough to gain their maximum opacity.

Dr. Hill Norris, one of the most successful dry-plate workers, found out years ago the necessity of getting rid of a tough skin on dry plates. He pointed out the value of "powdery" collodion for such purposes. The fact was also proved by me that bromide of silver in an infinitely thin film of gelatine gives good dry plates, whilst not a trace of a picture can be obtained when the gelatine film is a thick one.

All this points to the conclusion that the best dry plates are likely to be those wherein bromide of silver accompanied by a trace of organic matter lies like fine dust upon the surface of the film, and

not imbedded in any skin whatever. In such case collodion is obviously not a good vehicle to hold it in suspension. Some thick neutral liquid is wanted which will hold the precipitate in suspension but afterwards evaporate altogether, and leave the film high and dry upon the plate, or upon another film placed upon the glass to receive the coating of bromide dust. Xyloidine does not meet all these conditions, but it at least would hold the bromide of silver in suspension, and itself also dry like fine dust. Xyloidine gives rather an opalescent coating, but this may not be a serious matter, especially after the varnishing of the plate. Gelatine would probably be a better support for such precipitates than bare glass; but Major Russell has shown that gelatine acts as a retarding agent in dry-plate work, especially when used in large proportions. The remedy is to make it slightly alkaline before use.

One way of getting a powdered surface of dry bromide of silver might be to mechanically sift some of it over a half-dried surface of collodion or gelatine upon a glass plate. For a long time I have been thinking that such "dust" processes are right in principle, and have been waiting many months to determine the point by experiment. However, I have been so busily engaged in scientific literature as to have had no time to make the trials, and see no chance of being able to do so for some months to come. Hence nothing but the speculations themselves are now published, in the hope that they will prove to be of practical value. William H. Harrison.

THE PRESENT AND FUTURE OF PHOTOGRAPHY.*

At the commencement of a new session it seems but reasonable that we should take a review of the position occupied by our art-science, and the prospects which present themselves for the future.

Surrounded on all sides by evidences of a changing order of things, with hostile hands stretched out in every direction to alter or improve the most venerable institutions into conformity with modern views, it is not likely that photography and photographers more than anything else or any other class would escape sharp criticisms.

The claims made by certain professors to full admission for the members of our craft to the rank of artists, and for the pictures they produce to the rank of works of art, however reasonable it is in appearance amongst ourselves, are not so fully conceded as has been thought just. The photographer does not rank socially with the painter, the sculptor, the dramatist, the musician, the *littérateur;* he still, in the eye of the majority, occupies a place having no exact parallel in the world—he is a photographer. Of course there are photographers and photographers as there are painters and painters, and the acquisition of reputation is an individual work; it can only be of secondary importance to us to know the adverse opinion of many whilst we are so well aware that works of art in the highest sense of the word are daily being produced amongst us.

Meanwhile, as we look around, there are manifestly points upon which all can do no other than agree. Photography is more used than ever, and now more than at any previous time are its highest results in continual demand. Active minds and skilled fingers in all parts of the world vie with one another in adding to our store of knowledge. Never, probably, since photography became the subject of history has there been such a wealth of inventions and discovery as of late. Many have feared, and still do so, that our method of printing by silver may be superseded by a mechanical process which, simply requiring a suitable negative, shall rapidly produce thousands of copies at a very low rate. Nothing is more probable than that such may be the case, but not at present. Even when this occurs the skilled photographer will be required for the production of the original negative.

The processes towards which attention is now mainly directed for superseding silver printing by mechanical or other means are the carbon or autotype, and those of Mr. Woodbury and Herr Albert, of Munich. All of us have had the opportunity of inspecting the results of each invention. There is one grand point of difference between the carbon and the two latter processes, which may more affect this result than any other. It is this:—For the first (the carbon) an application of the actual original negative is made for each impression on a sheet of sensitive tissue, whilst for the last two the inventors employ with complete success *clichés* produced in any number from the negative, each one of which can be made to print large numbers.

In the power of production of large quantities, it is obvious that either Herr Albert's or Mr. Woodbury's processes can yield any quantity of impressions that may be required in a very short time without requiring daylight. Whilst the carbon, though not possessing these extraordinary powers, is, in comparison with silver printing, very rapid, probably more highly-skilled labour is demanded for producing carbon prints than either of the others. Each of the three processes claims to be absolutely permanent.

I may, perhaps, here be allowed to make the admission, as a confession of faith, that I am of those who consider a fine silver print on albumenised paper to be one of the most lovely objects it is conceivable for any graphic art to produce, and that any process to surpass it must, indeed, produce fine results. The evanescent character of our silver prints is in a great degree remedied, and, where fading occurs, it is from carelessness or neglect, either in printing or in the owner of the print.

In book illustration photography is peculiarly valuable, and one of the leading London publishers, who has during ten years issued large numbers of splendid works with silver prints, asserts that no instance of a single picture having faded has come under his knowledge. The new methods may, and probably will, strike out a field for themselves; but several drawbacks must be removed, and years must elapse ere silver printing be given up. More albumen paper than ever is now made and is likely to be.

The comparative excellence of British as compared with foreign photography is an oft-discussed subject, and one that sometimes occasions a little heartburning. In Paris, in 1867, with the exception of landscapes—by no means the most important branch of photography—we were beaten; and the result was just what might have been expected from the Anglo-Saxon race. First, incredulity; second, a determination to find out in what the difference consisted. It was not gratifying to our notion to find that works surpassing our own were produced by instruments which we are apt to think inferior to those of our great makers, and that hints were given that better work was yielded from our own makers' lenses abroad than at home. But "seeing is believing." The works of Adam-Salomon, of Reutlinger, of Ghemar fréres, of Carl Lackhardt, of Angerer, excited admiration from all. It was not alone Adam-Salomon who had distanced us. Though practising very different styles, representatives from each of the large capitals of Europe made a magnificent display, and, between ourselves, made us feel uncomfortable.

One of the earliest thoughts that strikes one, on recalling these things after a lapse of time that enables us to think quietly and calmly over the matter, is that in those countries where art has been most fostered are the best photographs produced. Surely no greater proof could be given that mere intuitive perception of the beautiful is not sufficient. A shoemaker has to undergo seven years' apprenticeship to learn his craft. How long does a photographer devote to it? I was confidentially informed by a sitter, a few days since, that he was given to understand that, by purchasing a shilling pamphlet on photography and religiously following out its instruction, anyone could speedily become a good photographer. Is this so? Our standard works are very few. The French and Germans beat us hollow, for in each language have been of late years published and issued in repeated editions large volumes, by learned and erudite men, on the practice and theory of photography.

But there is providentially a "but." There can be no reasonable doubt on the mind of a careful observer that a kind of *renaissance* took place in English photography after the result of the Paris Exhibition was apparent. First, there was a little angry discussion. Many went to the actual studio, and scraped acquaintance with the artist, and then came home and were delivered, to their great delight, of valuable information. They took little by their notion. Irreverent commentators were not wanting who repudiated their explanation of the methods adopted under the assertion that the means indicated were insufficient. The visitors had been received with Gallic courtesy, and, under a great appearance of openness, the vital part had been witheld from them. For a long time there seemed a risk of the real issue being overlooked, but at length it was apparent to all but the "irreconcileables" that photography pure and simple was at work, backed up by the great skill and ability of a born artist. The pictures were publicly offered for sale in London, and tourists were also able to purchase in Paris as many as they wanted at a price that may be called reasonable when the great care bestowed on each individual print is considered.

It seems to me here a proper thing to remark, *en passant*, that one of the points indicated to me by a friend who travelled recently through Europe—and who, at my request, took special notes for me on photography and photographers—is, that in the capitals and chief towns of the continent he found the photographer executing pictures of much more important dimensions, direct in the camera, than in England, and he remarked that the public seemed to willingly commission such pictures. In Paris, Brussels, Berlin, and Vienna he found them doing large work, and yet here many complain that it is almost impossible to obtain orders for such things.

* Read at a meeting of the South London Photographic Society, Oct. 14, 1869.

I believe the cause is readily to be found. Very few make much show in this direction, or take such pictures sufficiently well to create a demand. Again: it is said remunerative prices cannot be obtained. I declare it as my opinion, after most careful observation, that wherever unusual ability is offered to the public it is appreciated.

I have seen lately a man of great skill go to a town literally surfeited with photographers, and, taking premises and studio from a bankrupt's hands, rapidly take the lead at very high prices.

We must aim at much higher and better work; a much grander picture than the *carte* is desirable, and when taken with real skill it is fully appreciated. But—again a "but"—let there be no mistake about it, such work must be of the highest quality, or all attempts are useless. We all, by this time, ought to know how to build a studio with a fine light. The best studios are the simplest; the better the light the fewer the blinds. London photographers, for the most part, say things are very bad. The reason is a simple one: people used to wait till they came to London to be taken; now London people wait till they go to the provinces, where, in studios commanding far superior light and accommodation, they are taken. Within the last few years the increase of first-rate studios in the leading towns and cities and watering-places has been very rapid; those who have occasion to travel commercially in connection with photographic matters know this well. I have been astonished, in going a journey from Brighton to Penzance, to observe how every town had a capital photographer; and the thought came up, how few of these men are known in our exhibitions, and yet there are many doing work equal to the moist highly-praised men. I repeat that a *renaissance* has taken place. Better work is being done and it is fully appreciated, and, by the laws of natural reaction, by which the weakest go under and the race is continued by those of most power, better times are in store.

Societies have, in a great measure, fulfilled the objects for which they were established; communication is so complete, through the aid of the journals and by other means, that scarcely any of the societies retain their original force. The secret of their continued existence lies in making their meetings less formal and more conversational—more time for friendly, unconventional converse than for heavy reading.

Gentlemen, in conclusion: let us not cease to place before the world the best work we can possibly do; let us carefully consider the points in the pictures of great masters which mainly conduce to the effect, and, without slavish imitation, do likewise. Appreciation of art is rapidly spreading, as fine works are circulated at a moderate price. I feel tempted to go a little here into the oft-debated question of price, but I will spare you. Suffice it to say, in general terms, that the principles of free trade which govern the price of the necessaries of life do not apply to works of art in the same degree. At the same time, it is beyond doubt that the lower the price to be well remunerative at which high class works are given to the public the better for all parties. I am no friend to that lamentable degradation which is so discreditable to all, and which has resulted from inferiority in the producers. This is evidenced by the well-known circumstance that those most faulty have been men charging good prices.

There are, however, certain subjects for the production of which photography is admirably adapted, and which, though requiring good manipulative skill, do not come so much within the range of all as portraiture. I allude to reproductions from old masters and of objects of art and architecture. Let us take as an example the well-known pictures of Venice. The spots whence the pictures are taken are perfectly well known, having been selected by a famous connoisseur and art-critic. In many of them, when the sun forms a line with certain parts of the picture the exposure is made. A man whom a friend of mine found at work told him he thought he had been round the series of views fifty times, and that he knew the exact spot to pitch the camera and the exact time required. Every negative was magnificent; the thing is reduced to a mathematical certainty. The photographer realises an enormous income; constant employment is given to a great number of persons; troops of tourists are delighted at the chance of getting such pictures at a franc and a-half each, and buy dozens instead of single ones; and, more than all this, an accurate knowledge is conveyed to all parts of the world of the grandest architecture in the world. But when these prints were twenty francs each, only a few wealthy *dilettante* travellers were able to purchase them. Surely this is an unmixed benefit; but it is one of a special class, and is no reason whatever for our taking portraits, every one of which demands a great degree of special care, at similar prices.

As we consider these things in an enlightened spirit, we may be able to discriminate between what should be produced at a moderate price from the readiness of large production and what should be charged at a much higher rate, on the ground that each one requires special mental and artistic effort. In the main it is my belief that things are improving, and it will be our own fault if this be not continued. We have recently been told in an authoritative tone that we are all wrong—our processes based on erroneous principles, our practice one series of blunders. Perhaps it may be so; and when finer results from the new order of things are before us we may begin to believe it, but not till then.

Gentlemen, I thank you much for the kind attention with which you have favoured the few remarks I have made this evening, which, whilst containing little that can be new to most, may at all events direct some earnest thought towards matters that affect, more or less, the whole of us. SAMUEL FRY.

BEYOND THE REACH OF PHOTOGRAPHIC CHEMICALS.

HOLIDAYS have become an established institution, and so much the better, although few of us have the hardihood, like some of my friends, to shut up shop for a month without consulting any person's convenience but his own. My wanderings during my holidays took me to one of those retired nooks of which there are so many in the Scottish highlands, and cameras, lenses, tripods, plates, chemicals were all cheerfully forgotten, and the bracing air of the north became a positive enjoyment.

Rejoicing in my release from toil, and feeling certain that I should not be called upon to portraitise, in consequence of having left all the usual requirements at home, I laughed to scorn every attempt to induce me to change my mind. Was there not the village photographer only three miles off, who came twice or thrice a week to practise on the natives, and whose harvest was during the holiday season, when tourists—"got up" in most extraordinary style, many of them resplendent in tartans, as being the proper "sort of thing to wear" in the highlands—after exhausting the drives and walks as laid down in the guide books, and devoured with *ennui*, looked on the photographer as a kind of good angel sent for the especial benefit of travellers on a rainy day in the highlands.

Our village photographer was a good one, and could really execute his work in a creditable style, and I thought I was doing my friends a favour by sending them where their personal and artistic tastes could be satisfied. My state of happiness continued till within two days of the termination of my sojourn, when, oh! horror of horrors! who should drop in for a few days but a buxom, matronly lady friend from London, with her three marriageable daughters, and the accepted lover of the eldest. Such a dead set was made that I at last consented to telegraph for my "traps"—there being no time for post, nor, indeed, for anything save to pack and have them sent by the last train that night. This was done, and, on the following morning, the "traps" having arrived, I set to work.

The first two plates were faultless, the third showed slight pinholes, but by the time the sixth was reached the plates were perfectly riddled and useless. What was to be done? There were no spare chemicals—nothing but the barest supply of necessaries. The bath must be doctored—that was clear; but how? was the next question. I turned over in my mind all the likely and many unlikely ways of accomplishing this object; at last I determined on the following course of action:—The bath contained about thirty-three ounces, and was, presumably, thirty grains to the ounce in strength. I calculated that if I added ten grains of nitrate to each ounce the increased strength would dissolve the suspended iodide, which was the source of the evil. I reasoned that, as the bath was one which had been in use some time and had been just on the verge of being over-iodised, the additional plates I had excited destroyed the equilibrium, and so produced the result. Accordingly, I sent off a boy on horseback to the village to get the silver, if possible—the druggist and the photographer being the only two persons there likely to have it.

In the meantime I decanted the bath into a large crystal dish, borrowed some washing soda from the laundry, and dropped a bit into the bath, selecting a piece of a similar size for another purpose. A stick of sealing-wax was used for the purpose of stirring up the bath with the crystal of soda. The bath was then placed in the sun, and in a few minutes it coloured and finally began to deposit a brown powder. I now dissolved the other crystal in a little water, and, drop by drop, added vinegar from the domestic cruet bottle till it became neutralised. This indicated the proper quantity of vinegar (or acid) to add to the bath. Three ounces of water were now added to assist in throwing down the iodide, and the bath was then filtered, after having been about an hour in the sunshine. The silver was fortu-

nately procured and added to the bath along with the vinegar in the proper proportion, again filtered, when now it worked perfectly well, and the remaining pictures were obtained without a single speck.

Most people would think there had been sufficient trouble; but, no! there was more in store. After completing my task I emptied out the developing fluids, cyanide, &c., and proceeded to pack up, when, suddenly, my ears were saluted with the noise of a crash, a scream, and something that sounded very like an *emphatic* declaration. It was the poor plate-box carrying my day's work knocked over and smashed by the engaged couple! Four negatives out of the eight were thus destroyed (not to mention a clean glass or two) the box damaged, and my temper—well, ruffled; no, not exactly that. I am a bit of a philosopher, but "ruffled" or "riled" is not the word. I privately and, *sotto voce*, wished them—married!

It was evening now, and on the morrow the broken plates must be replaced by new ones being taken, as it was my last day. All the chemicals were used up; I had only the silver bath. After tea I started for the village, but could not find the photographer, and no such thing as photographic chemicals was to be found in stock at the druggist's little shop. What was to be done? I looked through the store and got some copperas (crude protosulphate of iron), with which I was fain to be content. On arriving at home I made up a developer with the copperas and the vinegar from the cruet-stand, which, mixed, I allowed to remain all night, and decanted the clear liquid in the morning. I tried a plate and found it to be quite the thing—as good, in fact, as need be. I had no fixing solution and no redeveloper, so I intensified with my copperas developer, and poured over the plate a solution of treacle and water, and consigned the plates to the box, which I had by this time patched up, taking care to allow no engaged lovers to approach them. I arrived at home that night, and on the following day washed the treacle solution from the plates, looked over them, gave a touch of pyro. where necessary, and fixed them all right.

This was "as how" I photographed under difficulties and "beyond reach of photographic chemicals." SIMON SLOWCOACH.

PHOTOGRAPHY AT THE PYRAMIDS.

THE majority of our readers are well aware of the part that photography, in the able hands of the Astronomer Royal for Scotland, was made to play in connection with what we may call a survey of the Great Pyramid in 1865. In our volume for the following year (page 268) will be found a detailed description of the unique apparatus employed on that occasion by the learned gentleman, and of that description we shall here give a *very* brief epitome, so as to enable our younger readers to become aware of the facts arising out of it to which we are about to advert.

In determining upon the kind of apparatus most desirable to operate with, Professor Piazzi Smyth resolved to produce his negatives by the wet collodion process, to make them very small (one inch square), to make them so thin that they would stand subsequent enlargement without hardness, and so sharp as to permit them to be examined under the microscope. The glass plates used were of the well-known standard size employed by microscopists—three inches by one; and the picture was produced at one end, the other serving as a holder. To show what a degree of sharpness was obtained it is sufficient here to state that the small views of one inch square have been magnified up to twelve or fourteen *feet*, on which scale they have been exhibited (by means of the lantern) to large numbers of spectators in the Scottish metropolis.

Within the past few months something of the nature of a dispute has arisen which is far from being terminated, in which the principals are men of eminence—one of them a keen observer, a man of science, and a practical photographer; the other occupying the highest position on the Ordnance Survey, and thus *ex officio*, presumably, an authority in matters pertaining to measurement. We refer to Professor Piazzi Smyth on the one hand and Col. Sir Henry James on the other. Ranged on one side is the whole strength of the Photographic Department of the Ordnance Survey, backed by field photographs of large size; on the other we have the private observations of only one gentleman, but one trained from infancy and naturally fitted for close and minute observation, and aided by photographs small in size but excelling in definition.

The case is shortly this: Col. Sir Henry James, the Director-General of the Ordnance Survey, recently published a quarto pamphlet on the Great Pyramid, describing the measures made and the photographs taken by a party of officers and men he sent there last spring, chiefly at the expense of Miss Burdett Coutts. We have the work now before us, and regret that the Colonel's photozincograph No. 3 not only represents one of the very fiducial corner sockets of the building as a miserable and barely-discernible scratching on loose ground; but in his letterpress he denounces in unmeasured terms not only the recent books on the Great Pyramid by Professor Smyth and others, but he ventures to say that at the time that gentleman and others were at the Pyramid (where Sir Henry James himself has not been yet), the said important corner sockets were "covered only by a little sand, easily removable by the hand."

Hereupon the Astronomer-Royal for Scotland is taking up these old negatives of his, and, by duly magnifying parts of them containing the sockets and the excavations made to uncover them when he was there in 1865, and representing them on glass plates 10 × 8 in., he hopes to show, as he describes to us in a letter we have recently received—

"1st. That Sir Henry James has vilified the work of the ancient builders, whose corner sockets were grand pieces of masonic work, cut into the living rock with care, skill, and perfection, and on a scale worthy of the ancient world's greatest wonder.

"2nd. That he has libelled the exertions of the *civil* engineers who uncovered the sockets in 1865 at their own expense and with my assistance, because what had covered the sockets up to that time was not sand, but a hard, tough *breccia* of limestone rubbish, and both so deep and over so large an area that it required a costly party of Arabs for many days, with picks and shovels, to remove it. In fact, as to Sir Henry James saying that he could *easily* remove it with his *hands*, it would take him all the rest of his life to do half of it in *that* way, and would reduce him to something like the condition of Nebuchadnezzar when he was driven forth from among men, and did eat grass like oxen, and his portion was among the beasts of the field—those beasts being, at the pyramid field, owls and bats and hideously black-faced hyænas gnashing for ever with their teeth—he being all the while as though a beast's heart were given to him, prone on the ground, grabbing at the stones with his nails grown like bird's claws and his hairs like eagle's feathers."

Professor Smyth, in a local paper (the *Edinburgh Daily Review*), in referring to a notice of Col. Sir Henry James's work—which latter, though without directly naming, contains offensive allusions to the Professor's researches—thus speaks:—

The one and only new instrumental observation, of all the many that might have been made, which the Colonel's pamphlet records, and was published very notably to record, is the mean length of a side of the Great Pyramid's base, from socket to socket. This length, he states, without giving working particulars, at 9,130 inches; and such being the result of an expedition composed of military men approved by H.M. Government, ordered by Sir Henry James, and paid for by a wealthy and well-meaning private lady in London, its numbers and consequences ought in honesty and officiality to be compared with the grounds which were previously put forward by its promoters to justify so unusual an undertaking. Now these grounds, though not mentioned in the pamphlet, were stated by Sir Henry James in the *Athenæum* for November 28, 1868, to be his own discovery (on paper), that the measures of all former explorers at the Great Pyramid were shamefully inaccurate, and laboured under so huge a discordance as nearly sixteen feet! What, then, has been the result of the new measure applied under the auspices of this remarkable discovery? Why, to bring out the number of 9,130 inches, which comes abundantly within the limits which I had previously deduced from all the best authorities as being those of the *true* length; and I had published them in the *Proceedings of the Royal Society of Edinburgh* for April, 1868, and elsewhere, thus--9142 inches, ⨱ *i.e.*, within the limits, *more* or *less*, of twenty-five inches. Here, therefore, is no atrocious discordance of sixteen feet, as so much insisted on beforehand by Sir Henry James, who now, indeed, instead of having succeeded in blowing up all his predecessors ignominiously, rather stands in the light of that engineer who was, so mirthfully to those who looked on, "hoist by *his own* petard."

The new base-side measure by his own Royal Engineers is, indeed, quite good enough to do that service for the gallant Director-General, but is it also sufficiently exact to satisfy the higher requirements of the modern theory of the Great Pyramid? By no means, I regret to have to reply, for it is merely another imperfect, approximate, or, shortly to speak, *bad* measure added on to the many other similar ones already in the field; and if you inquire how I venture to speak thus of a determination which "one of the greatest living authorities upon any question of measurement" thinks so highly of as to have built the castle of his aggressive pamphlet thereupon, I answer, with reference to what I published, both in special writings and in the papers of the Royal Society of Edinburgh, long before the military expedition to the Great Pyramid was even imagined, thus:—

1. The desiderated measure requires to be made upon *both* the corner sockets, *and* the casing stones *in situ* in the middle of the base-sides, the former by themselves not being fully interpretable. Yet they were the only fiducial traces attended to or seen by the Royal Engineers, whose measure is, therefore, deficient in some of the most important marks and things to be measured upon.

2. The Royal Engineers' measure, between such points as they *did* attend to, was not made with full first-class accuracy, even according to Sir Henry James himself; for he, in his subsequent discussion, lops off a whole ten inches from their result, without compunction, whereas it ought to have been measured to such precision that not a tenth of an inch could have been questioned, much less removed, with impunity; and in my first publication on the Great Pyramid I referred, as a proper ideal of accuracy in its base-side measures, to the astronomer Sir T. Maclear's measure of a base line in South Africa, accurate to within a quarter of an inch upon a run of eight miles—equivalent to an uncertainty of only five-thousandths of an inch on the much smaller length of the Pyramid base-side.

3. The Royal Engineers' measure has been most improperly altered in the pamphlet from 9,130 to 9,120 inches; for, while Sir Henry James keeps out of view *in this pamphlet* that there is any other socket measure of the base (which he assumes to be square) than a certain one which yields 9,110 inches for the mean side, there are two better and more careful measures of one of the sides of the said base, allowedly square, yielding the one 9,163 and the other 9,168 inches; and these are not only known to him (Sir Henry James), but the latter of them was quoted and adopted by him in the *Athenæum*, under date November 16th, 1867, as the one and only true measure of the Great Pyramid's base-side, when, for a totally different hypothesis to that which he is now maintaining, he *wanted* a different number.

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Hence it is quite futile to discuss any important question about the measures or history of the Great Pyramid upon the statements of Colonel Sir Henry James. When, therefore, he sets forth upon page 13 of the pamphlet which you have recommended to your readers that "from the measures of Colonel Vyse and Mr. Perring it is evident that the Second and Third Pyramid had the same proportions as the First or Great Pyramid," I shall not trouble myself to declare that he thereby says as much as that black is white and white black, nor shall I refer to my own published measures of the differences between the angles, which rule or constitute their proportions in the Great and the Second Pyramids both in their whole bulk and in each fragment of individual casing stones obtained, though it is a very important matter in the true theory; but I will simply refer to Colonel Howard Vyse's *Pyramids of Gizeh*, vol. ii., pp. 109-120, where he condenses the results of his own and Mr. Perring's measures, and where the following numbers may be read:—

Angle of the Great Pyramid	51° 50′
Angle of the Second Pyramid	52° 20′
Angle of the Third Pyramid	51° 0′

i.e., implying a difference rather in degrees than minutes, although some other of the Jeezeh Pyramids come, according to him, so near together in their angles of slope as thus:—

Angle of the Fifth Pyramid	52° 15′
Angle of the Seventh Pyramid	52° 10′
Angle of the Eighth Pyramid	52° 10′
Angle of the Ninth Pyramid	52° 10′

Not content, however, with misstating the results of former explorers at the place, Sir Henry James, in his easy chair at Southampton, flings degrading animadversions at those who bore the toil and expense of many a weary day at the Pyramid, in the following, among other sentences:—"Considering the number of people who have undertaken to measure this Pyramid, it is very remarkable that no one had measured all the four sides before Mr. Inglis did, and more especially because the positions of the sockets were known to within a foot or two, and they were only covered by a little sand, easily removable by the hand."

Yet how could these things be known to "*within a foot or two*" before any modern man had seen them? The length of the ancient base-side must have been at least *one* of the elements required to be known when commencing the search, and we have already seen that "the distinguished Director-General of the Ordnance Survey, and one of the greatest living authorities upon any question of measurement," was himself in error upon that one point, only last November, to the extent of *sixteen* feet. While, as to his positive statement that the sockets "were only covered by a little sand, easily removable by the hand," I have in my possession photographs, taken immediately after the uncovering by Messrs. Aiton and Inglis with their Arab workmen, showing that the material then cut through to uncover the said sockets was mostly a hard, stony rubbish, or rude, natural semi-concrete, and the depth so considerable as to amount over all four sockets to an excavation of several hundred cubic feet; the material, therefore, so hard and rough, and the quantity so great, that were the public—before whom I hope soon to exhibit some enlarged copies of these photographs on glass—were the public, I say, to condemn Sir Henry James to do what he states could have been done *so easily*, he would have to grovel in the earth all the rest of his days, and his two hands would be worn down to the bone, unless indeed the integument with which they are covered is of a remarkably pachydermatous order.

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But far more serious is it when the "Director-General of the Ordnance Survey" proceeds to ridicule the *religious* deductions of those who have recently written on the Great Pyramid; for when he indites what he *says* is a parallel case, in order to render it ridiculous and to knock it over, and entirely leaves out all allusion to the one and essential feature or claim of the Pyramid theory to be looked on as appertaining to sacred things—viz., its support from the revealed Word of God—he either shows that he knows nothing of what the religion of Revelation is, or commits a deadly sin. Yet the progress of the scientific theory of the Great Pyramid, which has insensibly merged into the religious, has been of late so decided that there is at least *one* of its crucial points which not even Sir Henry James has been able to gainsay or resist; *quietly*, therefore, has he adopted it, or at least nineteen-twentieths of it, in his last plate-page, without explanation or amend.

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We may further observe of the photozincographs in Sir Henry James's publication, that while none of them came up to the *minimum* attained both by Mr. Woodbury and Herr Albert in representing half-tint, No. 3 has evidently been faulty in the original negative from want of some means of equalising the light, and has not proved a true reproduction of nature when giving to the really light-coloured stones of the Pyramid in one corner of the paper the absolute blackness of the very blackest of printing-inks.

To his plate No. 1 we must also take an objection, and on more serious æsthetic grounds; for, while it is the one and only general view given of the Great Pyramid in a publication professedly devoted to that building, the most prominent object on the paper is made to be the Sphinx—a piece of idolatrous work of a different age and a totally opposite nature to the Great Pyramid, whose interior walls and original surfaces are pure and blameless, free from every scratch or trace either of worship of false gods or glorification of men. To put in the Sphinx, therefore, in *such* a way, on *such* an occasion, is neither more nor less than a piece of art-impertinence towards the grander subject treated of. Nor was there any necessity for so doing, seeing that far more instructive views of the Great Pyramid may be gained from other directions where the Sphinx is either not visible at all, or, if seen, is shown in its true insignificance of absolute size as compared to the Pyramid. To put up the camera, therefore, so close under the nose—and a very ugly nose too—of the Sphinx as to make that repulsive object subtend as large an angle as the Great Pyramid in the distance, is to cause the proverbially truthful instrument of the photographer to be an aider and abettor in producing a falsehood—a pictorial or æsthetic falsehood only, no doubt, but still such an one as we should be glad to see all good members of our art-science repudiate most thoroughly in *their* practice.

Contemporary Press.

THE PERMANENCE OF CARBON PRINTS.

[Journal of the Photographic Society.]

On a recent occasion we have had an opportunity of comparing a series of proofs taken by the new systems of carbon printing with other impressions produced from the same negatives by the ordinary method of printing upon albumenised paper sensitised with the salts of silver, and, as the results of such comparison, we have been very favourably impressed with the superiority of the carbon print in all cases where good artistic gradation and breadth of effect are the objects pre-eminently sought. If, on the contrary, it should be desired to secure the rendering as sharply as possible of certain details and minutiæ, such as hieroglyphics and inscriptions, we are inclined to believe that the continued adoption of the old process in the reproduction of such subjects will have its advantages. Foreseeing, however, an important career for the various systems of carbon printing, Woodburytype, and other processes wherein gelatine combined with pigments constitutes the groundwork of the record, we are tempted to inquire whether the present mode of working is the best that can be adopted for the purpose of hardening the gelatine, and rendering it so unchangeable by time that the permanent attachment of the enclosed pigments to the paper support or tablet may be unhesitatingly relied upon. One phase of this question came before the Society in the course of the discussions which followed Mr. Woodbury's description of the photo-relief process, and Mr. J. R. Johnson's demonstration of his simplified modes of transfer and processes of carbon printing given at the meetings of March and June last. But we believe that it may be correctly asserted that up to the present time a solution of alum has always been resorted to for the fixing of the Woodburytypes, and a salt of chromium used in combination with gelatine in the carbon prints.

We start, then, on chemical grounds to investigate the evidence bearing upon this all-important question. Under what circumstances may carbon and other pigments be best preserved in a matrix of gelatine? There is no fear of the lampblack itself or well-selected mineral pigments undergoing any change in the course of time; and the history of letterpress printing and engraving furnishes the proof of great durability being secured by the combination of blacks with slowly-drying oils

which harden upon exposure to the air. Gum, as used in the preparation of Indian-ink, seems also to be very permanent; but when gelatine is the substance employed, there is the possibility of a kind of animal decomposition being set up of a nature not widely different from that which cartilage and even bones are known to undergo by long exposure to air and moisture. Alumina, oxide of chromium, phosphate of lime, clay, and other earths are, so far as we are aware, unable to prevent this change, and the admixture of finely-divided charcoal may even expedite it. On the other hand, we have evidence, in leather and parchment, of the remarkable durability of gelatine which has been treated with tannin or other astringent substances. Animal skins left in their naturally moist condition soon begin to change; glue can hardly be manufactured in summer time without exhibiting signs of incipient decomposition, and paper-maker's size prepared with admixture of alum keeps good for a short time only in hot weather. Let the skins be converted into parchment or leather by tannin with oak-bark, galls, sumach, valonia, or catechu, and they enjoy a greatly prolonged tenure of existence; moisture is not then nearly so detrimental to them, and their insolubility is placed beyond doubt. Some marvellous examples of the preservation of animal organisms were shown two years ago by Dr. Abbati, of Naples, in the Paris International Exposition; and these were commonly supposed to have been treated with a solution of mixed astringent and antiseptic substances, of which tannin formed the chief ingredient. Thus we are assured that gelatine and tannin, although each incapable of being kept for any length of time in solution, can be perfectly preserved from change when thrown into a form of combination; and it suffices to immerse the Woodburytype impression in any pale solution of tannin, in order to effect the same end as is usually accomplished by the use of alum. We have treated a couple of prints in this manner and succeeded in fixing the gelatinous ink without detriment to any quality which characterises the finished result of Mr. Woodbury's ordinary operations. The cost of the tannin cannot be appreciably felt in these high-class applications, even when the best commercial quality is employed; but if this should for some purposes be considered a matter of consequence, there are still the infusions of sumach and nut-galls to be held available as cheaper substitutes. Tannin is readily soluble in warm water, and a diluted solution may be kept in stock, if mixed with a drop or two of carbolic acid; it is non-crystallisable, so that the retention of a small quantity of tannin in the picture need not be feared as in the case of alum, which by crystallisation may tend somewhat to disintegrate the paper. In our own trials a very slight washing was judged sufficient for the removal of the excess of tannin, and it is manifestly advantageous to avoid too prolonged an immersion of the print in plain water. By way of conclusion it may be remarked that the thin film of wax left upon the carbon prints transferred, according to Mr. Johnson's plan, from zinc plates is likely to have a beneficial influence in protecting the proof from atmospheric action; but we would suggest that a supplementary tanning-process might even in this case prove advantageous.

Our Editorial Table.

A Large Doublet.

Mr. Ross has favoured us with an opportunity of examining the largest doublet he has yet made, and which has just been completed for an export order. The diameter of each of the lenses is six and a-half inches, and, as it is one of the "wide-angle" class, the curves are so great as to have necessitated the employment of discs of glass of great thickness—the back lens requiring a disc exceeding two inches in thickness. The focus is twenty inches, and it covers a field from which a picture 30×24 may be cut, even when the lens has been considerably raised up by the sliding front. The front lens when used alone covers sharply a picture five feet square. It is a beautiful piece of work, and the purity of the glass reflects credit upon Messrs. Chance, as does also the finished lens upon Mr. Ross. The sky shade is composed of a large slab of ebonite, which is both light and rigid.

Transparencies and Other Specimens of Printing. By Walter Woodbury.

Some very beautiful specimens of the Woodburytype received from the inventor of the process require special notice at our hands.

Strong in the faith of what it was possible to achieve by his process when fully and fairly worked out, Mr. Woodbury has recently been applying it to the production of transparencies for the lantern and the stereoscope. He has now succeeded so perfectly, that by no process of silver printing—whether on a collodion or albumen surface—is it possible to produce pictures possessing a more delicate or extended range of tones. From the nature of the composition of the picture there is a certain degree of transparency even in the deepest shadows; and it is the perfect gradation consequent upon the employment of a coloured transparent pigment that has rendered the glass transparencies produced by this method of printing so superior to what at one time it was presumed to be capable of yielding.

The pictures, too, are now almost devoid of relief—indeed, in the case of the prints upon paper most recently issued, completely so. There is no tint in the negative so delicate that is not now reproduced by this process; and it is with much satisfaction that, from a critical examination of the specimens before us, we are enabled to supplement what we have before written as to the capabilities of this process, which, we may further add, has been brought to its present state of perfection by the unaided ingenuity and assiduity of its inventor. The subjects of the pictures we need not here refer to beyond saying that they comprise statuary, views in the Horticultural Society's garden, also views in Venice and Switzerland, and specimens of portraiture. Those who may feel interested in examining these fine specimens can have an opportunity of doing so by calling at the office of this Journal.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Oct. 26th	Liverpool Amateur	Free Public Library and Museum.
,, 28th	Oldham	Hare & Hounds Inn, Yorkshire-st.
,, 28th	Bristol	Philosophical Institution, Park-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The first meeting of this Society for the session was held in the City of London College, Leadenhall-street, on Thursday, the 14th instant,—the Rev. F. F. Statham, M.A., F.G.S., President, in the chair.

The Secretary having read the minutes of the previous ordinary meeting, and given a brief account of two social meetings which had been held during the summer recess, the Rev. Mr. Johnson, of St. Olave's Grammar School, was admitted a member.

Mr. Samuel Fry read a paper on *The Present and Future of Photography*. [See page 506.]

The Chairman, in proposing a vote of thanks to Mr. Fry (which was carried by acclamation), said that although his strictures were somewhat free, yet they were made in a good-humoured tone. One of the questions opened up was of the greatest importance, viz., the relative position of this country compared with other countries in respect of photography. It was well to look fairly at the shortcomings of English photographs, and he could not conceive of any system of attaining to eminence in the arts or sciences better than that of comparing our mode of proceeding with that of others, and thus finding out our shortcomings only to overcome them. It was scarcely to be wondered at that shortcomings would be discovered when a little country like this was pitted against the whole world. With respect to Paris alone, it was a perfect rendezvous of artists; but in spite of that he felt justified in saying that all the most important discoveries and advances in the science were made in this country; and even in looking at photography as an art, and taking Salomon's pictures as a fair type of Parisian art, they had had in this country photographs which very closely approximated to them. Respecting the position that photographers ought to take and their not ranking with artists, it was to a great extent the result of ignorance on the part of the public. In the production of specimens of a high class the photographer brought a vast and varied amount of knowledge to bear upon them; and if the public were aware of the difficulties connected with these pictures, and the skill, knowledge, and experience required to produce them, they would assign to photographers the status and position that they sought. In photography, England had taken a fair position; and if there were better pictures taken abroad, they were only so from their artistic treatment, and not in respect of their scientific production; for in this country they had first-rate chemists and able manipulators. The high position of this country among the others in the world was, he considered, further evidenced by their weekly journals devoted exclusively to photography. This of itself was a proof of the popularity of the science. The two weekly journals, edited by the gentlemen who were then sitting within a yard of him, formed, in his opinion, the best and most compendious manuals that existed; in addition to which each of them had for some years past brought out an almanac or annual epitome of the progress of art-science during the year. In no other country in the world was there a weekly photographic press. His own faith in the future of photography was very great. He concluded by instituting a comparison between painting and photography as the most valuable means of preserving faithful records of antiquity or archæology.

Mr. Simpson quite agreed with the greater part of Mr. Fry's paper. Respecting the Chairman's remarks on the relative position of photography in this and other countries he was quite right. Almost every

photographic process had originated in this country, and in general skill and practical knowledge English photographers could not be surpassed; but, so far as taste and art-education were concerned, better work had been produced abroad, where the facilities for art-education were greater than in this country, and it was in regard to art-knowledge and not to scientific knowledge that the difference existed. Concerning the literature of photography, while they had in a shilling manual almost all that could be practically taught on the subject, the same amount of information in countries abroad was imbedded in huge volumes, of larger-sized type, more profusely illustrated, and sold at a much higher price, but not containing any more information. After alluding to the position occupied by this country in respect to its journalism, and remarking that the bulk of the continental photographic journals were made up of translations from those of this country, he said that some Venetian pictures which had been considered as marvels of cheapness were really not worth much more than the low prices charged for them, as they faded rapidly. The characteristic of continental photography was the lack of permanence. In this country a much greater degree of care was bestowed upon them, and as a consequence they were much more durable. Although the English when travelling in Paris were large patrons of the photographers there, it was noteworthy that when French photographers opened establishments in this country they neither produced better work nor received a larger degree of patronage than native artists. When foreigners fought with English photographers on our own ground they found their level.

After some remarks by Mr. Howard,

Mr. Fry said that although he had spoken in laudatory terms of Parisian photography, he could by no means do the same of the works produced in the French provinces. There the state of the art was so low that it could not for a moment be compared with the provincial cities and towns of this country.

The Chairman said that the great amount of patronage extended to Parisian photographers by the English arose from the fact that when the latter went abroad they went with money in their pockets and with the intention of spending it.

Mr. A. L. Henderson exhibited some samples of permanent sensitive albumenised paper. He remarked that paper which would keep sensitive ready for use was a matter of importance now that the dull foggy weather was setting in. Doubtless all knew the disadvantage of the bad keeping qualities of sensitised albumenised paper. Sometimes there was every appearance of a fine printing day, and, in consequence, a large stock of paper was prepared, when a cloud coming over the scene of operations few or no prints could be got off the negatives. For some years past he had studied to discover the reason why sensitised paper should discolour so rapidly, even when not exposed to light or air. He had tried putting the paper in a receiver and exhausting the air, but that had not the desired effect. Such a research was necessarily slow, seeing that it required months and sometimes years to test the efficacy of each experiment. He should like members to test and report upon the samples now at their service. It could be prepared to keep any length of time; the image was more on the surface of the paper; the paper printed quite as rapidly, if not more rapidly, than ordinary sensitised paper, and the colour of the paper in the printing-frame was a beautiful copper colour. Care should be taken not to over-tone, as the paper contained a small quantity of gold, but not sufficient to dispense with toning altogether. He had not tried all the different kinds of toning baths, but he inclined to think that the sulphocyanide of ammonia and gold bath would be the best. He proceeded as follows:—Wash the prints; immerse them in salt and water to convert any trace of free silver; fix in hypo. fifteen per cent., five minutes; then tone in the sulphocyanide bath. With the ordinary acetate toning bath he could get more beautiful, warm, Salomonesque tones than he could with any other paper he had tried. There was more of the nasty yellow-jaundice tone about them. He would ask members not to condemn the paper without a fair trial. He himself at first felt inclined to throw all the prints away as bad, but when they dried they improved wonderfully. In conclusion: he might say that the paper would be prepared of uniform quality and sensitiveness, and sold by a well-known London dealer at a price that would, he thought, compel photographers to use it. Further particulars would be published in the journals. The thanks of the meeting were awarded to Mr. Henderson for his communication, and parcels of the sensitive paper were distributed among the members.

Mr. J. T. Taylor submitted for examination a number of photographs taken by Mr. Pollitt, of Manchester, showing the relative capabilities of the wide-angle and rapid rectilinears of Dallmeyer and the "periskop" of Steinheil, the subjects being the same; and, also, some interiors by Mr. B. Wyles, showing the capabilities of Ross's instantaneous doublet for that kind of work when used without a stop. These pictures were examined by the members with much interest. Mr. Taylor further exhibited some of the most recently-executed prints on glass and paper by the "relief" process of Mr. Woodbury, a brief notice of which will be found in another page.

Mr. Simpson exhibited some specimens of the Alberttype process of printing, which, together with those by Mr. Woodbury mentioned above, were handed round by the members and critically examined.

Thanks having been awarded to the gentlemen by whom they were exhibited, the meeting was adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The annual meeting of this Society was held at the Memorial Hall, on Thursday evening, the 14th instant,—the Rev. Canon Beechey, M.A., President, in the chair.

The minutes of the previous meeting were read and passed, and Messrs. J. W. Bibby, Thos. T. Pearson, and James Ward were elected members of the Society.

The President then read the

ANNUAL REPORT.

Your Council, in submitting the Fourteenth Annual Report, see no reason why they should do otherwise than assure the members of the continued prosperity of the Manchester Photographic Society.

The members enrolled in the books number eighty-four against ninety-three at the date of the last annual meeting, and there are three gentlemen nominated for election tonight. The falling off in numbers is, therefore, far from being considerable or surprising, especially when the commercial difficulties existing in Manchester now, and for many months past, are taken into account.

The financial condition of the Society is satisfactory, and the balance in the hands of the Treasurer (whose accounts will be submitted to you) is £15 16s. 6½d.

Your Council cannot justly compliment the members on the number of papers read during the past session, and wish to impress on each and all the absolute necessity of at least trying to contribute something—no matter how little—to the interest of the monthly meetings.

During the session Mr. Winstanly gave two demonstrations on the production of artificial light.

Mr. Coventry read a paper on the construction and use of the lantern, and Mr. Noton read one at the last meeting on *Streaks in the Direction of the Dip.*

The attendance at the meetings has exceeded that of the previous year, showing an average of 39⅓ against 34⅓, exclusive of strangers; and the meetings generally have not been without interest.

As regards the summer outdoor meetings, your Council are sorry to report a falling off; the interest and enthusiasm of former years has not been sustained. It may be that the unpropitious character of the summer exercised an adverse influence, or that members were away from home, or that the places accessible had been too frequently visited to afford sufficient novelty; but, whatever the cause, the outdoor meetings have been few. It must, however, be admitted that the few were, with one exception, numerously attended.

The annual *soirée* in February last was even more successful than its predecessors, the number of exhibitors and the variety and excellence of the photographs shown being greater than at any previous *soirée* and exhibition of this Society.

Your Council think it may fairly be said that the establishment of an art union in connection with the exhibition contributed very materially to its unprecedented success; and although absolute perfection in the management was not attained, yet, on the whole, the *soirée* and exhibition gave general, if not particular, satisfaction.

The art union did more than equal the most sanguine expectations of its promoters. The number of shares sold were 1,110, realising £55 10s., while the value of the prizes distributed was about £50. The art union books at the closing of the account show a balance of five shillings and eightpence-halfpenny to its credit.

After the acceptance of the annual report, the accounts of the Treasurer were read and accepted.

The President, in alluding to the death of an honorary member of the Society (Mr. Petschler), said the Council had unanimously decided to forward a letter of condolence to Mrs. Petschler; and he had no doubt that the members, remembering Mr. Petschler's many excellences and his unvarying kindness, would fully coincide in the proposal.

The election of officers then took place, and Messrs. Coote and Warburton were appointed tellers.

During the examination of the voting papers, Mr. Wade exhibited a number of prints from collodio-albumen negatives.

The President also exhibited several stereoscopic views, taken in the lake district upon Liverpool dry plates. Some of the negatives were taken at an elevation of 2,000 feet above the sea, and were very interesting mementoes of mountain tops.

The President said the presentation prints, so kindly offered to the Society by Mr. Woodbury, were ready for distribution, and would be placed in the possession of the members as early as possible.

In vacating the chair,

The President remarked that his other duties were so numerous and pressing that it would hardly be possible for him to be as regular in his attendance at the monthly meetings as he had been hitherto. He could, however, assure the members that his interest in photography had not abated, and that when absent in person he should always be with them in spirit.

Mr. Lund, V.P., then took the chair, and a vote of thanks was passed to the President for his services.

The tellers, having completed their examination, announced the result of the election as follows:—

President: the Rev. Canon Beechey, M.A. *Vice-Presidents:* Messrs. M. Noton, Thos. Heywood, W. T. Mabley, G. T. Lund, F. C. Töbler.

Council: Messrs. W. G. Coote, C. Hebert, W. Hooper, D. W. Sanderson, J. J. Kershaw, A. Coventry, J. Warburton, I. Wade, J. H. Underwood, A. Patterson.

Treasurer: J. H. Young.

Hon. Secretary: Chas. Adin.

Mr. J. Chadwick gave notice of his intention to propose at the next monthly meeting, "That the subscription be reduced to half-a-guinea

a-year, and that the Society shall discontinue to supply each member with a copy of THE BRITISH JOURNAL OF PHOTOGRAPHY."

The meeting then adjourned.

OLDHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of this Society was held at the Hare and Hounds Inn, on Thursday, the 26th ult.,—the Vice-President, Mr. J. R. Heaton, in the chair.

After the minutes of the previous meeting had been read and corfirmed,

The CHAIRMAN said he had much pleasure in introducing Mr. Kay, of Bolton, who had come before them that night to make a few remarks about his new photolithograph picture.

Mr. KAY said he had great pleasure in directing the attention of the Society to a new style of portraiture. The *carte de visite* had had a very long run—in fact, they never would, he believed, go out; but they were in want of something new, and that something he was about to introduce. If photographers could only be induced to try and take it up, he had no doubt it would command a very great sale. He (Mr. Kay) then passed round his picture, which appeared to give great satisfaction.

The picture, on being removed from its frame, appeared to be a very brilliant transparency, which, on being backed up with a common tinted mount, had the resemblance of a fine lithograph. Mr. Kay then gave his formula for producing the pictures, which caused a lengthened discussion.

The thanks of the Society were unanimously awarded to Mr. Kay for the kind manner in which he, a perfect stranger, had come forward and offered so much valuable information to the members, and a hope was expressed that he would make it convenient to be at the succeeding meeting.

Several of the members promised to try the process and bring forward their results at the next meeting.

The meeting then proceeded with special business.

Correspondence.

Foreign.

Paris, October 18, 1869.

IN my last I left the readers at St. Gervais, where I would advise the tourist to remain as long as he can. At the Hotel et Pension du Mont Blanc he will find every comfort he may require on very moderate terms. Excursions can be made from this place to a great many points of interest in the neighbourhood. Chamouni may be reached by the pedestrian by an excursion over the Col de Voza—a mountain about 6,000 feet high—or by the high road through beautiful mountain passes. This road has been made by the French Government, and permits the fine diligences to run to Chamouni from Geneva. The tourist at St. Gervais can take the diligence at the Baths of St. Gervais, about half-an-hour's walk from the village.

At Chamouni the work for the camera is pretty well known to photographers in the transparencies of Soulier and Clouzard, and the large paper pictures of Bisson frères. Quantities of these are to be purchased in the village. I noticed that the artists had presented some to the landlord of the hotel at which I was staying, and a photograph by our own countryman, Mr. Stephen Thompson, also adorned the walls of the Hotel du Mont Blanc at Chamouni.

From Chamouni the tourist can go to Martigny on foot or on mule, the road being altogether unsuitable and impassable for any kind of conveyance. From Martigny the railway conducts to Lausanne, where the circular ticket comes into operation again.

From Lausanne to Fribourg is the next stage—then to Berne. It is well worth stopping at this city for a time; the ancient and quaint buildings, antique and curious fountains in the middle of the streets, affording abundant materials for the artist. Not far from Fribourg the passenger hears the sound of German in the conversation of his *compagnons de voyage*, and the guards of the train speak both French and German, as required. At Berne you fancy yourself in Germany, the signs of the restaurants, hotels, the names of the trades, streets, &c., being put up in German. In some cases both languages are employed. The German wines and dishes are found at the "restaurations," and everything contributes to the belief that you have left Switzerland behind you.

Leaving Berne, the German element gradually disappears, and by the time you arrive at Neuchatel it is scarcely heard in conversation. At this town there is not much to occupy a photographer; the lake is very fine as a lake, but does not afford much scope for the use of the camera. The railway from Neuchatel to Pontarlier passes through beautiful mountain gorges, where the engineering must have been very difficult from the nature of the ground, the number of tunnels required, the inclines and curves, &c. There is but one line of rails, as is usual on such railways. Soon after leaving Pontarlier the country becomes level, and vast panoramas, stretching as far as the eye can reach, form a striking figure of the French landscape of this district.

The stations of Mouchard, Dôle passed, a few hours' travelling brings us to Dijon, the first point on the journey which has been touched before. From this the circular ticket conducts back to Paris by the same route as that taken in going, and so Fontainebleau can be revisited if desired and time permits.

I would not recommend the tourist to take Hachette's guide to Switzerland, at least if he does not get a more recent edition than that given to me by that firm this year. No mention is there made of the diligences from St. Gervais to Chamouni, as the road was not made when the book was compiled. Equal ignorance, from the same cause, is displayed of the existence of a railway from Martigny to Lausanne, and, in the map of the Paris, Lyon, and Mediterranean Railway, no notice is taken of the line in work between Pontarlier and Dôle. The terms and indications of the best hotels and pensions, &c., are incomplete, and not to be relied upon. I am sorry to say this, as I was under the impression it was one of the best guide books for travellers. Personal experience is a great corrective for many ideas.

Before quitting this subject entirely, let me assure any of your readers who may travel on the continent that nothing lowers them in the eyes of their own fellow-travelling countrymen, and renders them and their nation despicable to the people—whose guests they are so long as they are travelling in their country—as the hateful, insolent, and impertinent way in which some Englishmen, and women too, behave, whenever their wretched pronunciation of the foreign tongue fails to elicit an immediate response from the attentive listener. I have met such people, who seemed to act as though there was no one else in the world but themselves, who were constantly fussing after their luggage, or their tickets, or their feeding, and make everything a subject of coarse and stupid grumbling in very bad language, French especially. Such people are generally mean, and neglect to leave a few sous to the waiter, who has given them a great lesson of self-denial in attending to them at all, or to the cabman, who has with the greatest difficulty and ingenuity discovered the place they wish to go to. Be courteous, quiet, and good-humoured; you are not cheated any the more. If you are cheated, you have a better chance of restitution than if you blustered, and you are more of an ornament and credit to the British nation than the absurd people I have just described.

I am indebted to your contemporary, *Les Mondes*, for the following process of removing silver stains from the fingers, which has been communicated to its pages by the Abbé Fortin, of Sully-sur-Loire:—The fingers are to be washed with a solution of sulphate or chloride of zinc made as saturated as possible, and acidulated with a few drops of acid. Whilst the fingers are immersed in the solution a rod of zinc is rubbed over the blackest places, in order to facilitate the reduction of the oxide of silver or the gallate of iron. The salts of iron and zinc which have penetrated the skin are decomposed by the zinc salt, and all the zinc salts are white and soluble. When the last trace of black has disappeared the hands are rinsed in plain water, and then washed with soap and water. It is stated that by this plan the hands are rendered as clean as ever; no trace of poisonous substance is left in the skin. If there should be any slight sores the zinc solution cauterises and heals them. It is more efficacious than the solution of iodine in iodide of potassium; not dangerous, like the use of cyanide of potassium; and is less costly than the employment of either of these means.

R. J. FOWLER.

Home.

PHOTOGRAPHIC PANORAMAS.

To the EDITORS.

GENTLEMEN,—On reading your article on Sutton's panoramic lens, it struck me that, seeing it must be so difficult to procure curved glass plates and also necessarily difficult to print from them, not to speak of the trouble that there must be in a tourist carrying a few dozen of these bent glasses, a good substitute for them may be found in Blair's transparent paper, a *flat* sheet of which might, when rendered sensitive, be easily curved over suitable guide pieces in the camera.

If two pieces of curved wood or metal be placed, one at the top and the other at the bottom of the camera, and a piece of this kind of paper be then bent round them and firmly retained at each end of the broad band of paper—that is, at each side of the camera—the form of the curved paper will be as true as if it were bent over a curved plate of glass; at any rate it will be sufficiently smooth and true to be in focus in every part.

By the adoption of means analogous to those here indicated, this kind of lens might be rendered very useful. Let any reader try the effect of curving a large and broad band of paper round the edge of a small circular table, and he will find that even with this *one* guide-piece the paper will preserve an even degree of curvature; and if common writing paper will do so with one guide-piece, how much more will finely-varnished paper do it with two such guides.

An objection might be made against the presumed coarseness of pictures taken upon paper. I do not think this objection is worth much, because I have coated varnished paper with collodion which has been

sensitised, preserved, and dried, and upon which I have impressed pictures which were quite as finely defined as if a glass plate had been used as a support instead of the varnished paper. The picture being solely in the collodion film and not in the paper, there is no granularity.

I send these jottings in the hope that they may induce some one to enter into the subject of photographic panoramas, for, without saying a word against narrow angles of view (very useful in certain cases), a really good panorama is a class of picture which possesses many inherent charms.—I am, yours, &c., MEDICUS.

ARTIFICIAL LIGHT.

To the EDITORS.

GENTLEMEN,—Will you be kind enough to tell me the best form of coal gas lamp for the magic lantern? We have very good gas here. I am thoroughly tired of paraffine and other lamps, and have not room for the lime light, as it is only for a small room.—I am, yours, &c.,

33, *Market-place, South Shields, Oct.* 18, 1869. G. NICHOLSON.

[This is a subject on which we ourselves should also like to have some information. The flame from an argand gas burner we have ascertained to be thin and poor. If the gas be good, a dense body of flame should be obtained by having two or three fish-tail burners, one placed in front of and at a very short distance apart. A series of concentric argand burners should also give a good light. We have been somewhat disappointed in our endeavours to obtain a dense light from a single argand gas burner.—EDS.]

QUERIES ON VARIOUS SUBJECTS.

To the EDITORS.

GENTLEMEN,—I shall esteem it a great favour if you or some brother reader will answer me the following queries:—

1. Is it absolutely necessary to have clockwork when using the magnesium light for enlarging on paper, and using gallic acid for development?
2. Should a reflector be used, and, if so, what should be its diameter and curvature or radius, supposing the magic lantern condenser to be 3½ inches diameter?
3. How can I get the best results when printing from a thin negative?
4. I am about to try my hand at finishing enlargements in coloured crayons and pastels. Can you tell me of any books I could study with advantage?
5. What is the proper kind of crayons to use—hard, soft, Swiss, or French?
6. How can I make a kaleidoscope suitable for the magic lantern?
7. How can I make a microscope suitable for the magic lantern? Would a focussing eyepiece answer for the object glass?—I am, yours, &c., X. Q. K.

[1. It is *desirable* to use a clockwork arrangement for paying out the magnesium riband or wire, but it is not "absolutely necessary."—2. The best kind of condenser is one of such a degree of curvature that each ray that falls upon it shall be reflected through the flame; thus the reflected ray will fall upon the condenser in a similar manner as the direct ray—a condition necessary when the best definition is desired.—3. By judicious exposure and development.—4 and 5. Newman, of Soho-square, supplies materials of this kind.—6. We cannot tell.—7. Give more detailed particulars.—EDS.]

Miscellanea.

ETHNOLOGICAL PHOTOGRAPHS.—The Ethnological Society, under the presidency of Professor Huxley, is making arrangements to take photographs of specimens of all races of men in all parts of the globe. Such photographs should be taken before a background, ruled off by plainly visible lines into spaces six inches square, so that all the pictures shall show the dimensions of the individual photographed, and be directly comparable. The "sitter" should stand upright, and be in contact with the background. When photographs of such value are collected from all parts of the earth, it is ten thousand pities that they should be printed on paper by the ordinary silver process, to fade away in the course of years, and never, perhaps, to be replaced, as many tribes of savages are dying out before the progress of civilisation. The negatives should all be sent to England, and be copied by a permanent carbon process or upon collodion films, cemented between two plates of glass with tough Canada balsam. It is very much to be regretted that the Ethnological and Anthropological Societies do not sink their petty differences and unite into one strong body, to carry on their work with more power and efficiency.—*Mechanics' Magazine.*

PHOTOGRAPHIC FORGERY OF BANK NOTES.—When photography became established as a practical art, it was found that bank-notes printed with black ink lent themselves too readily to the machinations of the forger. Thereupon, the Bank of France determined to employ blue ink, which baffles the photographic imitator, and to have some engraved device or other on both surfaces. This plan has been completely successful. In regard to other modes of falsification, an experienced chemist is constantly employed in studying all new discoveries that may perchance be brought into requisition, in order to devise means of averting roguery. Forgery of the notes is now extremely rare. On one occasion, three persons attached to a deposed royal prince were found to have been concerned in a deep-laid scheme of note forgery; a packet containing twelve false notes of 1000 francs each was presented to be cashed, but the fraud was detected in time to avert loss. About 1853, a more determined attempt upon the bank was made. False 100-franc notes came to the bank with great rapidity and regularity. They were so admirably executed that no banker, money-changer, or trader could detect the fraud, and therefore no reason presented itself for refusing to take them in the ordinary way of trade. The experts at the bank alone detected them by means of a tiny black spot near the figure of Mercury. For eight years continuously did these notes make their appearance, defying all endeavours on the part of the authorities to discover the malefactors. The bank did not like to make the fraud known, lest it should shake the confidence of the public in the 100-franc notes generally. At last the clever scoundrel was discovered; he was an engraver, and it was found that he had successfully put into circulation false notes to the value of nearly 200,000 francs. His end was strange and horrible. Transported to Cayenne in 1862, he tried to escape into the Dutch settlements; faint and exhausted, he became fast embedded in the thick slimy mud of a river, and was there *eaten alive by crabs!—Chambers's Journal.*

THE ALKALINE WET PROCESS.—Referring to Mr. Blanchard's communication on this subject, which we published at page 457, Mr. Sutton thus writes in the *Photographic Journal:*—"Mr. Blanchard describes a process which is essentially *acid* in every stage. Collodion iodised with cadmium is always acid to test paper; a nitrate bath treated with carbonate of soda and then sunned is always acid to test paper; and a plain solution of protosulphate of iron is strongly acid. There is no analogy whatever in the process which he describes to a really alkaline wet process. He refers to an old controversy which he had with me some years ago relating to the effect of adding carbonate of soda to a nitrate bath. What I said was perfectly true, namely, that this treatment does not render a bath alkaline. The fact is so well known that it has been frequently alluded to in the journals. When bicarbonate of soda is added to a nitrate bath there are formed nitrate of soda, carbonate of silver, and carbonic acid, which is dissolved in the bath and renders it acid. If a bath in this state is sunned it becomes still more acid, because the ether and alcohol which it contains are rendered acid, and the mixture of organic matter with nitrate of silver is reduced and nitric acid set free. A bath in this state requires no further addition of acid. I feel quite sure that any attempt to increase the rapidity of a wet collodion film by leaving upon it free nitrate in an alkaline condition will end in a thick veil of fog, unless that free nitrate be removed before development. Many years ago, and long before collodion was used in photography, Mr. Robert Hunt described a process which was the nearest approach ever made in principle to the alkaline wet process which I have recently published. This he called the 'fluorotype.' A sheet of paper was immersed in a ten-grain solution of bromide of potassium, containing two or three grains of fluate of soda. This was excited on a sixty-grain solution of nitrate of silver, and exposed wet. After exposure it was washed, and developed with a plain solution of protosulphate of iron. The results are spoken of as showing great rapidity of action. It is important to remark that the free nitrate was removed before the application of the developer; and that is what Mr. Blanchard will have to do in the kind of process which he describes. Wash off the free nitrate after exposure, and then develope by Major Russell's alkaline method, intensifying afterwards in the usual way. Instead of a common nitrate bath one of ammonium-nitrate might, perhaps, be employed."

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

G. S.—We shall give the subject our attention.

D. M. (Liverpool).—The work is at present in the possession of the editor of *Scientific Opinion.* As soon as it is returned it will be forwarded as directed.

Y. R. K. S.—1. Use Browning's lamp with twelve rather than with six Grove's cells. With six pint cells you will get a pleasing little light; but, for your purpose, twelve will be much better.—2. A Bunsen's cell is nearly, but not quite, equivalent to a Grove's.—3. The fumes are injurious; convey them away.

INCEPTOR (Dursley).—1. At Mr. Ross's, Wigmore-street, if anywhere in London. We never saw the article, but understood at the time that he was the sole maker.—2. Your second question, "What is the *best* varnish for oil painting?" we cannot at present answer. Can any of our readers supply the information?

C. D. C.—The publisher has sent a quite new edition of the work ordered. It was only published a few days since. For your other query write to Messrs. Pumphrey, Bath-row, Birmingham, who are now the most extensive publishers in this country or in the world, so far as pictures of the kind named are concerned.

W. B.—1. We should prefer the "rapid" to the "D" for the purposes named.—2. By immersion in a solution of tungstate of soda the cardboard will be rendered incombustible.—3. Dipping the plate answers very well, provided your solution is in good condition, and it ought to be allowed to remain in the solution. One or two trials will enable you to acquire more experience than you could through the most extended tuition.—4. The same developer may be used several times.

GENERAL B.—You have quite correctly appreciated our meaning; the sitter is placed in one focus of the lens, the sensitive plate in the other, and any alteration in the position of the former necessitates a corresponding change in that of the latter. The defect which you describe as inherent in your lens is not astigmation but roundness of field. That would be cured by getting another back lens possessing more negative aberration than the present one, but it would also be accompanied by more astigmation. In the meantime, try the effect of placing the stop close up to the front lens; the field will thus be much flattened. For this experiment you may extemporise a stop of blackened card.

INQUIRER.—Seeing that the negatives are now fixed and varnished there appears to be no remedy for the mottled skies beyond the very obvious one of painting the sky quite opaque. It will then, of course, print white, which is very offensive; but this may be remedied by either printing a sky from a negative containing appropriate clouds, or by simply toning it down in the following manner:—When the printing has been effected, remove the proof from the pressure-frame, and, holding over it and at no great distance from it a sheet of opaque paper or card of sufficient size to cover it, raise it up to the light, and draw slowly down the sheet of cardboard, with an even and continuous motion, until the whole of the sky has been exposed, stopping the exposure as soon as the horizon has been reached. By this means you will get a beautifully-graduated sky, darker at the top than at the horizon. While on this subject, although it forms no part of your query, we may observe that it would be well if similar means were more frequently adopted to tone down offensive white objects in the picture itself, especially such inelegant subjects as broad and staring roads, which disfigure the foregrounds of many otherwise good pictures.

C. S. (Bombay) has met with difficulties which he thus describes, in the hope that some fellow-reader will aid him:—"I have been baffled in all attempts to transfer collodion films by Woodbury's plan, through the insufficient protection afforded by the coating applied to shield the original film from the action of the transfer collodion. I have tried gum arabic in solutions of varying strength. One of fifteen grains to the ounce appeared to offer no obstacle whatever to the destructive action of the transfer collodion, and when, by using stronger solutions, I obviated this difficulty, a mealy, granular effect was produced in the negative, apparently owing to the film leaving the glass in extremely minute blisters. I tried India-rubber with no better success; in fact, it treated me worse than gum arabic, as it failed entirely to protect the negative. My negatives are Liverpool dry plates, and I take this opportunity of recording my very high opinion of their value. Is it possible that my failures are to be attributed to any peculiarity which renders Woodbury's process of transfer inapplicable to collodio-bromide films? My transfer collodion contains fifteen grains of pyroxyline and ten drops of castor-oil to each ounce of the solvents, which are the best ether and alcohol procurable here. I thin this collodion (which is too thick for use) with an equal bulk of Thomas's plain negative collodion, and get a tough and brilliant film, though it is sometimes marred by bubbles, which seem to develope themselves *after* the collodion is poured on the plate, and are the source of annoyance. I have been trying to prepare collodio-chloride of silver by the formula given in your ALMANAC for 1869, but cannot get sufficient intensity. Can you suggest a reason? Thomas's collodion is the preparation I have used, and the film looks well enough when allowed to dry spontaneously; but I find that an attempt to hurry the drying causes the plate to be covered in patches with spangled crystals (which I am not chemist enough to recognise, but which, I suppose, must be nitrate of strontium), and these entirely destroy the homogeneity of the film, and cause it to print patchily. These crystals sometimes appear on plates which have been allowed to dry spontaneously. I suppose that collodio-chloride pictures can be transferred by Woodbury's method. It is difficult here to meet with paper suitable for coating with collodio-chloride, and I have a notion—possibly an unfounded one—that no prints taken on paper are so well defined as those obtained on glass, though the same preparation may be applied to both substances. I am looking forward with great interest to your report on Mr. M. Carey Lea's collodio-bromide process. I hope to try it myself, and will communicate my results, if they are worth recording. I will sum up the points on which I beg the favour of your advice:—1. What shall I coat my negatives with before pouring on transfer collodion?—2. What causes bubbles in the transfer film?—3. How is intensity secured in collodio-chloride plates?—4. What are the crystals noticed on collodio-chloride plates, and how may they be avoided?—5. Can the silver solution furnished with Mawson's collodio-chloride of silver, when discoloured (presumably by exposure of the solution to light) be restored to its original purity, so as to give a colourless film?"

WM. HERBERT.—The effect you have described may be produced by impure acetic acid, or impure alcohol. It does not appear to be the silver bath, but the developer, which is at fault.

AMICUS (R.).—We shall take care that you are properly informed relative to the matter inquired about. Meanwhile, be assured that it *can* be done, and probably better, too, in your city than in London. The two *brochures* have been received. Thanks.

C. M.—There is no effective remedy for a negative dense in some parts and wanting detail, or having that detail too thin in others. Much may be done by printing upon a weakly-silvered paper, or in a weak light. In the meantime fix the negative, and avoid making it any denser than it is, as it will only increase the hardness. The *best* way of proceeding then will be to obtain another and softer negative through the intervention of a transparency.

W. H. (Stromness).—While we congratulate you upon the introduction of gas into your town, we are unable to indicate in what manner this will be specially useful to you as an amateur photographer. It may prove to yield a light powerful both in a luminous and actinic point of view; on the other hand, it may be very much inferior to the paraffine lamp you have hitherto been using. In respect of luminous intensity, an argand paraffine or oil lamp is much superior to gas—at any rate to the gas supplied either at our office or at our private residence.

*** Some Reviews, Answers to Correspondents, &c., in type, are unavoidably left over till next week.

RECEIVED.—George Price; Sartor Resartus; Olaus Jastrau; G. W.; A. G. Grant, and others; *The Diatom Prism, and the True Form of Diatom Markings*. By the Rev. J. B. Reade, M.A., F.R.S., P.R.M.S.; the new price list of Messrs. Pumphrey, of Birmingham; a sample of Henderson's new sensitised albumenised paper.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.

SALE OF PHOTOGRAPHER'S EFFECTS.—From an announcement in our advertising columns we observe that Mr. Warner, formerly of Ross, is about to effect a clearance, by auction, of his surplus photographic stock.

A NEW USE FOR PHOTOGRAPHY.—While we write we have on our table a new thing to us in photographic literature, which comprises an idea worth attention and which may be advantageously utilised. It is a beautifully got-up card for a "*Souper de Bal du 7 Octobre*," at Hopetoun House. The body of the card is printed in gold; but the feature which renders it interesting to photographers is the heading, which is a miniature view of Hopetoun House, the seat of the Earls of Hopetoun. It is well executed, and, although copied from a large negative, is yet so sharp as to make it impossible to distinguish it from a direct picture. The entire impression of 150 copies was produced and delivered in two and a-half days. It is the work of Mr. George Campbell, Edinburgh.

FORTHCOMING EXHIBITION.—We have again to remind our readers that the exhibition *soirée* of the London Photographic Society will take place on the 9th proximo, at the Society's rooms, 9, Conduit-street. The exhibition will remain open for a week. Although last year's display was, perhaps, the best ever seen in the metropolis, it is confidently expected that the forthcoming annual exhibition of photographs will surpass its predecessor both in the number and excellence of the pictures exhibited. In order to admit of a proper classification of the photographs, and to facilitate the preparation of a catalogue, it is requested that all pictures be sent in a week prior to the opening of the exhibition. The Society's journal will be published on the 9th of November, instead of on the 15th (the usual day of publication), and that number will contain a catalogue of the works exhibited.

METEOROLOGICAL REPORT,

For the Week ending October 20th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Oct. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
14	30·20	55	41	44	47	W	0·01	Dull
15	29·86	58	46	51	53	WSW	—	Dull
16	29 47	58	51	54	57	SW	0·13	Dull
18	29·64	49	36	42	44	SSW	0 70	Rain
19	29·43	45	39	42	45	WNW	—	Fine
20	30 19	—	31	33	37	NNW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 495. Vol. XVI.—OCTOBER 29, 1869.

MR. HENDERSON'S READY-SENSITISED PAPER FOR PRINTING.

At the last meeting of the South London Photographic Society Mr. A. L. Henderson exhibited a number of specimens of a new albumenised paper ready sensitised, and which is believed to be capable of retaining its sensitiveness and colour, if not indefinitely, at least for a very long time. Mr. Henderson distributed a number of samples at the meeting, so that many will have the opportunity of testing the new paper; and, as we have carefully examined the specimens which we have received, a few remarks upon the subject will not be out of place here.

Of late years we have had numerous ready-silvered papers in the photographic market; of these not the least important were the leptographic, Carrièr's, the carbonate of silver paper of MM. Schæffner and Mohr, and the collodionised Obernetter paper. With the exception of that last named we hear very little now of any of these papers, notwithstanding the admitted value of some of them. In fact, lying before us as we write is a piece of leptographic paper which has lain in a desk for nearly three years, and during that time has, no doubt, frequently been exposed to a feeble light, and yet its colour is comparatively little changed, it being now of a very pale brown tint. Strange to say, the lights of a print on another piece of the same are but very slightly altered, although upwards of two years have elapsed since it left the printing-frame, and, though never toned or fixed, it shows much less evidence of change than the piece which was not exposed to light under a negative.

We mention this for the purpose of showing that some of the ready-sensitised papers which have been introduced from time to time really possessed the remarkable keeping properties attributed to them. One cause of the non-success of some of these has been the slight trouble attending the manipulation of the paper; but increased price was, no doubt, a serious stumbling-block to many, while the strongly-marked spirit of conservatism amongst photographers may likewise have had its share in preventing the more general employment of any of these papers.

Mr. Henderson at the outset makes two statements relative to the ready-sensitised paper which he seeks to introduce:—First, that it will keep for any length of time; and, secondly, that it can be manufactured of uniform quality at such a price that it will be more economical to photographers to employ it than to use the ordinary process. Some time must elapse before the first statement can be established, and of the second we will, no doubt, soon be in a position to judge. Meanwhile, there are some points upon which we can form an opinion touching the performance of the paper in question.

The sample of the new paper in our possession apparently differs in no respect from ordinary sensitised albumenised paper; after keeping for several days, however, we have failed to detect the slightest tendency to discolouration of the surface. Mr. Henderson states that the new paper is at least equally as sensitive as the ordinary paper, and we have found this to be the case. The chief difference which can be noted in printing is that the shadows take a coppery hue. On washing the print in water a little gold is stated to be dissolved out, and this assists in the toning. Mr. Henderson hopes to be able to introduce sufficient gold into the paper to enable it to tone the print without any external assistance in this respect. As it is, however, the prints tone well to a good warm tint in the ordinary acetate of soda toning bath. Mr. Henderson recommends the sulphocyanide of ammonium bath, but we have not yet tried this, as our results with the first-mentioned solution have been satisfactory.

This paper possesses one very useful quality—it is only necessary to tone it up to the desired point, since it is not lowered in the fixing bath.

Our readers will now ask—"How is this paper prepared?" It is not our wish to pry too closely into Mr. Henderson's secrets, or, at any rate, to reveal them; but this much we may say—that the paper carries excess of nitrate of silver, and, we believe, has been sensitised with a forty or fifty-grain bath of the salt, and we have been given to understand that after the paper has been sensitised it undergoes no further treatment. It is quite clear that, prior to sensitising, the paper is treated in some way which enables it to bear keeping. This, of course, is the secret of the process; and, as we have already stated that we do not wish to pry too closely into the matter, we will not state here the results of our analysis of the paper, but content ourselves with mentioning a curious result which we obtained without any premeditation in working with the paper.

One of the prints we made with the paper proved to be much under-printed, and with this we did not proceed any further than to tone it. As we had used the toning bath as much as required, we left it by with the solitary print in it, and did not look at it for twenty-four hours or more. On examining the dish and the print we found that the whole bath had taken a decided purple tinge, and the whites of the print had taken a strongly-marked *purple* hue, quite different from that resulting from prolonged contact of an ordinary print with a toning solution not exhausted of gold. On going a little further with this experiment it was easy to ascertain that the purple colour of the print was due to the production of the well-known *purple of cassius* in the film. The purple of cassius is a beautiful compound of gold and tin; therefore a compound of the latter metal is present in the prepared paper. As this is a result which might be easily obtained by anyone in working with the paper we note it here, and give the explanation of the production of the purple compound.

Of course we can have a pretty good idea of the composition of the paper, but we hope Mr. Henderson will work out the subject thoroughly, and state his process at some future date; at the same time, it is scarcely reasonable to expect that he would *at present* be disposed to publish his method of preparing the paper, since, if successful, its preparation on a large scale would be tolerably certain to "pay." There can be little doubt that the inventor of a good process for preparing ready-sensitised albumenised paper, capable of being preserved for a very considerable time without discolouration, might fairly hope to reap the golden fruits of his labours; and if a paper of this kind could be sold at such a price that its use would be much more economical than that of the home-prepared paper, Mr. Henderson might reasonably expect to establish a profitable

trade in the article. But when a certain point in the manufacture has been reached, it might serve to promote confidence in employing the paper if we were made acquainted, in a general way, with the process of its manufacture. We mention this more particularly, since the addition to the paper which renders it permanent before exposure to light does not of necessity ensure the permanence of the finished print.

TRANSFERRING COLLODION FILMS FROM GLASS.

The following explicit directions for transferring negative films from glass have been written with a view to aid our Bombay correspondent, "C. S.," whose letter of inquiry appeared in our last number. Accompanying the annexed communication was a film very perfectly transferred by the method described:—

I have transferred many dozens of negatives with perfect success, using India-rubber dissolved in benzine. I have never succeeded with gum. My transfer collodion is—

Pyroxyline	10 grains.
Ether	½ ounce.
Alcohol	½ ,,
Castor oil	5 drops.

The number of drops of castor oil will vary according to the quality of the cotton. I put in as much as will prevent the films puckering on drying after removal from the glass. Too much oil makes the films blue; but this can be dried out by a fire, unless in great excess.

Use the India-rubber solution as thick as yon can, so long as you can filter it through cotton wool. If above a certain strength it will not filter at all. [Dilute the India-rubber solution sold for pasting on photographs, which is of the strength of ten grains to the ounce or thereabouts, until you can filter it.] Pour it on the plate; tilt it into the bottle as long as it runs in a stream. When it begins to drop flow it back to the other end of the plate, and leave it to dry on a levelling-stand.

This is almost always sufficient protection for a dry plate. To be quite safe with a wet plate apply a second coating when the first is dry.

With respect to the bubbles alluded to by "C. S." they are caused by two things:—1st, if the plate be not as cold or colder than the collodion when you pour it on, you will have them all over the plate. 2nd, by the collodion passing through small holes in the India-rubber when the coating is not thick enough.

Hoping the above may be of service to your correspondent, I am, yours, &c., J. Hely Hutchinson.

Seafield, Donabate, Ireland, Oct. 25, 1869.

MISCELLANEOUS HINTS.

Chloride of Gold.—Whilst it is always a mistake for the photographer to undertake to make his own nitrate of silver, the matter is quite different in the case of chloride of gold. Nitrate of silver can be always obtained of excellent quality and unadulterated; with the gold solution there is less certainty of this. Besides, the quantity of chloride of gold used is much smaller, so that, in a single operation, the photographer may prepare enough to last him for a very long time. Without, therefore, undertaking to say anything very new upon the subject, I shall endeavour to give clear directions, such as will enable anyone who cares to do so to prepare this chemical for himself without danger of loss of so valuable material.

For a first experiment it will be well to use a small quantity of material—a gold coin weighing a few pennyweights. It will be well also for the first time, or the first two or three times, to weigh the coin, and then, by weighing the product at the end, the operator will assure himself that he has incurred no loss of material.

The next step will be to dissolve the coin in aqua regia, prepared by mixing hydrochloric and nitric acid in the proportion of one ounce of the latter to two of the former. As gold has a large equivalent number, the quantity of acid necessary to dissolve it will be but small. A moderate excess is proper; a large excess does no harm, except as wasting the acid.

In this first dissolving of the gold its solid condition renders its solution slow, and a gentle heat may be applied to expedite it. No precautions are necessary, as in the second dissolving of the gold after its purification, when, instead of being in the solid form of coin, it is in fine powder.

The next step will be to precipitate with protosulphate of iron. The action of the protosulphate has here some analogy with the development of an exposed plate in the wet process. In the latter metallic silver is thrown from the silver solution; in the former metallic gold from the gold solution. There is an important difference, however—the gold is thrown down pure, which is not the case with the silver salt. Therefore, this mode of operating cannot be used for the purification of silver; recourse must then be had to the precipitation as chloride.

In saying that the gold is precipitated in a state of purity, it should be mentioned that, strictly speaking, there may be thrown down with it two other metals: the revived gold may contain traces of silver and of platinum. It is evident that there can be very little silver present in the solution, by reason of the hydrochloric acid used in making the solution, and the amount of platinum present in gold coins is infinitesimal. There is no difficulty, if desired, in getting rid of both these substances. Silver is removed by simply evaporating to dryness and dissolving with a little water, which dissolves the chloride of gold, but leaves behind any trace of chloride of silver. Platinum is got rid of by fusing with nitre; but as both these other metals are found in extremely small quantity when present at all, and are wholly without injurious effect, it would be a mere waste of time to undertake to remove them.

The operator will, therefore, take his precipitate as being pure. If he has already (in the case of a first trial) weighed his gold before solution, he will do well to weigh also his precipitate, first, however, washing it carefully by stirring it up thoroughly with water and allowing it to *completely* subside again. This is best done in a deep glass vessel; a precipitating jar is the most convenient. To get it dry (which is only necessary if it is to be weighed) pour off the last washing water pretty closely, then shake up the powder with what remains of the water, and pour out into a clean porcelain capsule. In a few moments the gold will subside to the bottom; the water may then be poured back into the glass jar to wash off whatever adheres to its sides. By repeating this a few times the whole of the gold will be transferred without loss to the capsule. After subsiding again the water is poured off closely, and the capsule set in a warm place to dry.

After drying, the operator can take the weight and ascertain (allowing for the mint alloy) whether or not he has the right quantity. If he has not, it will probably be ascribable to his not having allowed his precipitate of gold to thoroughly subside during the washing before decanting. This is a point requiring attention. It is advisable always to pour the *gold solution into the iron solution*, and not reverse this order. Employ the solutions cold, and the stronger the better. The iron solution should be acidulated with a few drops of either sulphuric or chlorhydric acid; in either case, especially the former, the acid should be pure. The object of these latter directions is to get the gold in larger particles, so as to subside more quickly and more completely. If you reverse them all, using your solutions weak and hot, and pouring the iron into the gold, you will succeed just as well, but must, in such case, leave the gold powder a long time to settle between each decantation.

Having now got the gold powder, it only remains to convert it into chloride. Mix a little weak, warm aqua regia (say diluted with its own bulk of water) in a capsule, and add by degrees the gold powder. Each portion will speedily dissolve; if it do not, apply a little heat. The action of the acid on the metal in a state of powder is far more rapid and powerful than upon the solid coin. Avoid using any large excess of acid, and evaporate gently to dryness. It is best to do this on a water bath; at any rate, avoid any excess of heat. Dissolve the chloride in water, allowing eight grains of metallic gold to each ounce of water, and keep this solution by you. Each fluid drachm then contains one grain of metallic gold, and you will always know the exact strength of all the solution that you make.

A circumstantial description like that which I have given makes the operation seem more troublesome than it really is. But it also tends to save from annoying and expensive mistakes those who may try it without much familarity with chemical manipulations.

The Toning Bath.—As the preparation of the toning bath is the immediate object of the making of the chloride of gold, a brief word on it will scarcely be inappropriate here.

A simple solution of chloride of gold largely diluted with water will tone a print, but eats it away too much. It becomes, therefore, needful to remove the acidity, and this may be done in various different ways, which, although they act in the same general manner, give rise to gold deposits of very various shades of colour.

A very simple method of making a toning bath lies in shaking up the gold solution, diluted so as to contain about a grain of gold to the ounce, with precipitated chalk. The quantity of the chalk should be not less than a grain or two to each grain of gold. More will do no harm; the excess simply falls to the bottom. This solution is then further diluted with six or eight times its bulk of water.

A more common method lies in neutralising with bicarbonate of soda; two or three grains to each grain of gold are generally employed, and the solution diluted as above.

Acetate of soda is likewise capable of neutralising a gold solution, and the acetic acid liberated is of no more injury than the carbonic acid in the two previous cases. Benzoate of soda, of ammonia, or of potash act similarly. In the case of the acetate and benzoates, two or three grains to the grain of gold, precisely as in the former cases, will give a satisfactory result.

The acetates and benzoates make the best of all toning baths. Rich warm shades of purple black and sepia are more easily got with them than with any others. I do not propose here to enlarge upon the superiority of this form of toning bath, having already done so on a previous occasion; but I cannot leave the subject without strongly recommending those who have been in the habit of using alkaline carbonate or chalk to give the acetate or benzoate bath a fair trial. The result, I think, will, in most cases, be its permanent adoption. M. Carey Lea.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER XI.—ON THE FOCUS OF LENSES AND OTHER MATTERS.

The present chapter—which is the last but one of this series—is, by the request of many readers, devoted to gossip about, rather than descriptions of, lenses.

One subject for gossip is derived from a letter we have received, in which the writer says:—

"What is meant by *back focus* and *equivalent focus?* I have a *carte* lens which measures five inches from the back surface to the focussing glass, and yet it gives me a picture the individuual parts of which are as large as those obtained by a landscape lens, which the maker says is seven inches in focal length. Ought this to be so? and, if not, why not?"

The point embodied in this question is—back focus *versus* equivalent focus; and on this we shall offer a few remarks.

If a lens which measures five inches from the surface of the glass to the focussing screen gives an image of the same size as one which purports to be a different focus, the difference is solely one in name; there is no difference in reality in their focal length. Two other lenses of the same nominal focus may form images of different degrees of magnitude; but, in this case, the two lenses, whatever may be said by the makers, are of different foci. A good standard lens by which to measure the focus of others is a simple double-convex—a spectacle glass if you will—the focus of which, when a distant object is projected on the ground glass, may be measured from the centre of the glass, the resulting measure being as nearly accurate as photographers need to care about. This, or other lenses of the same kind, may be retained as standards by which to test any combination; for if the size of image thrown on the ground glass be the same as that obtained by means of one of these simple lenses, then, no matter what the seller of the combination may have stated its focus to be, it is in reality the same as that of the single lens.

In the case of a portrait combination the optical centre from which the equivalent focus must be measured is situated between the lenses, and is rather nearer to the front than the back lenses in the tube. Now, both because it is considered a feat by opticians that a lens of short focus shall cover a certain size of plate, and also because it is easier to measure the focus of the lens from the back surface than from the optical centre, the habit has been extensively adopted of giving the distance between the back surface of the glasses in the combination or objective and the focussing screen as the focus of the lens.

This giving of the back focus does not properly indicate the capabilities of the lens. A combination may have a strong front and a weak back lens, the tube being very long. In this case the disproportion between the back focus and the real focus would be very great. We lately had an old but good portrait combination, in which the back focus was only two, although the equivalent focus of it was six, inches; and, in the extra-rapid lenses that were several years ago made by Voigtlander, the back focus did not much exceed two inches, although the diameter of the lenses was the same as that employed in whole-plate combinations. Many persons, therefore, used to speak of the extreme shortness of the focus compared with the diameter of the front lens, which was three inches and a quarter; but they overlooked the fact that the real focus of the objective ought to have been measured from its optical centre. It would be easy, indeed, to construct a lens the back surface of which should be within a quarter of an inch from the sensitive plate, but it would be absurd to speak of this as a lens of a quarter-inch focus, when, in reality, the focus might be twenty or thirty times longer.

Admitting, it may be said, that the focus of a combination of lenses such as that employed for portraiture must be measured from a point situated between the lenses, two questions arise:—First, by what means is that point to be ascertained? and, secondly, in what part of a single combination is the optical centre placed?

We have already stated that in a bi-convex lens the optical centre is situated in the middle; if, however, the lens is a meniscus, that centre or point is a little outside of the lens, and nearer its convex than its concave surface. In general terms it may be stated that the optical centre of a double convex single lens is in the centre of the lens, that of a plano-convex lens on its rounded surface, and that of a meniscus a little distance outside of its convex surface.

The methods of finding the exact focal length of any single lens or combination of lenses we shall now proceed to point out, premising that this knowledge is of the greatest consequence to photographers, more especially to those who have to do copying to scale, either in the way of enlargements or reductions. In this case a knowledge of the exact equivalent focus of each lens immensely facilitates operations.

The method of finding the focal length of a lens, first published by Mr. Grubb in The British Journal of Photography about seven years ago, appears to be that which of all others has found most favour; and as it is so simple, and requires no apparatus except a sheet of paper, a pencil, and a foot-rule, we presume that it is within the reach of every person to adopt.

Having, in the first place, drawn two lines from top to bottom of the ground glass, at equal distances from the centre and distant from each other say three or four inches—a precise distance is not required—spread a sheet of paper on the table and place upon it the camera pointed to any well-defined object at a distance, such as a tree or a house. Having, first of all, focussed the image, cause the object to fall exactly on one of the lines drawn upon the ground glass, and then with the pencil draw a line on the sheet of paper on which the camera is placed, using the side of the camera as the ruler. Now turn the camera so far as to make the image of the house or tree move from the first line to the second, and when that has been done with the pencil draw another line the same as before. These lines are placed at an angle to each other. Now, by means of a straight edge and pencil, extend them until they meet at a point.

You have now the angle through which the camera has been moved. Draw a line between these two, which line must be equal in length to the distance between the two lines on the ground glass, and be so placed that it shall *just* touch the two previously drawn—something like the cross line in the letter A. Now measure the distance of the intersection of the two first lines and the third line, and you have the "equivalent focus" of the lens.

There are other methods, such as the following, which, however, is not so good as that just described:—

Place a sharp piece of printed matter in front of the camera, and draw out the back containing the focussing screen until it is about twice its usual or solar focal distance from the lens. Now adjust the camera and lens so that the image on the ground glass when in the sharpest possible focus shall be of exactly the same size as the original. Measure accurately now the distance between the focussing glass and the printed matter which was reproduced, and the equivalent focus of the lens is one-fourth of that distance. For example: if, when the image on the ground glass corresponded in size with the object in front of the camera, the distance between these two planes—the object and ground glass—were found to be twenty-five inches, then the equivalent focus of the lens would be six and a-quarter inches; or if it were thirty-two inches the equivalent focus of the lens would be eight inches.

We now touch briefly upon a matter which was slightly alluded to in a previous chapter, viz., the capabilities of a portrait combination in the copying of an object the size of the original. We have already stated that in reducing an image the *back* lens of the combination must be nearest to the sensitive plate, and that under the opposite circumstances—that is, when producing an enlargement—the *front* lens must be nearest to the sensitive surface. When copying with a portrait combination any object its own size an inferior measure of success will be obtained, no matter what end of the lens is turned next the sensitive plate. But a beautifully sharp and crisp image will be obtained if the back lens be altogether removed, and its place supplied by another front lens as near in focus and size to the existing front as possible. With an extemporised combination of this kind very admirable reproductions may be effected; but owing to the flatness of the lenses the field is not so flat as to permit of a large angle of view being included. Those who have a pair of portrait combinations for either *carte* or stereoscopic purposes may thus interchange their front lenses with excellent effect.

DIPPER MARKS.

While recently reading over with some care a parcel of back numbers of this Journal, which from preoccupations I had only glanced at when they were published, I observe the old question of *Streaks in the Direction of the Dip* has been once more revived. It strikes me that neither your contributors nor your correspondents have put the saddle on the right horse, or have strapped it on awry. I have a strong impression that the proximate cause of these streaks was explained on mechanical principles, and the explanation and remedy published, about a year ago either by Major Russell or myself; but I cannot at present put my finger on the exact where and when. A reventilation of the subject, however, will do no harm.

These blemishes, which ought now to be called "dipper marks," seeing their origin has been well established, have been a source of annoyance ever since the collodion process began to be practised; but it was not till the year 1865 that public attention was forcibly called to them by Mr. Davies (see vol. xii., page 26). In the same page there is another short article written by me, wherein the same fault in negatives is discussed; but there was little advanced by either of us to clear up the matter, for the reason that both of us were groping in the dark, and had failed to reach the real source of the evil. Next week I gave a fuller account of some of the predisposing circumstances, although I still failed in finding out the proximate cause. Having in the meantime given considerable attention to the subject, I wrote next year another article on *Streaky Negatives* (see vol. xiii., page 580). In this communication, which your contributors and correspondents seem to have overlooked, I got nearer the mark, and explained on mechanical grounds the more remote although fertile sources of streaks in the direction of the dip. Still I missed the main point.

Towards the close of the same year (1866), and in 1867, I had some correspondence with Mr. Warner, of Ross, on what he called "dipper markings." He insisted on the point that these marks *must* be caused by the dipper, because they were always in the same relative position on the plate, and corresponded with some portions of the projecting ledge of the dipper, whatever might be its form. Several negatives, streaked in identical forms and position, were afterwards forwarded by him to me in corroboration of his opinion. They were shown to Major Russell, who previously had met with similar experiences, and had suspected, if not demonstrated, the source of the stains. After some further experiments with and without dippers in a bath and with collodion both eminently predisposed to streaks, the proximate cause was clearly traced to the jagged or curved dipper ledges projecting beyond the surface of the collodionised plate while being immersed in the nitrate bath.

The explanation seems to be this:—The projections act mechanically by diverting the silver solution, during the immersion of the plate, into uneven upward streams, impinging with unequal force or velocity on different portions of the film. *Upward streams* may seem a Milesian sort of expression, but practically the effect is the same, although in opposite directions, whether one pours a stream of liquid *down* the surface of any fixed solid or thrusts the solid into the liquid. If the collodionised plate be lowered very gently into the dipping silver bath, as suggested by me a long time ago, the evil is very much mitigated, because the irregularities of the stream are less violent, but it is not always cured. If into the same bath a similarly coated plate is immersed by a clip attached to the upper corner of the glass, as suggested by Major Russell, who, for some time, has invariably used this plan, or if the dipper be furnished with a ledge not thicker than the plate which rests on it, no streaks will appear unless there are projections on the film itself. Neither will they appear if you pour out the same exciting solution into a *cuvette* or flat bath and sensitise the film therein, according to the system generally adopted in France and Belgium.

These facts obviously prove that the dipper, if made on faulty principles, is solely to blame when the chemicals are predisposed, and the remedy lies in avoiding those defects in its construction which undoubtedly give rise to the evil in question.

A collodion film only partially dry, and containing fluids of very different density from the solution in which it is immersed, is clearly not in a position to be equably penetrated by the silver, unless the ether and alcohol are conveyed out of it in an uniform manner. And this uniformity of removal cannot be secured if the stream of silver solution impinges on the ether and alcohol-charged film with different velocities, as it is sure to do when there are projecting ridges at the bottom of the dipper to divert the current into streams of varying strength, with their attendant eddies or refluxes.

I consider that dipper marks merely show on a small scale what can be largely represented at any time by withdrawing a plate from a bath, whether of the flat or dipping form, the instant after it is immersed, allowing the film to drain for half-a-minute or thereabouts, till the silver solution has coalesced into decided lines or drops on its surface, and then replacing it in the solution till fully sensitised. In the negative will be seen streaks or marks exactly corresponding in form and position to those streamlets or drops observed on the film when first removed from the bath, and it will be of no consequence how long you allow the plate to remain in the sensitising solution the second time; the mischief has been done and cannot be remedied.

Something like an analogous effect occurs when one fails in spreading the developer evenly on an exposed film. No "after-dodging" or forcing will enable you to get those parts which have been missed at first, or on which the developer has been poured too violently, up to the same intensity as the rest.

I confess my inability to explain satisfactorily the mechanical or chemical forces at work within or on the film to prevent complete sensitising in the one case or development in the other. All that we need practically care about, knowing as we do the proximate causes, is to avoid them; and that is easily done.

The predisposing causes of dipper marks are many and varied, such as using a horny and repellant collodion, exciting in an alkaline or too acid bath, or in one too weak to convert rapidly the iodides and bromides. With respect to the latter, there is a fashion among some photographers of using an extra large dose of bromide in their bromo-iodised collodion, without making a corresponding increase in the strength of their silver solution. This should not be, because bromide in collodion requires a much greater relative strength of silver to convert it than is needed by the iodide. It is the first impact of the silver on the film that determines whether the negative shall be streaky or not; and if the solution be not strong enough to give at once the first knock-down blow, if I may so speak, to the iodide or bromide in the film, the negative will be studded with faults of many kinds. Take a plain bromised film, for instance. It will require about ten minutes' immersion in an eighty-grain bath before it is fully sensitised. If you attempt to sensitise it in a bath of half that strength, the bromide will either burst out into the bath or the film will be sensitised only on the surface, however long it may remain in the solution. Under such circumstances, streaks, also, are sure to occur. But if you first immerse a bromised plate in an eighty-grain bath—say for two or three minutes—you may then transfer it into one less than half that strength, and afterwards complete the sensitising without any fear of bad consequences.

George Dawson, M.A., Ph.D.

NOTES ON THE COLLODIO-BROMIDE PROCESS.

In complying with your request that I should shortly describe the collodio-bromide process as worked by myself, I wish it to be distinctly understood that I lay no claim to novelty in any of the steps described.

I make my own pyroxyline and collodion after the method laid down by Mr. Dawson in his recent articles on this subject. I certainly prefer that the pyroxyline should be made with acids at a high temperature. I think that greater rapidity is thus secured.

With one ounce of collodion, containing five grains of bromide of cadmium *plus* three grains of bromide of ammonium, I shake up thoroughly eleven grains of nitrate of silver very finely powdered. The emulsion should be filtered and used within twenty-four hours; I am then certain that there will be the necessary excess of unencumbered bromide, which would probably not be the case if the preparation were allowed to stand longer. (See my letter on this subject in a former number.)

I prefer making a large batch of plates at a time, as I am then sure that they will be uniform in action. I can easily prepare six dozen 8 × 5 plates during a morning or evening.

My apparatus for washing the plates is very simple and effectual. To sustain the plates I have constructed two racks, holding three dozen each. They resemble a plate-box with the top and bottom removed, and are provided with two crosspieces on which the plates rest vertically. They are admixed and weighted with lead. An upright piece projects and serves as a handle to raise them from the water.

I have three earthenware foot pans, each of which will just hold one of these racks. I place the first rack in its pan and cover it with water. I tip a glass plate with a solution of India-rubber, and coat it with collodio-bromide; it is then placed in one of the grooves of the rack as it stands. Plate succeeds plate in this manner until the rack is full; it is then removed to foot pan No. 2, having first been allowed to drain for a few seconds. The second rack is then

covered with water in pan No. 3, filled with sensitive plates, and removed to pan No. 1, the water of which has been changed.

By this time the earlier plates are ready for the application of the preservative. They are removed one by one from the rack as it stands in the water, and plunged into a bath composed of one hundred grains tannin, one hundred grains gum arabic, and twenty ounces of water. They are then drained and placed, cornerwise, in a dark cupboard to dry.

The development is that recommended by Mr. Dawson, except that the large amount of gum in the preservative renders it desirable to intensify with citro-nitrate of silver. The primary development is very rapid, and thus no time is really lost by this proceeding. The excess of gum greatly assists the production of softness and aërial perspective.

I should say that I have chiefly been employed with landscapes containing strong contrasts.

I started on my tour with plates prepared by this process, by the gum gallic process and with Liverpool plates in equal numbers; but, in future, I shall adhere to collodio-bromide alone, because—

1. Plates so prepared are more sensitive than any other I have been able to procure.

2. They yield as good pictures and keep as well before and after exposure.

3. They give infinitely less trouble in preparation, neither nitrate bath nor distilled water being required at any stage.

ANDREW JOHNSON, M.A.

P.S.—I use no substratum, and find the films develope very clearly and most free from stains and spots.

HINTS ON BURNING-IN PHOTOGRAPHS ON ENAMELS.

THE study of fire, the knowledge of the degree of heat best suited to the fusion of an image, requires, on the part of the operator, some experience and a little practice. In the meantime I would observe that, with enamels, in order to facilitate his work, a brisk, ardent fire is equally necessary both above and below. It should be of a white rose colour; there must be no currents of air. At the time of vitrifying shut the ashpan and the lower side doors. The apparatus can be closed below by an earthen plate; but I prefer, for my own part, those which are open with a fire below. All the advantages of the closed apparatus are obtained by employing wide and thick plates which sufficiently isolate the enamel.

When ready for burning—that is, when a sufficient number of enamels have been prepared—a plate of suitable dimensions, which has already been covered with chalk or fine whiting, should be heated beforehand in the muffle. After the lapse of a few minutes it is taken out and the first enamel is placed well in the centre of it. This enamel heats rapidly, and its temperature soon reaches a high degree. It is then introduced into the muffle. The collodion becomes burnt without sustaining any damage; the image disappears for a moment to reappear soon afterwards. Already some parts have taken a shining aspect, which indicates that the fusion has commenced. The plate must now be turned slowly by the aid of pincers, so that the heat may be everywhere equally divided.

The door of the muffle being always open, the progress of the fusion can be carefully watched. An experienced eye at once detects when the enamel is at the proper point; but, as it is indispensable to avoid going beyond this point and so burning the image, I recommend beginners to take out the plate from time to time and look at it by daylight, in order to ascertain whether all the surface is well glazed. If any part still remain dull the enamel must be put again into the fire until the fusion is complete. I need not add that this operation must be as rapid as possible.

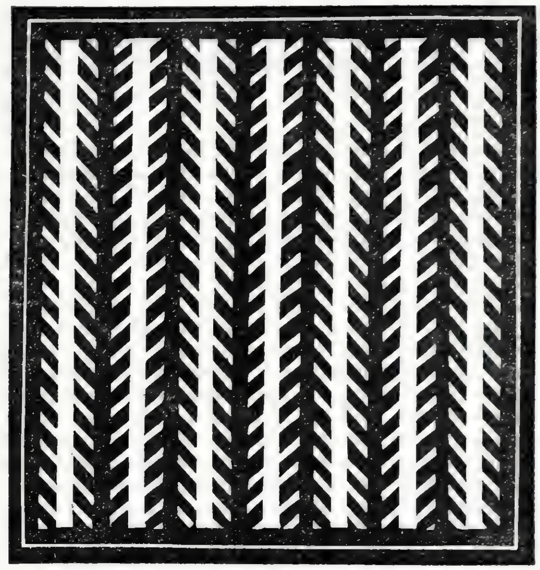
After the fusion, the plate is taken out and placed at the side of the furnace on a brick or some other substance, shaded from all currents of air, particularly in winter. At the end of a short time the enamel will have become hardened, and may be taken off with a blade of iron and placed on a cold surface. If, in spite of the whiting, it is perceived that the enamel still adheres to some part of the plate, wait a little, and a few strokes on the plate will suffice to detach it. The plate, still hot, receives a second enamel and is replaced in the muffle.—*Moniteur.*

OPTICAL ILLUSIONS.

IF any of your readers can explain scientifically the "why" and the "wherefore" of the following optical illusions those explanations will be interesting.

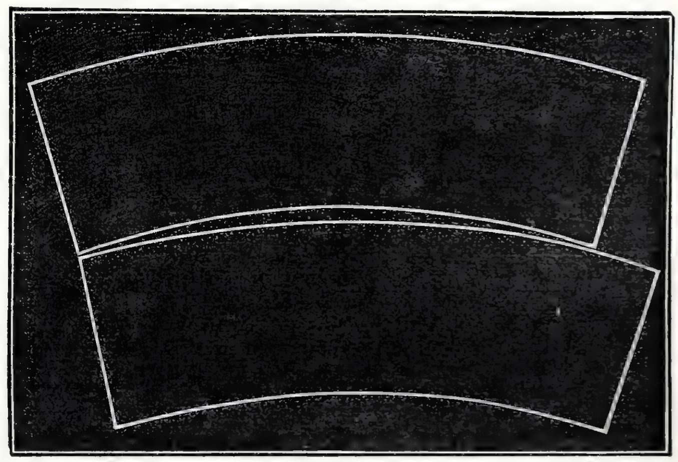
The first I select is one exhibited by Dr. Power at the Royal Institution, and it is shown in *fig* 1. In this cut the vertical lines are all parallel to each other, yet they appear to be inclined to or from each other:—

FIG. 1.



In the next cut (*fig.* 2) we have two segments of the same circle, and one is placed above the other. One of these segments is longer than the other, and measurement will show that the one which appears longest to the eye is the shortest in reality.

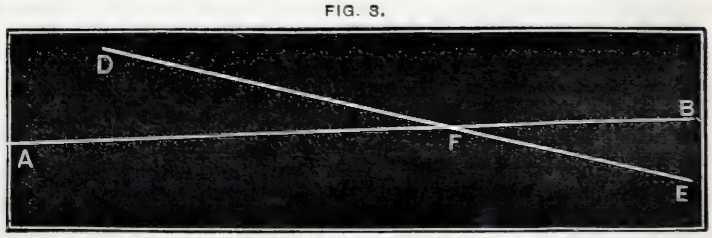
FIG. 2.



Strange to say, in the foregoing cut much, though not all, of the illusion is lost, in consequence of the method of cutting diagrams for this Journal. The lines are enclosed in a black rectangle, and the sides of that rectangle enable the eye to measure the lengths of the segments more accurately than would otherwise be the case. If the segments be cut out in paper by the reader, and placed one above the other as in the figure, the apparent difference in the length of each is something remarkable.

Another illusion is one which may often be witnessed from the ends of large railway stations, where a long row of iron tie rods are seen crossing each other in couples all down the full length of the roof, as shown in *fig.* 3:—

FIG. 3.



Let A B and D E be the two rods crossing each other. They appear to be slightly bent and not straight at the point F, where they seem to intersect each other.

WILLIAM H. HARRISON.

QUININE AS A NON-ACTINIC MEDIUM.

In our number published on the 3rd ult., page 423, we gave a translation of a paper, by Professor Morren, on the *Chemical Reaction of Light.* Mr. John Spiller, F.C.S., has been making some investigations in the same direction, and in the last number of the *Journal of the Photographic Society* he gives the results of his experiments, which he says must be considered as supporting the view which is currently believed in regard to the optical properties of sulphate of quinine. Mr. Spiller thus states his mode of procedure and the conclusions he has drawn from his experiments:—

A fine sample of this salt, procured from Messrs. Davy, Yates, and Routledge, was dissolved in water by the aid of a minimum amount of sulphuric acid, in the proportion of one ounce of sulphate of quinine in a pint of water, thus making what may be termed a five-per-cent. solution. The epipolic character of this liquid is not nearly so well marked as with solutions of lower degrees of concentration, and other experiments had, therefore, to be made with one per cent., or less, of the quinine salt in solution, which then showed a beautiful blue fluorescence. Besides trying the sulphate in this form, one experiment was made with an addition of common salt, which, as pointed out by Professor Stokes, at once destroys the fluorescence.* With regard to the apparatus employed, I found it convenient to use an ordinary camera, reared upright, with the lens removed, and the circular aperture covered with a glass beaker containing the quinine solution, all extraneous light being excluded at the junction by wrappers of black velvet, and the top edge or rim of the glass vessel was likewise screened from the light, so as to avoid direct transmission through the substance of the glass into the camera. Into the dark slide, or "carrier," was temporarily fitted a slip of wood, placed diagonally, so as to throw a corresponding shadow upon the sensitised collodion plate behind it. Mawson's bromo-iodised collodion was employed with an iron developer, and several plates were exposed in succession for the intervals of time and with the varying depths of solution specified below:—

Expt.	Quinine Solution employed. Strength.	Depth.	Time of Exposure.	Results.
I.	5 per cent.	$1\frac{1}{4}$ inch	15 seconds	Image very much over-exposed.
II.	1 ,,	$1\frac{1}{4}$,,	5 ,,	Image over-exposed.
III.	$\frac{1}{2}$,,	$2\frac{1}{2}$ inches	1 second	Distinct impression.
IV.	5 ,,	$\frac{1}{2}$ inch	1 ,,	,, ,,
V.	$\frac{1}{2}$,,	$\frac{1}{2}$,,	1 ,,	,, ,,
VI.	$\frac{1}{2}$ (with salt)	$\frac{1}{2}$,,	1 ,,	,, ,,
VII.	5 per cent.	1 ,,	1 ,,	,, ,,

Considering that these experiments were made on a dull October afternoon, with rain falling at intervals, and that dense negatives were obtained as late as 5 p.m., with exposures not exceeding one second, I conclude that it would be utterly impossible to substitute this mode of illumination for the yellow glass at present employed in "dark rooms." It is not even necessary to inquire into the practicability of using quinine for the purpose of screening off a portion of the highly refrangible rays (particularly the violet and others in the invisible part of the spectrum), since those extending from a point below the violet down to the middle of the green exert so powerful an action upon a bromo-iodide of silver plate that, unless these coloured rays were intercepted, no practical advantage would be gained.

An optical examination of the quinine solutions through a spectroscope showed how little the visible spectrum was curtailed; and it was found that all the active rays below a point situated a short distance above the region of the fixed line G streamed through the liquids with unimpaired intensity—a circumstance which rendered almost superfluous the institution of these experiments.

Since making, however, the above experiments, I have found a singular confirmation of my results in the statement of Mr. Robert Hunt, recorded in this journal at page 16 of the first volume. At the ordinary meeting of the Society of March 3rd, 1853, Mr. Hunt said:—"It occurred to me this morning that it might be readily determined whether or not the solution of sulphate of quinine stopped back the chemical rays, and, if it did not, this would prove that those blue rays which were not allowed to pass could not be the rays by which chemical changes were effected. Consequently I tried a very rough experiment, which, in its way, is sufficiently satisfactory. I placed upon a piece of paper, which was washed over with the ammonio-nitrate of silver, a glass box, which was filled with a solution of quinine, the depth of the fluid being a little more than an inch. I found that upon that part of the prepared paper where the rays freely passed through the whole of the fluid, it was darkened as much as where it had been exposed to the full influence of the sunshine. Here we have a proof that the sulphate of quinine, which does not allow the epipolic rays to pass, does admit the chemical rays without interruption."

Mr. Hunt subsequently modified this view, in consequence of the precise nature of the quinine absorption having been pointed out by Mr. Crookes. The fact stands good, with the following qualification:—Sulphate of quinine, which does not allow the epipolic rays to pass, *does admit most of the chemical rays included in the visible portion of the spectrum* without interruption.

P.S.—Since writing the above account I have been favoured with the following communication from Professor Stokes, who refers for specific details to his paper on fluorescence, printed in the *Philosophical Transactions of the Royal Society* for 1852:—"As to the quinine solution, it will transmit, even when strong, rays from the extreme red up to about the line G. It will, therefore, not by any means stop *all* chemical action on the salts of silver, but it would go far nearer towards stopping all action in the case of iodide than bromide preparations."

* *Journal of the Chemical Society*, May, 1869, p. 174.

AN EXTENSIVE PHOTOGRAPHIC ESTABLISHMENT.

The *Harrogate Advertiser* of Saturday last contains a somewhat full account of one of the largest and most complete photographic establishments in the country—that of the Messrs. Holroyd, of Harrogate. We append the article, believing that it will prove interesting to a large number of our readers:—

Esplanade House, Messrs. Holroyd's establishment, occupies a commanding position on the Esplanade, Harrogate Wells, near the Beech grove. Exteriorily, it has the appearance of one of the handsomest of the many elegant abodes dotted bowlike round the far-stretching "stray." With its suite of artists' rooms, where portraits in oil, water-colour, crayon, pastel, acquarel, or miniatures in ivory are taken; its photographic galleries, printing, drying, print-washing, pressing, and preparing rooms, and premises for burning-in porcelain or enamel, it forms one of the largest—if not the largest—and most complete establishments of the kind in the United Kingdom. Elevated on one side above many of its neighbours, and secluded from any thoroughfare on the other—enjoying unbroken light and freedom from dust, it is better situated than almost any place in England for the purpose for which it is designed.

Passing up the flight of steps in front of the premises, the visitor is ushered into a handsomely-furnished reception room, where miniature painting is being carried on by a lady. Several bulky albums are conspicuous objects on the centre table, and on the walls and everywhere there is evidence that we are in a realm of art. Turning over the leaves of the albums, pictures of the *crême* of society, peers and peasants, men and women of eminence, and men and women unknown to fame will be found. The loveliest of the lovely figure there, with those who appear to have no personal charms to recommend them. There are family groups and loving couples, jolly-looking folks and queer-looking folks—in short, an immense number of specimens of the family of man, from various parts of our own and other lands, the whole forming a splendid collection in a physiognomical point of view, and a rare exhibition of photographic art. The attitudes and expressions called forth or selected are an ocular demonstration of the artistic instincts of the "poser." The *cartes* are of the deep, rich purple tint so much appreciated—a colour generally considered much more agreeable than the cold grey; and, with an absence of hard outlines, there is that agreeable softness about them not generally observable in photographic portraits.

Oil Painting Department.—To the left of the reception room is the painting room, where portraits in oil are taken. *Cartes de visite* have been called the democracy of portraiture, and we may with propriety term portraits in oil the aristocracy. The photograph is within the reach of almost everyone, and the artisan as well as the peer may have his family gallery, and hand down to posterity sun pictures of himself and relatives. Portraits in oil, however, are only within the reach of the wealthy. Less handy than the photograph, more durable and costly, they only grace the drawing-rooms of the merchant and man of position, reminding their children and friends of the original more vividly than any photograph can. They descend as heir looms, and stand for centuries as memorials of the departed. When we entered the painting room the portrait of a Bradford merchant was upon the easel, and Mr. T. Holroyd was giving it finishing touches. Finished and unfinished pictures were lying side by side, comprising notabilities of London, Manchester, and the northern counties, with the more familiar faces of men of local fame, all so lifelike that we could scarcely help thinking that living individuals were looking upon us. The walls were adorned with several excellent landscapes—continental scenes—and a Titian treasure, *Donna del Specchio,* lay like a diamond in an obscure corner. Mr. Holroyd's talents are not confined to portrait painting. He is also good at landscapes. With the enthusiasm of a genuine artist he has made several excursions to Rome, and travelled in Germany. Most of the pictures on the wall are from sketches taken in his travels. Both pictures and portraits are evidences that he possesses artistic talents of no ordinary type.

This firm have four artists always at work. On the first floor oil and miniature painting is carried on, whilst upstairs are the sanctums of the German and Italian artists, who work in water-colours, crayon, and oil;

everywhere there is evidence, in the finished and unfinished work going on, that Messrs. Holroyd are not only first-class photographers, but fine miniature painters, and excellent artists in oil, water-colour, crayon, pastel, acquarel, and other styles.

Photographic Department.—In conducting any large business, men find it best to adopt the system of a division of labour; and, just as in the manufacture of a pin it is found advantageous to employ ten men, so is it best to employ a number of hands in the manufacture of a *carte de visite.* Messrs. Holroyd see this, and subdivide each branch of their business into departments. By employing one man from year end to year end in his own particular department, they secure a perfection of workmanship unattainable where one person has to perform every operation; and, by using the best appliances, and employing thoroughly-experienced assistants, they are able to produce the highest specimens of the art. Each operation is performed in a separate apartment, and science and common sense are brought to bear upon it.

Here, on the one hand, are the galleries, fitted up with all the essentials for good portraiture. There are three galleries or studios. The first which attracts attention is the studio for children. By an ingenious arrangement, a screen or screens are drawn from a framework and the likenesses of children can be taken in the open air. Then there is the lower gallery, and the upper or larger studio for large pictures, copying, &c. This latter, we believe, has been built three times over, in order to get an exact balance of light. The dimensions of each are 33 feet by 12 feet, and 30 feet by 15 feet. The aspects are due north, which secures a regular and well-balanced light, ensuring successful results at any time of the day, and the most perfect machinery exists for controlling the light. Obviously, this is an all-important point in any gallery, and apparently Messrs. Holroyd have devoted special attention to the subject. The result is, they possess a most perfect control of light. There are movable slides on the top of the building to shut off the light as may be required; whilst all the windows are made to open and give more light when necessary. Each studio is provided with side and top screens for darkening the room, movable on a kind of tramway to either end of the gallery, enabling the operator to take the likeness from either end, and fix his subject in the position most likely to hide or shadow any blemishes in the features, as well as secure the best "picture."

The studios are furnished with articles rich and rare, evidently picked up in various parts. There are splendidly-carved chairs and other objects from France, Italy, and other places, many of them articles which would rejoice the heart of a collector of curiosities. An "old arm chair," provided with reading desk, receptacles for cigars, tobacco, and etceteras for smoking, compact enough and comfortable enough for the laziest lounger, is worthy of attention. There is a rare repp screen from the Ghetto (the Jews' quarter in Rome), and valuable tapestry for making beautiful backgrounds. There are dressing-rooms, with every necessary convenience adjoining each gallery, and the dark rooms, where the process of preparing and developing is going on, are fitted with double doors, so that they may be entered at any time by any of the assistant operators whilst the work is in progress.

Adjoining the lower studio is the solar-camera room, where the large portraits are taken, for which Messrs. Holroyd have acquired prizes and obtained a deservedly high reputation. It is the largest instrument in the kingdom.

Leaving the solar-camera room and the studios, we may mount to the printing gallery—a square tower built expressly for the purpose, upon the glass sides of which 150 negatives may be placed during wet weather. Once more descending to *terra firma*, the print-washing and drying rooms may be visited. Here hundreds of *cartes de visite* are being washed in zinc troughs, designed by Mr. Holroyd to supersede the unsatisfactory apparatus generally used by photographers. By an ingenious yet simple arrangement fine jets of water are thrown fountain-like upon the photographs, from tiny holes perforated in the sides, and, after in this manner undergoing their ablutions, the pictures are placed in the clutches of "American pegs," and hung up to dry.

An adjoining apartment is devoted to the pressing of large pictures and preparing paper, whilst in a room beyond this arrangements are in progress for conducting the process of burning-in porcelain and enamel, which will be in operation next year.

Leaving these buildings, passing the galleries and garden, through the drawing-room beautified with sketches of Italian scenery, by Mr. T. Holroyd—most of them views from the extreme north and south of Italy, and very desirable works of art—we arrive where the photographs are cut, moulded, and finished, and at the end of our perambulation.

Messrs. Holroyd have attained a very high reputation as photographers and artists. They have gained prizes for *carte-de-visite* portraits and enlarged solar-camera photographs in the exhibitions of Belgium and York. The universally-admitted excellence of their work is often attributed to the clear air of Harrogate; but a genuine likeness can only be obtained anywhere with the best appliances, and by the best and most artistic operator. After this rapid survey of Messrs. Holroyd's establishment, our readers will admit that they possess these requisites; and that their premises, their large experience, and system of carrying out each department, are all calculated to ensure the highest specimens of the art.

Contemporary Press.

AMONG THE PHOTOGRAPHERS.

[Chambers's Journal.]

It is curious how many odd corners of humanity there are, and how well they are worth peering into. In some we may find (metaphorically, like the old woman) a silver penny; in others, we may even have the luck to light upon a pearl. Going the other day among some photographists this truth was illustrated charmingly.

"Taken like life!" a tall, thin, soft-spoken man accosted me with, at the threshold of the first studio I visited. "Wait on you in a minute. Better walk in."

My addresser had not done all his part by simply getting me to walk in. His higher duty was to induce me to double my bargained outlay by having my portrait coloured, and he set about this with skill.

"You sat beautifully!" he cried, holding the portrait so that I could not catch a glimpse of it. "It's positively perfect! I need not ask whether you'll have it coloured?"

No, I said—no. That would do nicely.

"Not coloured!" he cried, being too much astonished to credit what he had heard. "You wanted a portrait, and this is not a portrait as it is! You have a colour, and this is pale."

It would do nicely, I said. I was quite satisfied.

"But you are spoiling it," he said, as though it was a Titian, and I a Goth and Vandal both, in monstrous combination. "You cannot know what colouring will do. You should *not* let it be as it is; you should not, really."

I still fought the battle (the battle for an extra sixpence), and stood my ground.

Then my friend brought out his last shot. "Come," he said; "I'll tell you what; I cannot spoil a picture for the sake of a few pence. I'll colour it for you for half what I would charge any one else. There! I can't say more than that. Come!" After which, when my armour remained still unpenetrated, he never said a word. I was below a parley; and, completing his bargain with lofty dignity, he allowed me to go my way.

In five minutes I was inside another studio and in communication with Artist Number Two. I was thrust into him. I say *thrust* in, because it was literally so. An eloquent man outside had opened a rattling door the moment I had addressed him, had given me an appreciative slap upon the back, popped me inside, and taken himself off again, chuckling loudly at the speed and success of his manœuvre. I was shot and bagged with a sort of first-of-September rapidity, very invigorating to his sense of self-approval; and sharper and truer would be his aim for the next half-hour from mere relish of his victory.

I was a sad interruption to his assistant; that is, I was a member of the De Trop family, who was quickly made to feel myself so, for I came into the midst of busy talk with a tall acquaintance. I was addressed with suave politeness, and then familiarly there was laughed out a gay supplement to some former remark. I was asked deferentially the style of portrait I required, and the next breath of the speaker was devoted to verbal fence and parry; I was told courteously to keep my eyes fixed, and a merry reminiscence succeeded so quickly to the order, there was not a comma to keep them apart; finally, as a further proof of the little consequence I was, when the artist had retired to the dark closet to complete his work, the tall acquaintance walked up to the camera he had left, and deliberately bent down and peeped at me as I sat.

I endeavoured to take the undue examination as easily as I could. "An interesting sight, no doubt," I said, and smiled and arranged myself more comfortably, to try to look as if I didn't care.

But I *did* care very much. Had the fellow taken a peep and gone, it would have been nothing; I might have concluded he had a taste for scientific investigation, and we might have fallen into conversation as deep as our ignorance allowed. But he kept on looking, and would not say a word. I tried him with a remark about photography in general; I spoke of the weather and the neighbourhood; I alluded—as offhandedly as I could—to the study afforded to photographers by the people they see in shoals, and there was no more sound in answer to me than if my tormentor had had but one faculty left him—gigantic concentrative Gaze.

"At any rate," I cried at last, goaded to the sudden recollection of a fact that gratified my spite, "you can only see me standing on my head!"

And this finished my odd inquisition! A lady entered at the moment in greasy short hair and a dirty long skirt, who was very fine and glaring, and whose duty, like that of my first friend, was to coax me to have my portrait coloured. Like him she set about it gallantly.

She began by smiling fascinatingly right up into my face. "Ah," she cried, "it *will* look nice when it's coloured! How *well* you have sat! Pictures *never* look well in their own black and white; do they? I *can't* like them till they have the colour. You will be *surprised* what a difference I shall make."

"I think them much better as they are," I said; "I would rather have this just as it is."

"Ah!" cried the lady, "that depends on how the colouring is done.

You have seen it done anyhow; *I* should do it properly. And I should just gild your ring and chain, and everything! You'll be surprised."

This was all as though I really *meant* to have it, and the lady's hands were absolutely getting ready her materials as she sweetly spoke; but *diminuendo* went her winning ecstacy when I adhered to my No. Never, evidently, had she experienced defeat before, and no more blandishments were given me; they were all lavished on the tall acquaintance. The lady's hands were nimble in varnishing the back of the little image of me that had just been taken; her mind and tongue were with the long man who stood beside her.

"No, I won't," she said to him, holding me—that is, of oourse, my image— over a candle, as if it were congenial to her to give me a scorch, "I won't, indeed; the last was quite enough!"

"Do!" urged the tall friend, finding a monosyllable for her, though he had not even that for me.

"Oh, I daresay!" laughed out the lady, twisting me into a tinsel frame.

"You'd better," the tall friend gaily persuaded. "Do."

Have what? I wondered, as I saw myself folded and pinched, and papered and pressed down; and then the last pinch was administered to me, and I said "Good-day."

"A Doorman Wanted" was pasted upon the show-case of the next studio I entered; and this brought to light the fact that being doorman to a photographer is a distinct "line."

The opposite is operator. This I learned when I had penetrated to my third studio and was chatting to the owner.

"Trust no one to be your operator," was his sage warning. "Do your operatin' yourself. *They* only care how quick they gets it done, and don't think if they pleases at all—it made me take to my own operatin' myself," added the artist, a burly, labourer-looking personage in very greasy clothes. "I *must* turn pictures out so that people will come again."

His was a wretched place—so thoroughly irregular and unsavoury indeed, that the artist's wife thought it incumbent on her to push her small self to the front to offer me an explanation.

"We have the bricklayers all over the house," she said in a thin treble that assured me of the sort of *agitato* melody she would be able to pipe upon it when things "crossed" her. "We ain't got a decent place nowhere to put a thing in. The mess is awful!"

Truly, as I saw; and truly, as I thought, it would have been, if no workmen had been busy, and all had been at its best. The aspect of my small Xantippe herself gave me this conviction. The bricklayers were not at work on *her;* so she need not have had ladders about her, so to speak, or have been mortar-sprinkled, or strewn with shavings. But this was a reflection I kept to myself. I only answered the little woman with an assurance that she need not trouble herself about me in the least.

"But it *looks* so," Xantippe continued to apologise, with an air that seemed as if she thought she ought to blush. "One can't be tidy, nor clean, nor nothing."

I felt for her, I assured her; and said that, to *my* mind, it was so inconvenient to have workmen about a house, I thought there never ought to be anything to pay at the end of it.

Xantippe revived. "You may well say that," she chirped out. "Why, the money this'll cost is dreadful. There's twelve rooms in the house, there is, and workmen in every one!"

I was properly impressed. And, then, it being time that I should take my seat, I took it; and Xantippe's husband, emerging smilingly from the dark cupboard in which he had temporarily been immured, threw his loud voice into the conversation again, and formed a very sounding bass.

"You can't help dirt in photography," he said for a first plunge; and it made his small wife look more revived still, and glance down at her gown and stroke it, as if every sin it had were now accounted for, and she could not have made it different if she had tried. "Spoils!" went on the man—"why, it spoils every thing we have!"

"That's a pity," I said, "for portrait-taking is very interesting. "So many people pass before you, I would very willingly change places with you—for a day or two at any rate."

This was seized by the burly fellow in a business spirit at once. "I've taught a many in my time, I have," he said. "For you see," he continued, as he focussed me through the camera, "photography's wanted so much now for gover'ment. Most of those I've taught has been for the surveyin', engineerin', and artchitex—they all want it now. Why, I've taught so many down at Woolwich, I've been offered a gover'ment place myself!"

"Really," I said. And that was all I *could* say; for the appreciated gentleman signed to me at this moment to be dumb, and look where he had placed his finger; and, after flinging his black cloth upon the camera, and extracting something from it with the *aplomb* of a dentist pulling a tooth, he hid himself hurriedly in the cupboard. I rose to go towards Xantippe's table, but her husband's ears were open, though the chemistry he was engaged in was supposed to be all-absorbing, and he stopped me before I had gone a step.

"Don't move," was his sharp order, rumbling out of his shut-up cupboard like the beat of drums. "Don't move yet! I'll take another of you first."

Very conscientious of him, I thought, as I retook my seat. And then—the good people want new portraits for their newly arranged show-case after their alterations, and this is only a *ruse* to reserve a copy of mine! And as this new reading came to me I sat much more imposingly on the chair, and posed my head as attractively as it would go. Since they wished to have my portrait, for *their* sake it should be as good as I could make it.

"Yes," the big operator resumed, once more at his camera, taking in and out his plates; "I was offered a gover'ment place myself, I was; but I didn't take it—I staid where I am—the pay wasn't enough. They'd only give five guineas a week, and I was paying my operator two guineas myself, then.—And what's five guineas a week, you know! Why, I should be wanted to travel about—to Scotland, and the Ilerwight, and all manner of places; and a sovereign don't go very fur, you know, when you come to go them long distances by train!"

I accepted the good man's position, when I had been again taken, and was once more free; and no one, surely, could have negatived it.

"And now," he began, emerging once more from his wee laboratory, and coming to where I was watching Xantippe's pasting, "you shall see both the portraits, and have which one you like. This one—this is the last—is a capital one, and when it's coloured, it'll look fine."

Ha, ha! I thought—the old battle about the tinting. Well, I have faith in my now twice-tried resolution; so for a little dalliance before we begin.

"I am watching your wife," I remarked easily, feigning I did not hear. "How clever she seems at all this sort of work."

"She wouldn't do for a photographer's wife if she warn't," blurted out the operator, as though he could change his wife as easily as his door-man, if she didn't suit.

"She must do pretty nearly as well as you," I said again, still feigning to overlook the photograph held out to me, and only taking notice of Xantippe's smiling face. "How useful she must be!"

"Ah!" the man said, led to explanation by interest in his art, "there's a many things a female can do in photography, there is; but there's one part she ought never to go into—she ain't fit for it.—The dark closet! Too much work for the 'ead!"

As Xantippe acquiesced with a look and a good many nods in this Blue-Beard arrangement of her husband's, I had only suppressed amusement to give to it, and passed on to discharging the first shot in the little forthcoming war.

"Oh, thank you," I cried, as if at that moment conscious of the portrait being thrust under my eyes—"thank you. That will do nicely. I am much obliged."

The operator, however, was equally on the alert as I. "You shall see the two," he parried—the first *and* this. And"—to prepare me before the disappointing exhibition—"you know, of course, how badly they look before they're coloured?"

"No, I don't," I answered. "I think they look badly *after* they are coloured;" and I put down my money as though the thing were quite decided.

Xantippe laid her hand upon the money with queer avidity (it was exactly the price of *two* portraits) and her husband took up arms.

"You'll be very sorry," the man argued. "And what's the expense? why, a mere nothin'!"

"Really, I *prefer* it as it is," I said. "I am saying exactly what I mean."

"Ah!" Xantippe put in here glibly, abetting her husband with a repetition of her nods and smiles; "you don't know how *nice* they look with a little tint on 'em! You can't tell!"

"O yes," I answered, smiling with benignant unsuspicion at this feminine pertinacity, "I *do* know, and I *can* tell, nicely."

"Look there, then," cried Xantippe, executing as sudden a manœuvre as ever won *bonâ fide* battle; and she pushed into my hands the first portrait her diplomatic husband had taken of me, all framed, and gilt, and coloured, so that for mere shame I *must* have it, whether I would or not! And the little shrew positively chuckled. She overran with rapid little nods and smiles.

"Ha, ha, ha!" I laughed out heartily.

No wonder the man had given me the second sitting! The two had plotted this waylaying, had entertained me during its short hatching, and here was I, the conqueror conquered, in such amusement at the duet of business dexterity, I had not the heart to say it should not win!

"You are wonderfully clever," I exclaimed, going on with my laughter still. "Really, I don't know which is the cleverer of the two."

Small Xantippe, woman as she was, thought I was captured by her singularly skilful colouring; and her little head rose, and her smiles came, and her hands stroked her sides with pride. "It *do* look nice, don't it?" she gloried. "There's the laylock there, and the dark-brown here, like life to a pin!" And I did not undeceive her, but, still laughing, went away.

It was a singular door through which I arrived at the next studio. It was a hole in the ceiling of a cheap confectioner's shop, through which one went up and up like a tremulous "property" in a play. And it was singular how I was prevailed upon to go there. I was deeply studying the show-case appertaining to it, when the owner accepted the challenge my looking was to him, and approached me.

"You are at the worst side of the case," he said, in a nice fluent voice,

and very politely. "Would you do me the favour, if it is not too much trouble to you, to come round this other side?"

He was a real cavalier. Dingy, of course—a cavalier, perhaps, when his party had been discomfited; but a regular Prince Rupert man for all that. And he was tall, and bronzed, and handsome, with a red-brown moustache; and he wore a soft hat, that sat on him in seventeenth-century fashion, and only wanted a plume and glittering buckle to make it the thing itself.

"This side, if you will be so good," he repeated. "Pray, do me the favour to look this way."

"There is a beautiful thing there," he announced, pointing to the portrait occupying the *place d'honneur*. "We are particularly successful in *cartes—and* in vignettes;" for my eyes had fallen on one of these last, instead of implicitly following the direction he indicated, and he had wisdom enough to care only for the making of a breach—not which way it was effected. "Vignettes are the best of photographs, in *my* opinion; and it is a style that *you* would do in beautifully. I am so convinced of this," continued the cavalier, coming out with his masterpiece of insinuation, "that if you can spare the time to sit, and will allow me, I will take a portrait of you, just to keep for myself.

I was thrown right over by this, of course; and vanquished I went in.

The next artist I visited was fat, aged, and frowning, in his shirt-sleeves, and on a wooden leg.

"Can you take my picture at once?" I asked him.

I was favoured with a sharp sour look and a testy scowl.

"I am in a hurry," I explained; "I have no time to wait."

"I can take you," gruffed out the old lameter, his voice as surly as his look. "Go up."

"If I am incom"—— I began.

"I can do you," repeated the lameter as surlily as before. "Go up!"

And when I *was* up, the old fellow stumped himself to me, and began to screw my head into the iron rest with considerably more than necessary force.

"I can sit still," I said, hating the imprisonment; "I don't want this!"

"What!" screamed the old man, deafened by the clatter of his wooden leg upon the floor—"what! Eh?"

"I don't want *this!*" I shouted: "I can sit still."

"You *can't* sit still?" screamed the old man interrogatively.

"I *can* sit still!" I repeated: "I can do without this rest!"

"Oh!" yielded the old fellow. "Do without it then."

I did; and was that much more comfortable. But every other little word I had with my *vis-à-vis* was in the same quarrelsome style.

"Put your head more to the right!" he cried, when, after much clatter and fussiness, his plates were prepared. "Look out there!"

"So?" I asked, turning, as I thought, the way he indicated—"So?"

"No!" he roared; "to the right! There!"

"So?" I asked again, with, possibly, an aggravating smile.

"No!" he roared once more; and he made right at me with his stump, stump, stump, and seized my head and twisted it, and would have liked to wrench it off, I am sure.

A different character entirely was revealed to me by Photographer Number Six. In person, this gentleman was short, and round, and young; in manners, he was peevish and desponding.

"You lean too backward," he cried, in a pining voice, from behind the camera when he was operating: "sit straighter up."

I stiffened my back as well as fatigue would let me, and altered the position of my eyes.

"Now you've got your eyes higher than your head," was his peevish complaint.

I laughed. "How *can* they be?" I asked. And the young man laughed faintly with me, and put his remark in less equivocal terms.

"You're showing your teeth," was his next accusation, before my smile had quite died away.

"No wonder!" I reminded him; "besides," I added, "I generally do!"

"Then," conceded the artist, "show them now. I don't hold with people going again' nature. Stick to nature."

My next "subject" was his near neighbour—a handsome woman, young, and a widow. She had a firm voice, and a rapid, busy way of doing her work, that showed her evident conviction that if it were to be done, then 'twas far best that it should be done quickly. She might have been tender and down-eyed enough once; but now she had the "operating" branch of a brisk photographic trade to carry on; she had children to keep, and rent to pay; and what was there for her but to turn tigress, and clutch at what was needful for her with vivid paw? Room was scarce with her too; so her children, having no definite place in which to play, obtruded themselves into her business precincts, and thereby taxed her patience. One of them came tumbling out into a near passage, hushing an empty hat and shawl in baby fashion; but this poor mother had no time or temper for a smile at the pretty mimicry. Vexation bristled from her instead.

"Be off!" she harried out, with hand and voice both upraised. "Play with that best hat again, and *I*'ll be after you!"

Then the woman who was her helper made more of her hot words fly. She was a pallid, dawdling creature—a widow too!—who only par-cleaned the little squares of glass given her, and returned them so that specks and streaks could still be damagingly seen.

"*This* won't do!" cried the superior soul. "*This* won't get your living. You must work hard, my good woman—as hard as we all have to do for everything."

Severe philosophy this; and severer still to have been forced to live the life that led to it. There were two women, too, in the room, whose lines had fallen in such different places. They were loose red-haired hoydens, who had bounced up into the studio, dragging with them a gallant as boisterous as themselves, and him they had just succeeded in coaxing to sit, and to treat them each to a sitting. The only anxiety of the girls was for each to outvie the other, and get all favours for herself alone.

"Give it me when it's done," lured one of them. "Do; there's a dear!"

"Aw," cried the other, "that's a shame. It ought to be for me. You like me best, dear, don't you?" and her wide arms were about the lover's neck, with a close hug.

"What a lark!" was the man's cry, chuckling at the rivalry, and shrewdly avoiding saying which way his vote should go. "I see. Let's all be took in a mob!"

They were harmless, all. It was only their hilarity and irresponsibility that made them noticeable. There was serious life in store for them, of course, even as there were sunny spots lighting up the struggle of the artist-widow. *She* had a large jug of the pretty Rhine pottery on her window-sill, sent her, she said, from Germany full of butter; and *they* had let their lover go from them, to call together some other *convives* to add to his promised "mob;" and I saw him, a street or two further on, revelling in a noisy public-house, with perfect oblivion of the quest on which he had gone. Things are balanced more evenly than at first sight could be supposed.

A singular scene was enacted before me in the rooms of photographer the last. In common with all my artists he was only rich enough to occupy a small part of a house; and in one of the many homes a roving life had led him into, a fellow-lodger had incessantly aggravated him by putting a certain door wide open, when he had been equally determined that it should be shut. A petty thing this; but the annoyance had so galled and worried our photographer that the memory of it rushed upon him green and sapful when the woman who had been his antagonist presented herself, during my visit, to make his wife a friendly call.

He came face to face on her, as he emerged from his dark cupboard; and because he only looked from under his thick eyebrows, and did not speak, his wife asked if he had forgotten who it was.

He merely looked again—being a broad black-whiskered fellow, seemingly mighty strong. But he growled an answer out at last. It was "No. I know the sulky thing. I ain't likely to forget."

The woman had no resentment for this. She folded her hands on a heavy basket of vegetables she had rested on the table; she shrugged her shoulders a little; looked down; grinned; and was dumb.

"I know her," the man cried again, taking the smile and silence (as they were meant) as so much confession and repentance. "She blackguarded me once for an hour, *I* remember."

The woman gave a downright laugh then. She had come off conqueror from this long vituperation, it was clear, and she knew how hard to be forgiven was such vanquishing; but she had not miscalculated when she had thought the olive branch would now be accepted.

The man held his hand out for it in his own rough way. It was only by a kindly question, but that was quite enough. "How's Mat a poddlin' on now?" he asked. "Pretty square?"

After which, the big fellow opened his breast, quite. "I'm a precious rough customer, I am, you know," he said. "Precious rough if I'm treated to a bit of tongue! I'd be gentle if folks would let me; but I think nothin' of chuckin' a fellow out of winder when I'm riled!"

So, speaking of his passions as of something over which he had no control, as of a sort of whirligig firework that *would* go off if anybody touched it, the woman accepted his position thoroughly, and the *amende* was made. I did not wait for the smoking of the pipe of peace; it was enough for me to have seen it produced, and I walked away.

South London Photographic Society.—In connection with our report of the last meeting of this Society, which appeared in last week's number, we desire to amend a misconception of what Mr. Henderson said respecting his permanent sensitised paper. For example: in speaking of the sulphocyanide toning bath, Mr. Henderson hinted at a certain course of operations (stated in the report) as one worthy of trial; in short, it was only a suggestion rather than as manipulations he had tried. With respect to the tone obtained by using the acetate toning bath, it was said in the report that there was "more" of the yellow-jaundiced tone usual in under-toned prints, whereas it ought to have read "there was *none* of the yellow-jaundiced tone"—obviously a printer's mistake, but one by which the sense was quite altered. In addition to what was mentioned in the report we are, from information received from Mr. Henderson, now in a position to add that all the printing peculiarities of albumenised paper are retained in this paper. For example: it may be prepared to print from either thin or intense negatives, and although it prints quite as rapidly as freshly-excited albumenised paper, its sensitiveness is increased about fifty per cent. by previously subjecting it to a fumigation with ammonia.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 4th	North London	Myddelton Hall, Islington.
" 4th	Edinburgh (Ann. Meet.)	Hall, 5, St. Andrew-square.
" 5th	Glasgow	Andersonian University.

EDINBURGH PHOTOGRAPHIC SOCIETY.

This Society held its seventeenth meeting of the session on Wednesday, the 20th instant,—Mr. Thomas Pringle in the chair. A large number of members were present.

The minutes and reports of the summer out-of-door meetings having been read and passed,

Mr. John Nicol proceeded to the business of the evening, which was to read a paper *On the Uses and Reactions of Nitrate of Ammonia in the Printing Bath*, in opening which he stated that the subject to be brought before them that night was but part of the much larger subject of the uses of ammonia in all its relations to photography—a subject he had been studying and experimenting upon for a considerable time, and further instalments of which he would be able to bring before them in the course of next session. He then proceeded with the reading of his paper, which will be given in our next number.

At the close of Mr. Nicol's extremely interesting remarks,

The Chairman observed that he had listened with great pleasure to Mr. Nicol's statements, and in certain of the experiments he could corroborate the positions taken up and propositions laid down by that gentleman. He related several examples of a similar character of experiments in which he had been engaged, and cautioned those present against some of the frightfully-explosive compounds alluded to, as he had personally suffered from a similar accident.

Mr. W. H. Davies stated that he could by no means allow some of the remarks and opinions of Mr. Nicol to go forth uncontradicted, and he was the more astonished at that gentleman making those statements as he must surely recollect that very opposite opinions on some points had been demonstrated before the Society by the speaker. He alluded to that part of the paper which denied the possibility of using albumenised paper with the ammonia-nitrate bath, and he recalled his (Mr. Nicol's) attention to a paper which he had read in February, 1865, on the steamed insoluble albumenised paper of Mr. Wood. Paper treated in that way, they all knew, would submit to be silvered without dissolution in the ammonia-nitrate bath. On other points he (Mr. Davies) could bear out the position taken up by Mr. Nicol as to the value of the nitrate of ammonia in the printing bath, more especially in hot and dry weather, inasmuch as the hygrometric character of the salt assisted in keeping the paper slightly moist, and so in a better state for printing.

After a few words from Mr. Burns, Mr. Nicol, and Mr. Lothian, the subject was dropped.

The pictures taken during the recent out-of-door meetings were then exhibited and commented upon; and after a vote of thanks had been given to Mr. Nicol and the members who had contributed pictures, the meeting was adjourned at a late hour.

Correspondence.

Foreign.

Paris, October 26, 1869.

Our old friend, pyrogallic acid, has lately been the object of the attentions of experimenters, and an interesting series of researches upon this product has been just published by M. Aimé Girard, an eminent chemist, whose name is well known to scientific photographers. He finds that the oxidation of pyrogallic acid in an acid liquid is attended by a phenomenon of reduction that is quite unexpected. In ordinary circumstances, *i.e.*, in presence of an oxidising agent and an alkali, pyrogallic acid is transformed into carbonic oxide, alkaline carbonates and acetates, and strongly-coloured and amorphous products. If a solution of nitrate of silver be mixed with one of pyrogallic acid, and if the rapidly-produced precipitate be taken up by alcohol, it will be found that this deposit contains, besides reduced silver, a new red neutral product—which is volatile, and presents many analogies to alizarine and purpurine. Other substances than nitrate of silver can produce this body, and it is found that permanganate of potash acidulated with sulphuric acid forms it in the most regular manner. The following oxidising liquid gives the best results:—

Permanganate of potash	60 parts.	
Monohydrated sulphuric acid ..	55 "	(by weight).
Water	1000 "	

The pyrogallic acid is dissolved in a small quantity of water and added slowly to the above solution; if added quickly the temperature is liable to be raised. To oxidise ten parts of pyrogallic acid, 250 parts of the permanganate solution must be employed. On the addition of the pyrogallic acid the liquid becomes of a dark yellow colour, and a mixture of carbonic acid and oxide are disengaged with effervescence. During this the new product falls to the bottom of the vessel in crystalline flakes of a beautiful orange red.

About twelve per cent. of the pyrogallic acid thus employed may be converted into "purpurogalline," as this new substance is called. The flakes are washed with a little water, dissolved in alcohol, or sublimed. The sublimed purpurogalline is a beautiful substance in the form of red needles, is soluble in ether and benzine, but not so much so in water or alcohol. Its solutions in contact with potash or ammonia take a fine blue colour, which is very transitory; for in a few minutes the liquid becomes green, and then yellow. Nitrate of silver colours the solution of purpurogalline of a violet blue in the first place; the liquid then becomes brown, and the metallic silver is precipitated.

M. Girard thinks that in some of the reactions of this substance a colouring matter or dye may be found, and he recommends further researches to the attention of those interested in this part of the question. For his part he is studying gallic and tannic acids under the same circumstances. Although at present I do not see any direct influence upon photo-chemistry which may result from these facts, still I think they should find a place in the pages of The British Journal of Photography, where all facts bearing upon our science are recorded.

Another series of experiments upon pyrogallic, undertaken by M. J. Personne, have established its poisonous properties. It may be remembered that a paragraph went the round of the newspapers that the best antidote to the poisoning of phosphorus is spirits of turpentine. The phosphorus owes its poisonous qualities to its power of absorbing oxygen from the blood, and the death is rapid in proportion as this absorption is quick or slow. To confirm this theory M. Personne thought of a body analogous to phosphorus in its properties of absorbing oxygen, and undertook some experiments upon pyrogallic acid, which is well known as a powerful deoxidising agent, and whose solution when in contact with alkalies absorbs the oxygen from the air with great activity. Some thirty grains to a drachm in solution were given to a dog. In a quarter of an hour the poison began to act, and was accompanied by all the characteristic symptoms of poisoning by phosphorus. In an hour the animal could scarcely move, and in fifty hours it was dead. Till now pyrogallic acid has been considered as harmless, but for the future it must be ranked amongst the poisons. Small and frequent doses would probably have very pernicious effects in deoxidising the blood. M. Chevreul is interested in these researches, as being in harmony with some of his own upon the importance of the alkalinity of the blood during respiration. May we think of the alkaline development of photographic images in connection with this matter, as it would appear that the deoxidising power of pyrogallic acid is much increased in the presence of an alkali?

A delicate test for the presence of iodide of potassium in bromide of potassium is published by MM. Bobierre and Herbelin. Upon a sheet of paper which has been sized with starch is placed a crystal of the suspected bromide; a drop of distilled water is poured upon it so as to moisten the paper with its solution, and then it is submitted to the action of the vapours of chlorine or bromine. If it contain iodide a blue colouration is instantly produced upon the paper, from its decomposition by the gaseous bodies, and the immediate formation of the blue iodide of starch. A little stoppered bottle containing asbestos moistened with bromine water will be found very useful as a reagent always ready for use. If the quantity of iodide be exceedingly small, the blue colour may be marked by the brown produced by the liberated iodine. In this case proceed as follows:—Pulverise a crystal of the bromide; place it on a watch-glass, pour a few drops of bromine over it, and cover it with a bell glass. If impure, the salt becomes brown immediately. Sometimes this colouration may not be decided enough to make the operator positive as to the presence of iodide. In this case, place the crystal in a tube and pour over it some benzine which is perfectly colourless. Shake well up, and if a rose tint be imparted to the liquid, the fact of iodine being present cannot be longer called in question. The feeble rose tints are only to be seen by examining the liquid above a sheet of white paper.

Another practical process, which has been in use many years, is published by M. Alfraire. A solution is made composed of—

Starch..................................	1 part.
Nitrite of potash	1 "
Water...	100 parts.

This is boiled for five minutes, and when cold is poured into a bottle, where it may be kept for years. When required for use, a quantity of two and a-half drachms is taken out, and one drop of hydrochloric acid is added to it. This solution can be kept for some months in a stoppered bottle. When a sample of bromide is to be tested, a small crystal is placed upon a white porcelain capsule, and a drop of the *acidulated* solution is added to it. If all remain without colour there is no iodide; if there should be a trace of it, the crystal becomes of a decided blue colour. It is important not to use an excess of acid in preparing this reagent. The proportions above given should be adhered to.

I will conclude this chemical letter by describing a process for the production of oxygen without heat, and as easily as carbonic acid from

marble and muriatic acid. Whether it will be found cheap enough for practical uses I cannot at present say; that it will be useful to all who wish to prepare small quantities without much trouble I think will not be questioned. The process is due to Boettger. Equal parts of peroxide of lead and barium are mixed together and placed in a flask, to the neck of which is fitted a cork, with bent tube and funnel. Some weak nitric acid is poured over the mixture through the funnel, and the evolution of gas commences at once, and continues with effervescence. The gas can be collected in jars, &c., over water. I wonder if a solution of protoxide of nitrogen in water would be useful to photographers. It can be made, and may be considered as water containing a large quantity of oxygen in solution. R. J. Fowler.

Home.

ROSS'S LARGE DOUBLET.

To the Editors.

Gentlemen,—In the notice given in your last number of the large doublet lens I have recently made, there is a slight error which you will oblige me by correcting. This lens is the largest *large-angle* doublet I have made, but not the largest *doublet*, as last year I made for the Belgian Government an *ordinary-angle* doublet the lenses of which were 8½ inches in diameter, the focus 40 inches, and which gave very great satisfaction.—I am, yours, &c., Thomas Ross.

53, *Wigmore-street, Cavendish-square,*
October 25, 1869.

SILVER RESIDUES.

To the Editors.

Gentlemen,—The editorial comments on two passages of my communication of last week have some force. Photographers, I am afraid, might be apt to read too literally my statement that the water in the waste jar should be kept "well loaded with salt." The expression should have been "charged with salt." The fact of my having been sporting for several weeks in the country is likely the cause of my having used the word "loaded" as synonymous with "charged." But even had I used the latter term, I ought to have added a caution not to throw too great an excess of salt into the butt, because chloride of silver is *slightly* soluble in a concentrated solution of chloride of sodium; but the silver is again thrown down when the solution is diluted.

With the second editorial comment, viz., that "it is in every every way better to avoid mixing the sulphide of silver precipitate from the fixing bath with the other residues, as the sulphide of silver requires rather different treatment from the chloride or ashes," I cannot altogether agree. It is easier, I grant, to drive off the chlorine than the sulphur; but both such residues may be reduced together, with less trouble and expense than both separately, if they are only in moderately large quantities, such as mine were. Besides, the refiner would charge for two smeltings instead of one, and thus add again to the expense; but when the residues are sent to the smelter, and if sulphide of silver is mixed up with the chloride, &c., he should be told so, that he might arrange his crucible accordingly.—I am, yours, &c.,

King's College, October 25, 1869. George Dawson.

P.S.—Since the above was written, my opinion that the chloride and sulphide need not be reduced separately has been confirmed by the head of one of the largest refining firms in London. He says it is of little consequence whether these dried residues are mixed or not. But, with a knowing smile, he added—"You see it is for our interest to have as many parcels as possible." Of course it is. He also told me that the residues from hyposulphite fixing baths were hardly worth preserving, unless the photographer prints on a very extensive scale or uses the same fixing solution many times. As a rule he finds the crude sulphide of silver sent to him barely yields in silver one-tenth of the same weight of impure chloride. He also told me another suggestive anecdote of a "large photographer," but I must defer this to another occasion.—G. D.

ARTIFICIAL LIGHT.

To the Editors.

Gentlemen,—I have much pleasure in informing Mr. G. Nicholson how I get a very good light by common house gas. I have, as you suggest, three fishtail burners let into a piece of one-inch pipe, the two outer so inclining to the centre that, when lighted, they form one flame, which gives me a fine light for nine-feet pictures.

If more light be desired I use turpentine along with the gas, which adds much to the light. I have the gas conduct pipe inserted in the high part of the one-inch pipe, and just before screwing it on I partly fill this one-inch pipe with turpentine, and, when heated up, it gives off a vapour which combines with the coal gas and makes it much brighter.

If these particulars be of use to any of my brethren in the art, I hope they will not withold anything they know when information is asked for through your columns.—I am, yours, &c., S. M'Watters.

Grahamstown, Falkirk, October 26, 1869.

DISSOLVING OF THE NEGATIVE FILM.

To the Editors.

Gentlemen,—I shall be glad to get the experience of any of my brother amateurs on the partial dissolving of the film in varnishing negatives:—

1. Is there any other cause than the too great strength of the solvent of the gums as compared to that of the gun cotton?
2. Why, out of a batch of negatives, are some affected in this sad way and others not?
3. Why have I only of late experienced this climax to all photographic sorrow, though for years I have used similar collodion and varnish?
4. Why—but perhaps it is irrelevant to inquire why—one's *pet* negatives are usually the most determinedly attacked?

I shall be glad to give details, but I scarcely think I am alone in my grief.—I am, yours, &c., E. Ryman Hall.

Oxford, October 26, 1869.

PHOTOGRAPHY AND EMIGRATION.

To the Editors.

Gentlemen,—Are there not already far too many photographers in this country? The fact is, photographers' assistants are generally underpaid; and if anyone intend to commence business for himself he cannot find a locality where there is not already too many photographers, which is proved by the fact that failures and bankruptcies are very common.

I would feel obliged if, in your "Answers to Correspondents," you could give your opinion on the following:—Is there a likely chance of a photographer succeeding in Canada, with its vastly-increasing population? In the West, where the farming districts and settlements are thinly populated, are there available means of obtaining chemicals and photographic requisites, so that something might be done in the way of photography when not otherwise employed? And, thirdly, will the climate admit of photographs being taken in the winter?

An answer will oblige,—Yours truly, Enquirer.

October 23, 1869.

[This being a subject of much importance to many more than the above correspondent, we print his letter with a view to the subject being commented on.—Eds.]

Forthcoming Works Illustrated by Photography.—Messrs. Provost and Co. announce for publication during the ensuing season the following additions to their list of works illustrated by photography, viz.:—*Venice and the Poets*, containing selections from Byron, Browning, Clough, Rogers, Shelley, &c., &c. The work will be edited by Mr. Stephen Thompson, and illustrated with ten photographs taken expressly for the work by that gentleman.—*A History of Gibraltar and its Sieges*, with photographic illustrations by Mr. J. H. Mann.—*Our English Lakes, Mountains, and Waterfalls*, as seen by William Wordsworth. Fourth edition. With photographic illustrations by Mr. Thomas Ogle.—Two volumes, intended as the commencement of a series of *Public School Histories*, viz.:—*Harrow*, with eight photographs by Mr. Russell Sedgfield; and *Uppingham*, with ten photographs by Mr. Charles Drake.

Condensing the Smoke of Magnesium.—Mr. A. J. Grant has written to inform us that, upwards of two years ago, he managed, by means unexplained, to absorb the smoke from magnesium undergoing combustion; but the great expense attendant upon patenting an article for which, owing to the high price of magnesium, there would necessarily be a limited demand, was such as obliged him to lay the invention aside until such time as the cost of the metal become so much reduced as to permit its being more generally used. Pending Mr. Grant's publication or patenting of the means he adopts for the above purpose, we too have been experimenting on the subject, and shall, in the course of some articles on enlarging which we are preparing for publication, communicate the results to our readers; and about the same time the long-expected reduction in the price of the metal will take place.

Jottings from Foreign Journals.—Dr. Liesegang speaks in high terms of results recently obtained by Herr Obernetter, by the following process:—Herr Obernetter spreads on a plate a solution of gelatine, albumen, sugar, and bichromate of potash, which is left to dry. He then exposes under a negative. After exposing, he sprinkles the plate with powdered zinc, as is done in the preparation of photographic enamels. The plate is afterwards heated to a temperature of 150° Reaumer, or is exposed until the whole of the layer is rendered insoluble. Etching is effected with muriatic acid or diluted sulphuric acid. In this operation the parts of bichromated gelatine covered with zinc are, through the formation of hydrogen, rendered capable of absorbing water to a certain degree, whilst the other parts on which there is no zinc are in a position to receive the thick ink. The printing takes place in the same manner as with a lithographic stone. The zinc powder is obtained by rubbing a wet plate of this metal with flint.—Dr. Borlinetto has published a pamphlet in Italian on carbon photography, and the different processes appertaining thereto.

EXCHANGE COLUMN.

A full-plate mahogany bellows-body camera, a full-plate Lerebours' portrait lens, and a 10 × 8 view lens, will be exchanged for a Powell's binocular stereo. camera.—Address, HENRY EMERY, 40, Anderson-street, Everton, Liverpool.

A first-rate *carte* lens by Ross, and a No. 1 triple achromatic suitable for groups, architecture, landscapes, or copying, will be exchanged for a good binocular body of a microscope.—Address, CHARLES LAMBERT, 7, Amersham Vale-road, New-cross, London, S.E.

I will exchange photographic transparencies for the lantern for a second-hand set, or part of a set, of slides of rackwork astronomy, or for the loan of the same for this winter. A list of subjects to choose from.—Address, JAMES DALY, Lime Cross, Hurstmonceux, Sussex.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—
John Beattie, Clifton.—*Two Portraits of Mr. Daniel Dunglass Home.*

☞ *Correspondents should never write on both sides of the paper.*

FRED. CHILDS.—It was Wheatstone, not Brewster, who invented the stereoscope. Brewster, however, invented the refracting stereoscope.

MARY B.—The yellow markings are caused by your having permitted some hyposulphite of soda to touch the back of ths prints. Probably you have laid them down on a dirty table.

JAMES SHEARER.—The arborescent markings in your lens will disappear if you apply a certain amount of heat. It is caused merely by the balsam by which the lenses are cemented, and does not betoken anything seriously wrong with the lens.

AN OLD COLLEGE STUDENT.—To make liver of sulphur (sulphuret of potassium), fuse together one part of sulphur and four parts of carbonate of potash. Pour out on a slab and break up into pieces of suitable size, which keep in a wide-mouthed bottle.

G. W.—We have measured the slope of a capital studio of a width similar to yours, and find that each side of the roof stands at an angle of about 115° to the other. There is no necessity whatever for having a greater slope than this; if it were flatter, snow would be apt to lodge upon the roof.

S. S. C.—In copying a Daguerreotype let it be so placed that it shall not act as a mirror to reflect objects into the lens. The angle of incidence being equal to the angle of reflection, let a black velvet cloth be so arranged that little or no light shall be radiated from its surface, and then let the rays from this surface fall upon the polished face of the Daguerreotype, at such an angle thaf they shall be incident upon the lens. In this way the greatest amount of brilliance will be obtained.

ERRATA.—In Mr. S. Fry's paper, in our last number, page 506, second column, line 32 from top, for "Carl Lackhardt" *read* "Carl Luckhardt;" same column, line 23 from foot, for "notion" *read* "motion;" page 507, first column, line 29 from top, for "reaction" *read* "selection;" same column, line 28 from foot, for "faulty" *read* "busy;" same column, line 24 from foot, for "range of all" *read* "range of art."—We regret that Mr. Fry's corrected proof reached our printer too late to be of use.

J. H. B. (Cheltenham).—1. Respecting the name on the lens, we know of only one person bearing that name.—2. You cannot obtain, ready made, a ball-and-socket arrangement by which to attach the lens to the front of the camera; but there is a detailed account of it to be found at page 146 in our volume for 1859 (vol. vi.), which will enable any ordinary carpenter or cabinet-maker to construct one.—3. The graduation to which you allude is only useful in lenses in which the foci are not coincident.—4. We cannot at present supply the date asked for, but we may state that the patent is still in force.

A JUVENILE.—The developer which was specially recommended by Mr. Blanchard for winter work consists of the following:—

Protosulphate of iron	1 ounce.
Glacial acetic acid	1 ,,
Citric acid	4 drachms.
Water	20 ounces.

To this add sufficient alcohol to make it flow easily over the surface. As it improves with age it is well to make a considerable quantity at a time. It may be used as an intensifier as well as a developer.

GEORGE JONES.—Thanks for your attention. Respecting the precipitate it is *not* fulminating silver, nor is there any danger of this potent substance being formed so long as you use your ammonio-nitrate solution as you describe. Were the oxide of silver digested for a few hours with ammonia the case would be very different, and you would then have just cause for fear. Avoid trying any experiments in this direction, unless you have previously carefully read and studied what has been written on the subject; for, with the exception of the iodide or chloride of nitrogen, fulminating silver is the most unmanageable of the violent explosives.

PHOTO. (Regent-street).—You will accomplish your object in a highly satisfactory manner if you concentrate the sun's rays upon the face of the picture by means of a magnifying glass of six or seven inches diameter. In this way you will secure a vignetted *carte* print in less than one-fourth of the time which would otherwise be required; and for a special purpose, such as that intended, you certainly ought to obtain a lens of the description mentioned. If you call at our office by appointment, we will enable you to try a lens of ten inches diameter. A small lens—that is, one of three or four inches—would answer better than none; but the advantages arising from a larger size would prove so great that we unhesitatingly recommend it.

RECTILINEAR PHOTO. (Maida-vale).—Meagher, Hare, or indeed any camera maker, will supply you with bellows of any dimensions wanted. Respecting your other query: No. 2 will include more subjects in the plate than No. 1. For a detailed account see an article on doublets and rectilinears at page 432.

E. X. TANNIN (Leeds).—If you really be, as stated, a novice, you are entitled to commendation; for the pictures, on the whole, are remarkably good. We observe that the time of exposure in most of them has been very long. You might shorten this materially, provided you were to use an alkaline developer. Even by using the ordinary developer warm, the exposure might be considerably reduced. Add as little silver to the developer as will suffice to give density, you will thus get softer negatives and more detail in the shadows. But it is possible to obtain much better and more brilliant prints from your negatives than those you have sent. They are slightly overtoned.

REV. T. B.—The Zentmayer lens has been favourably spoken of, and we have seen two pictures taken by it, the sharpness being all that could be desired. Although it is composed of two single or uncorrected meniscus lenses it is said to be practically achromatic, requiring no shifting to make the visual and chemical foci correspond. We are not aware of any agent for the sale of these instruments in this country, nor can we inform you where you can see one.

CLERICUS.—Since our interview with you we have effected a great improvement in the apparatus for examining, or rather exhibiting, photographs. This improvement consists (to parody the phraseology of the specification of a patent) in entirely new and improved means of causing the paper photograph under examination to disappear gradually, and another as gradually to take its place. The effect is similar to the well-known dissolving views, with this important difference—that ordinary paper photographs are employed. More of this again. The address asked for is Paradise-street, Lambeth. In reply to your last query we add that the whole of the silver can be recovered from an ammonio-nitrate of silver solution equally as from a plain nitrate solution.

AMATEUR (Edinburgh).—1. The optical part of a magic lantern consists of a condenser and an objective. Your quarter-plate lens will answer for the latter; the former must be provided. The size of the condenser will determine the size of the transparency. It ought not to be less than three and a-half inches in diameter, and should be composed of at least two lenses. You will find directions and hints on this subject in our last ALMANAC.—2. Engravings may be copied for private use, but not for public exhibition or sale.—3. Our last three volumes contain an account of all that is known in connection with heliochromy. You are quite right; the work by M. Cros will not answer your purpose.—4. The little transfer picture which you enclosed is very pretty when placed upon white porcelain; but it will not answer as a transparency, owing to the opacity of the pigment. Sheets of these pictures may now be readily obtained at the cost of a few pence.

PRIZE ENAMELS.—We have recently been afforded an opportunity of examining the frames of enamels for which a special silver medal was awarded to Mr. A. L. Henderson at the late Exhibition of the Royal Cornwall Polytechnic Society. The sizes of these enamels are very large, no fewer than twenty-five of them ranging from quarter-plate to half-plate size. Notwithstanding their large dimensions they are exceedingly perfect, one portrait of a young lady having so many fine and delicately-graduated shadings on the face as to render it difficult to conceive of a farther advance being made in this department of our art. The general tone of these enamels is, in our opinion, warmer and more pleasing than those of the same artist which we examined on a previous occasion. The medal by which Mr. Henderson's merits have been recognised has been well earned and most worthily bestowed.

LONDON GAZETTE, *Wednesday, October* 26.

NOTICE OF SITTING FOR LAST EXAMINATION.

C. TOWNSEND, photographer, Doncaster.—November 17.

METEOROLOGICAL REPORT,

For the Week ending October 27th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Oct. 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
21	30·22	51	37	49	51	NNW	—	Fine
22	30·50	54	38	42	45	NNW	—	Fine
23	30·39	51	44	45	48	W	—	Foggy
25	30·28	55	41	43	44	WSW	—	Dull
26	29·90	51	41·5	41	44	WNW	—	Fine
27	29 83	41	32	33	35	WNW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 496. Vol. XVI.—NOVEMBER 5, 1869.

PHOTOGRAPHY AND THE PRODUCTION OF DIFFRACTION GRATINGS.

About fourteen years ago an interesting paper was communicated to the *Philosophical Magazine* on *The Application of Photography to Experiments in Diffraction*, by Mr. John Bridge. This paper contained a suggestion that photography should be applied to the production of a number of fine lines on a glass plate, in order that white light in passing between the edges of these lines should be broken up into its constituent coloured rays and a spectrum produced.

At the time the paper above referred to appeared, the wonderful method of "spectrum analysis" was almost unknown, and any information upon the subject then but little appreciated. Now the case is very different. Within the last few years a new method of investigation, of surprising delicacy and accuracy, has sprung up, by the aid of which we are not only able to ascertain the composition of terrestrial substances, but also of the materials building up the far distant worlds which people space. These results are obtained with the aid of the spectroscope, which is simply an arrangement for properly observing the light transmitted through a prism. As our readers well know, the function of this prism is to break up a narrow band of light made to pass through it. If, when this bundle of rays emerges from the prism, the image be received on a white screen or the retina of the eye the original band of white light will now be seen to have been expanded into a brilliantly-coloured luminous strip—in fact, into a spectrum. A result very similar to this is obtained if for the prism, in the above arrangement, we substitute a plate of glass, on which a number of extremely fine lines have been ruled very close to each other. When such a plate is held between the eye and a flame a spectrum of the light is obtained, and any bands characteristic of the presence of particular metallic vapours in the flame can be easily perceived.

The production of accurately-ruled lines on glass sufficiently fine and near to each other to give satisfactory results in this way is a matter of considerable difficulty, and glass plates so engraved are, comparatively speaking, very costly. We, therefore, thought that the description of a mode of easily producing a grating of this kind, by means of photography, would be useful to some of our readers who may not have been aware of the existence of such a mode of making an apparatus for obtaining the spectra of flames.

The first point to be attended to is the production of a set of black ruled lines on a white surface, which can then be photographed and reduced to any desired extent. The best material on which to draw the lines is a board coated with ordinary white paint, and then flatted so as to avoid troublesome reflections. When dry, a number of very narrow lines should be very carefully ruled parallel and close to each other, but not so close that a very well-marked white line cannot be seen between each dark one. The lines are best made by a strong stroke of black lead pencil. Care should be taken not to let the stroke vary in intensity. Each line should be about six inches long, and the number ruled would best be about five hundred.

In photographing these lines it is necessary to use a very fluid collodion and one without any tendency to "ridginess," since the film should be as thin and even as possible. Having selected the suitable collodion the camera should be set up opposite to the board, and care taken that the plane of the board and that of the focussing glass shall be as nearly parallel as possible.

When the proper adjustment has been made a negative can now be taken in order to test the arrangement. If all be right the camera can be moved so far away from the board that the five hundred lines shall occupy the space of about half-an-inch or a quarter of an inch on the focussing glass. When this has been secured, a negative can be obtained which, when clear and sharp, will produce beautiful diffraction or lateral spectra when the portion of the plate on which the lines have been photographed is held *close* to the eye, and any flame examined through the grating.

By the same means triangles, circles within circles, &c., can be easily produced which will occupy on the ground glass a less area than that of the pupil of the eye.

NITRATE OF AMMONIA IN THE PRINTING BATH.

In another column will be found a very interesting paper on the above subject, which was read at the last meeting of the Edinburgh Photographic Society, by Mr. J. Nicol. We have often heard of the use of nitrate of soda or of potash in the printing bath; but nitrate of ammonia has been comparatively little employed as an aid to nitrate of silver in sensitising albumenised paper.

Mr. Nicol states that he has obtained most satisfactory results with the aid of a compound bath prepared by dissolving thirty grains of the nitrate of silver and the same weight of the nitrate of ammonia in each ounce of water—the paper sensitised on this bath yielding "finer-coloured and more brilliant prints," and this with a saving of silver.

We have not yet had time to make any trials with the bath above referred to; but some old experiments of ours with a solution of oxide of silver in nitrate of ammonia appear to show that, in the presence of nitrate of ammonia, silver compounds are capable of rendering albumen insoluble, even when the silver solution is extremely dilute.

We all know that a very weak silver bath becomes quickly charged with organic matter in consequence of the solution of albumen from the surface of albumenised paper floated on the liquid. The addition of nitrate of soda certainly diminishes this tendency to solution of the albumen film. But the addition of the soda nitrate to the bath is quite unnecessary if the albumen film be previously rendered insoluble; *then* a silver solution containing no more than ten grains of nitrate of silver per ounce, or even less, may be employed.

Assuming, however, that we do not wish to render the albumen insoluble prior to sensitising, and that we do not wish to add nitrate of potash to the weak silver bath, we can prevent the albumen dissolving by adding to the bath a little solution of oxide of silver in nitrate of ammonia; the body present in such a liquid has the property of rendering the albumen insoluble.

Mr. Nicol's results seem to prove that nitrate of ammonia has the same power alone, and as the latter salt can be easily obtained in

commerce in a pure state, it would be a most convenient adjunct to nitrate of silver, and, being very soluble and slightly deliquescent, would tend to prevent the paper sensitised on a compound bath of the kind proposed from drying to a hard, brittle tissue.

HOW TO KEEP PHOTOGRAPHIC CHEMICALS AT A PROPER TEMPERATURE DURING WINTER.

A FRIEND, who left this country last spring for a protracted tour of a semi-photographic character in Iceland, the Hudson's Bay Co.'s territory, and other localities in a high northern latitude, while making preparations for his journey consulted us respecting several things, and, among others, one which may prove interesting to some readers during the ensuing winter. The special topic to which we are about to allude will be introduced by giving an extract from that portion of our friend's letter which refers to it:—

"And now respecting another matter: I have already stated to you my reasons for preferring to use the wet rather than the dry collodion process, notwithstanding the additional *impedimenta* in shape of tent and chemicals which must necessarily be the consequence of this decision. The experience of every person, myself included, points to the fact that when the temperature of the bath and chemicals is low, there is no chance whatever of getting good work. Now, as the temperature in that hyperborean region [Iceland] is unmistakably low, I should feel greatly obliged if you would suggest a simple and ready means for my adoption by which the solutions can be kept at a good working temperature. It would be very inconvenient to have to carry a furnace, no matter how small, and, although I have a spirit lamp as part of the outfit of my tent, I do not just now see how it can be utilised for the purpose under consideration. My daily excursions may extend twenty or thirty miles from what I may call our main settlement, and during these excursions my bath and developer may become cold enough unless some preventative measures be adopted. I have a hazy kind of idea respecting the adoption of a felted 'cold proof' box like the Norwegian cooking stove, but as you have had experience in 'Greenland's icy mountains,' I prefer waiting for any hint you may offer before I decide upon any final step regarding this."

From the above it will be seen that what was wanted was a simple means of keeping the solutions at a moderate temperature in an intensely cold atmosphere. The advice which we tendered in reply to the above communication was acted upon; and from a letter which we recently received from Iceland we are glad to perceive that it was attended by the greatest success. As the means employed may be useful to those who "live at home at ease" as well as those who visit high latitudes, we here publish the advice given to our friend.

The bath should be made of thin, well-annealed glass. It must have a case or covering of ebonite or gutta-percha—the former to be preferred. This case should not only *not* be a tight fit, but it should be so wide as to hold a considerable quantity of water when the glass bath is in its place. The object of this, it will be readily guessed, is to contain water of a temperature sufficiently high to influence that of the supposed half-frozen silver solution inside of it.

But how and in what manner is warm water to be procured when in a cold, snowy region, and the nearest fire perhaps at a distance of several miles, is now the question for our solution.

Every schoolboy who has made a study of what are known as chemical tricks knows how to produce a hot liquid by mixing together two cold ones. Let those who are not aware of the method of accomplishing this small feat in chemical jugglery take a thin bottle and half fill it with cold water; now add to this common sulphuric acid—a few drops at a time—and observe that the bottom of the bottle becomes rapidly warm. This warmth is diffused by stirring up or shaking the liquid. Upon adding a few drops more of the acid a further rise in the temperature is effected, and this may go on until the bottle becomes so hot as to prevent its being held with any degree of comfort. The height of temperature which may thus be obtained is far above that at which ether will boil, and even several degrees above the boiling point of alcohol. From this may be deduced the great value of such a simple mixture when warmth is required and no fire is nigh.

We will now apply this to the case in hand—that of raising the bath solution from an almost frozen condition to a proper working temperature. The outer receptacle or case for the glass bath is made about three parts full of water, and to this is added only a few drops of sulphuric acid, so as not to endanger the glass bath by a too sudden rise in temperature. Continue to add the acid until by the thermometer or the application of the hand the desired temperature has been secured.

The developer may, in like manner, be rendered warm by having a cylindrical case for the bottle capable of holding a little water.

There is in this operation only one point to be regarded—do not add too much acid; for, in that case, the rise in the temperature would be so great as to endanger the safety of the bottle which might be subjected to it, unless, indeed, it were thin and well annealed. The temperature to which the mixture may be raised when the acid and water are in certain proportions (three to two) is 180° Fahr.

Here is a pretty experiment in connection with this subject:—Place in a thin glass developing measure some chloride of silver, and pour over it a little solution of hyposulphite of soda previously made very cold. Observe that the choride does not dissolve. Set the measure in a second vessel of very cold water, into which (the water) pour a small quantity of sulphuric acid. Observe now that the chloride of silver dissolves. The chloride is soluble in a solution of hyposulphite of soda, as every photographer is aware; but if the soda solution be very cold its solvent powers become impaired. The addition of the sulphuric acid to the water causes such a degree of heat as to warm the hyposulphite, and restore in an energetic manner its dormant solvent powers.

There are many amateur photographers whose dark room is an outdoor shed or other garden building, and from the great coldness of such places in the winter months, and the inexpediency of lighting a fire for the short time the room might be required for an occasional experiment, there is a feeling that the lowness of the temperature would prove fatal to the obtaining of good results. To those who are placed in such circumstances, the method of obviating such a condition of the chemicals may prove to be of value. Indeed we know of many dark rooms situated within a short distance of a room in which a good fire burns all the winter, but in which the cold, notwithstanding, is very intense in the coldest season. Those who are thus situated will also be in a position to profit by the hints above given.

COLLODIO-BROMIDE.—TRANSFERRING NEGATIVES, &c.

THE Rev. Andrew Johnson's capital though short article on the collodio-bromide process (see page 518) is, in some respects, not sufficiently explicit, inasmuch as he has omitted to state the composition of his preservative solution, and has not described his method of mixing up and filtering his collodio-bromide emulsion. In other particulars his plan of working is excellent, if one wants to make sure of getting uniformity of sensitiveness and of good results by this process. The employment of a little—very little—gum arabic along with the tannin preservative is certainly advantageous in some respects; but I believe Mr. Johnson to be mistaken when he supposes a gum preservative to be inimical to full development by the alkaline method. At all events, I have never found it so.

Should any one adopt Mr. Johnson's plan of mixing the collodion emulsion, washing, and finishing the preparation of such dry plates, I am convinced, from long experience of similar conditions, that it is preferable when developing the image to commence, as Mr. Johnson recommended, by bringing out all the details feebly with alkaline pyrogallic acid and a few drops of a ten-grain solution of bromide, and not to attempt to force the intensity far by these means, in case of inducing fog, but to wash the film well, and intensify afterwards with citro-pyrogallic acid and silver. If the plates are not so well washed as they must be by the admirable system adopted by Mr. Johnson, they are considerably less sensitive, but have the advantage, after sufficient exposure, of being capable of full development by the alkaline method alone, without danger of fogging. Thus it is a question of advantages *pro* and *con*. For my own part I generally prefer increased sensitiveness to less trouble and fewer messes in the manipulations.

In hot weather and in a good light the Liverpool dry plates, as prepared by Mr. Mawdsley, require about three times the length of exposure of a highly-sensitive wet plate. In a dull light or in cold weather the proportion of comparative sensitiveness is, I find, considerably altered in favour of the wet plate, to the extent sometimes of from six up to ten to one. A similar sort of ratio seems to hold good under altered conditions of exposure with all kinds of dry plates however prepared, that I have ever tried. The reason why is not very obvious—at least I cannot, in my present imperfect stage of knowledge, explain the cause of such a difference. Perhaps some of your readers may be able to furnish us with a satisfactory theory to account for it.

With respect to the transferring of negatives from glass, on which Mr. Hutchinson sent you an interesting communication last week (see page 516), in reply to "C. S.," of Bombay (page 514), I wish to make a few observations. I had an article in embryo for the benefit of this Bombay gentleman and others whom it might concern; but

in the part referring to the transfer of negatives Mr. Hutchinson has forestalled me to some extent.

Mr. Hutchinson and I have had long and interesting correspondence about collodio-bromide and transferring negatives, and sometimes worked together in both processes. We have also compared notes of practical experience. He is in the habit of transferring all his negatives that are worth preserving. So do I. But the instructions given by Mr. Hutchinson, adept though he be in the art of transferring, are scarcely sufficiently explicit for the guidance of a beginner.

The formula as to quantities given at page 516 for the collodion cannot, I think, be improved upon. It is the one always used in my establishment, except when making experiments to try and improve it, which I have been unable to do. The pyroxyline should be made in cold acids, to give greater toughness to the film. With the same object in view the solvents (both of which may be methylated to save expense) should be of the highest strength. The quantity of castor oil to be added should be regulated by the brittleness of a dried film of the plain collodion. From three to seven drops to each ounce are usually sufficient. Sometimes when, from the nature of the pyroxyline, the film is very contractile and apt to shrivel up, it will be found useful, besides the castor oil, to add to each ounce of the collodion a drop, or may be two, of glycerine. But the latter must be used very sparingly; because, if added in excess, the transferred film will never dry thoroughly, and is disposed to "sweat" or condense small globules of water on its surface when the air is charged with moisture.

If it be wished to transfer a negative which has been varnished, the safest plan—although not always essential—is to remove the varnish by soaking the film for a short time in common (not too strong) methylated alcohol, or in the solvent of the varnish-gum, whatever that may be.

In the mode of protecting the negative from the solvent action of the transfer collodion Mr. Hutchinson's experience is exactly in accord with my own. Nothing that I have ever tried is so good as a tolerably thick solution of India-rubber in benzole. Twenty grains of the gum to the fluid ounce of solvent are not too much, provided the solution will flow over the plate evenly. Robinson's India-rubber paste for mounting photographs, or Swan's solution used in carbon printing, when diluted with a minimum of benzole so as to make them spread evenly, answers remarkably well. The danger to be avoided is in using the solution too thin, thus giving an insufficient protection to the film. There is no necessity for filtration; the solution will clear itself by subsidence and decantation afterwards.

Before applying the India-rubber protective coating to the plate make sure that the film is perfectly dry. I prefer warming the plate to a degree similar to that required when varnishing a negative with spirit varnish. I then pour on the solution like collodion, allow it to soak in for a few seconds, return into the pouring bottle the greater part of the excess of liquid, and lay down the plate to dry on a large glass slab previously levelled. Should occasion require I coat half-a-dozen or more films in a similar manner and place them on the same slab.

The next operation is to apply the transfer collodion; but this must not be done until the plates and the collodion have reached the normal temperature of the operating room, otherwise bubbles of locked-up air or vapour will be generated within the film. The same fault will also occur when the India-rubber coating is not thick enough to protect thoroughly every part of the negative, or when there may be a little hole caused by dust, &c. In the latter case there will not only be a bubble in the transfer pellicle, but also a transparent hole bored right through the negative.

When the negative is fit to receive the transfer solution, gently pour on each plate, as it lies on the levelled stand, as much collodion as will lie on it without running off. Some experience is required before one knows when to stop pouring; but should the limit be exceeded and the collodion run over the edge of the plate, allow the compound film to dry for a day, and afterwards go through the whole process with India-rubber, &c., from beginning to end, once more.

In my experience I find it desirable in all cases where the negatives exceed 8 × 5 inches to have a double pellicle of both India-rubber and collodion. Considerable extra trouble and expense are thereby incurred, but, *per contra*, these films, when detached from the glass, are specially strong, and, like the smaller ones, are pliant, not liable to breakage, can be stowed away in little bulk, and can be printed from either side. Besides these advantages, a piece of plate glass, worth all the materials used in transferring, is set free for future use.

With respect to two other queries (3 and 4, page 514) of your Bombay correspondent, I suspect he uses the term collodio-*chloride* instead of collodio-*bromide*. His question—"How is intensity secured in collodio-chloride *(bromide?)* plates?" has been answered by Mr. Johnson in last week's Journal, and partly also in this article, if sufficient intensity cannot be got by alkaline development alone. "C. S.'s" fourth query—"What are the crystals noticed on collodio-chloride *(bromide?)* plates, and how may they be avoided?"—is a puzzler to me, as I have never observed anything of the sort in the whole course of my experience with such kinds of sensitive films. I believe Mr. Hutchinson has met with something similar. If so, perhaps he will be kind enough to tell us something more definite respecting them. The fifth question, asking whether collodio-chloride of silver, after being discoloured by light or otherwise, can again be restored to its pristine solution is more easily answered. It cannot. George Dawson, M.A., Ph.D.

ON THE USE OF NITRATE OF AMMONIA IN THE PRINTING BATH.*

No doubt most of you are aware that, at present, my hands are sufficiently full of work to have warranted me, although generally not backward in taking my full share of the Society's work, in refusing the pressing invitation of our Secretary to read a paper tonight. You know, however, that he possesses in a high degree the qualification of a secretary expressed in our national aphorism, "He winna tak a na-say for an answer;" and so I found it easier to steal an hour from, perhaps, more pressing work to write this than to convince him that it was impossible to do so.

This may be considered the first meeting of the season; the amateur portion of the members have finished their summer work, laid aside their cameras, and are ready to take advantage of the few bright days given us during the winter months to print copies from their negatives for friends and acquaintances. At such a time, then, probably the most fitting subject for our consideration will be something connected with printing, and so I have resolved to direct your attention very briefly to the use of nitrate of ammonia in the printing bath.

In the early days of printing, when as yet our attention was mainly directed to the production of the negative, we were not difficult to please in the matter of prints; but, as our negatives improved, we began to get dissatisfied with what could be got by the use of nitrate of silver and plain paper. A great improvement was made by the substitution, for nitrate, of ammonio-nitrate of silver; in fact, the fine velvety tone of some of the prints made at this epoch are not surpassed by anything that our greater experience and modern appliances can produce.

The watchword of our art, however, is "progress;" and, no sooner had we got our prints toned to our satisfaction, than we began to find fault with the want of brilliancy caused by the granular surface of the paper, and found a remedy in albumen.

Albumen, however, like many other things in the world, was found not to be an unmixed good; for the ammonio-nitrate which with plain paper had done such good service, would not be coaxed into union with the new surface, or rather, I should say, it persisted in forming a union after its own fashion, by stripping it almost entirely from the paper. Under these circumstances it had to be discarded, and our attention was turned to other methods of getting the desired tones, with, on the whole, very fair success.

But, notwithstanding that success, photographers could not get rid of a lingering fancy for ammonia in some form, and many and varied have been the experiments made with that object in view. Nor was this fancy without foundation. Photography is essentially a chemical operation, based on a series of chemical decompositions, brought about generally amongst compounds of loose affinities; and amongst these it may be stated, as a rule, that the more unstable the compound the better fitted it is for photographic work.

Although the nitrogen and hydrogen of which ammonia is built up cannot be said to hang loosely together, they, in that connection, enter into the composition of a large class of very unstable substances—some of them so unstable, indeed, that they cannot be touched without violent decomposition. I allude to such substances as the teriodide and terchloride of nitrogen. This tendency to produce unstable compounds, I believe, has kept up the desire to enlist ammonia as an agent in printing operations; but, except the fuming of sensitised paper as introduced by an American photographer, very little success has attended experiments in that direction.

Some years ago, some of you will remember, the late Colonel Bell showed some very fine prints sensitised on what he called a "queer" bath, and which he described as "a solution of silver, nitric acid, and ammonia in unknown quantities." He had been trying to sen-

* Read at a meeting of the Edinburgh Photographic Society, October 20, 1869. Se report of the discussion on this paper in our last number.

sitise albumenised paper on a solution of ammonio-nitrate of silver, and, finding it would not do, had gone on adding pretty large quantities of nitric acid and ammonia alternately until he had, no doubt, formed a pretty strong solution of nitrate of ammonia. The prints were exceedingly fine, and thinking that the ammonia salt might have something to do with it I made some experiments, and the results were so satisfactory that I have used it ever since.

The advantages which I think a mixture of nitrate of ammonia and nitrate of silver has over a solution of nitrate of silver alone are two—a finer-coloured and more brilliant print, and a decided and considerable saving of silver. A fair comparative trial will, I think, satisfy any member of the former, and a little consideration will make the latter quite clear.

Of course the chloride in the albumen will decompose its equivalent of nitrate of silver, whatever the strength of the solution on which it is floated may be; but the quantity thus consumed is small, compared with what is removed by the surface liquid adhering to each sheet on its removal from the bath. When the sheet is hung up the watery portion of this surface liquid evaporates and leaves the solid matter evenly spread over the sheet, the quantity depending entirely on the strength of the solution.

Suppose the sheet to retain adhering to its surface two drachms of the solution at sixty grains to the ounce, the quantity of undecomposed silver would be about fifteen grains; and there is a very general impression abroad that really good, brilliant prints cannot be got from much weaker solutions. If, however, the solution contain only thirty grains to the ounce, then the silver consumed is only seven and a-half grains, or, speaking roundly, a saving of something like thirty shillings on each ream of paper.

Of course this saving cannot be effected by using nitrate of silver alone, for the reason already stated; but if as good results can be got with a sixty-grain solution, one-half of which is nitrate of ammonia, as with one altogether of silver, there can be no reason why the saving should not be made.

Although I have mentioned a solution of thirty grains each of the salts, I have not made careful experiments with a view to decide as to the best proportions. My practice has been to dissolve an ounce and a-half of each in twenty ounces of water; to this I add half-an-ounce of kaolin, and when it subsides pour out as much of the clear liquid as will be sufficient to float the paper I intend to sensitise. After sensitising the liquid is poured back into the bottle, well shaken up, and is ready to be decanted again when required. This routine I continue without addition of silver so long as there is sufficient liquid to float the paper, and have not noticed any difference between prints sensitised when the bath was fresh and those floated when it was reduced in bulk by at least one-half.

You will see that I have confined myself to a statement of what I believe to be facts without attempting to discover the *why* thereof; but, as I have been for some time examining the whole question of the relation of ammonia and its salts to photography, I hope on a future occasion to bring the matter more fully before the Society.

JOHN NICOL.

NOTES ON PASSING EVENTS.

By a Peripatetic Photographer.

If Brown and Smith have a grievance against each other, and if, in the course of a few words of mutual and probably unappreciated admonition, Brown asserts that Smith is "no gentleman," he has committed an offence in the eye of the law, and may be rendered liable to damages for libel. If Brown, instead of using this language, prefers the more effective method of directing the finger of ridicule to Smith through the medium of a photographic or any other kind of caricature, he is equally—nay, more—liable to be mulcted in damages for libel than when uttering a few words which may have been hastily and unthinkingly enunciated. A case has recently been decided in the Wandsworth Police Court, from which it is clear that when, through the agency of art, a man is held up to ridicule an offence has been committed liable to be punished with fine or imprisonment. Photographers should, therefore, bear this in mind.

Mr. Sutton is indignant at my publication of his latest discovery —his "ham-fat process." If he intended to have written a pamphlet on the subject, I regret having given it such a degree of publicity that the number of half-crowns which might otherwise have been invested in it would be materially lessened. Mr. Sutton says that in my description of it I am not entitled to credit. He knows best; for my account was a copy, *verbatim et literatim*, of his own words. As he appears desirous of raising my pseudonymous veil, I might have set him right respecting my personality by sending him my card; but as his defunct publication, the *Notes*, bears witness that the contents of private letters have sometimes been communicated by him to the public, I shall play with him a little longer before I take this step.

The societies are now commencing with vigour their meetings for the winter session.

To begin with the oldest. Many photographers throughout the country are preparing such a display as will adequately represent them at the forthcoming exhibition of the London Photographic Society, which I believe will be the best that has yet been held in the metropolis. But, as it is difficult to count one's pheasants before they are shot, I must return to this subject next month.

The meetings of the North London Photographic Association do not appear to be much kept in remembrance by its members, there being, according to what I can learn, but one member present at the last meeting. This body has, by this time, been made aware of its folly in pooh-poohing the overtures which were made to promote a union between it and the South London Photographic Society, which latter body, very curiously, is made up to a large extent by those who reside in the northern districts of London. The North London federation is not yet beyond the pale of hope despite the discouraging circumstances under which its first meeting (?) was held. There are still good men connected with it, and it only remains for them to make an effort in order to reinstate the Society in the high position it once occupied. It is a great pity that the members cannot make up their minds to elect a president who will take some interest in their proceedings, even if it be only to the extent of attending *one* meeting in the year. The rock here faintly indicated is that on which this once active Society will founder if care be not taken to avoid it; and, in the case of a body which has done so much for photography, and still has it in its power to do so much more, such a catastrophe were deeply to be deplored.

The South London Photographic Society opened its session under favourable auspices. A suggestive paper was read by Mr. Samuel Fry on the aspects of photography. After a discussion on this subject a number of pictures illustrative of one or other department of the art appears to have been exhibited. Concerning those exhibited, as showing the present state of the Woodbury process, it is now generally conceded that when a large number of prints are required from one negative no process of printing can surpass Woodbury's—nay, for the matter of that, no process can compete with it; but when only a few specimens are desired its employment will be found inexpedient, seeing that the principal expense is incurred in the preliminary operations. After these have been accomplished the expense resolves itself into the cost of paper, ink, and the value of labour expended, which latter, in this stage, is of a mechanical nature. It would be gratifying for the photographic public to have an answer to the following:—Given the most perfect working machinery, what would be the minimum number to be produced at which, in respect of cost, printing in this way would approximate to silver or carbon printing? I am quite aware that in the case of large numbers Woodbury would distance his rivals; what I want to know is—What is the state of the case with respect to small numbers, that is to say, dozens? I do not of course allude to what is termed *small* orders, or a couple of dozen or under, but to those pictures for which a reasonably large demand might be anticipated. If this fall under the eye of Mr. Woodbury, he may be assured that a few words from him in reply will be much esteemed by many photographers—more, perhaps, than he is aware of.

Like many more who take an interest in the subject of photo-lithography, I have been puzzling my brains to discover the difference between the printing process of Tessie du Mothay and that of Albert, and confess to discovering none. In the process of the former a solution of bichromatised gelatine is spread upon *anything*, exposed to light, immersed in water, inked, and printed from *à la* lithography; while in the process of the latter bichromatised gelatine is spread upon glass, exposed to light, immersed as before, inked, and printed from. Then wherein lies the difference? Without doubt, it must be in the ink. Fair detail and good half-tones may be got by this kind of printing when the most common lithographic ink is employed; and, if so, what should not be obtained by a careful study of the requirements in an ink calculated to produce the best possible results? It is a question for practical lithographers to discuss. Very probably if one of the best photographers were present, and saw Albert going through the whole operation, he would *not* be able to "go and do likewise."

I have not very often occasion to make comments, especially of an antagonistic nature, upon the editorial articles which appear in this Journal. I think, however, that I ought to subject to criticism one

or two statements in the series of articles devoted to the lenses used in photography. "All portrait lenses," you say, "are composed of more than one achromatic lens." Now the great thing in connection with a portrait lens is to have the best definition at the least expenditure of optical means. A crossed lens, with the most convex side towards the object, is stated in all the treatises on optics to be free from spherical aberration, and, if so, why seek to complicate matters by adding a second combination? In a telescope the best definition is sought to be obtained, but there is no second lens in that instrument. I have one by Cooke, of York, that defines admirably, and yet it has only one lens as an objective. I do not, therefore, see the necessity that exists for having more than one achromatic lens.*

Again: did it not strike you, when describing the panoramic lens, which is a glass globe full of water, that a much better instrument might be made by employing an *ordinary* photographic lens, but mounted on a revolving strap so that its axis could be directed to any part of the plate? A lens of this kind possesses an advantage over the panoramic instrument you describe, inasmuch as, in the first place, its price is a mere trifle when compared with that of the spherical lens; secondly, a very much wider aperture may be employed; thirdly, being corrected for flatness of field, which Sutton's lens is not, the foreground will be quite as sharp as the distance. With a lens of this kind, and mounted in the manner hinted at, good pictures might be obtained either upon curved plates of glass or upon sheets of paper bent round a couple of guides, as suggested by one of your correspondents. A travelling screen with a slit would have to be employed to prevent any rays from falling upon the plate but those in the neighbourhood of the vertical axis of the lens. Some years ago I heard of what was called a "scioptric camera," in which the lens was made to rotate in something like the manner described. If your correspondent "Medicus" will send me, through the Editors, his address, I shall forward him a drawing of a panoramic camera in which a common lens may be employed.

Truly sorry was I to read in the report of the last meeting of the Manchester Photographic Society a notice of the death of Mr. Petschler. He was a neat worker with the collodio-albumen process, and some stereoscopic pictures by him in the possession of one of my friends indicate him to have been not only a master of the process, but to have been possessed of the artistic element in a large degree. From what I recollect of his pictures, their characteristic elements were the sharp crispness of a dry process combined with the soft delicacy of the wet. The collodio-albumen process, as described by him four or five years ago, is, to my own knowledge, practised with great success by several artists.

Mr. A. G. Grant, I observe, has written to you stating that two years ago he managed to absorb the smoke from burning magnesium. Allow me to express my fear lest Mr. Grant has allowed his eyes to deceive him; in other words, I fear it is "too good news to be true." It is not quite a month since I conversed with a manufacturer of magnesium on this subject, and he assured me that this desideratum had not yet been accomplished. The best way that is yet known of consuming the smoke is to cause it to pass through a box, or apparatus, or chimney so fitted up with obstructions that the smoke shall condense before it reaches the outer end. Now, by means of zigzag passages, formed of felt and kept moist by acetic acid, a very considerable condensation of smoke will take place, especially of the grosser particles; but no matter to what amount of interruption the smoke is subjected, some will eventually always escape at the orifice of the chimney. I am aware that experiments are being made so as to try and deposit the last traces of the smoke; but, in the meantime, so far as my information extends, it has not yet been accomplished. I think it probable that magnesium will have a fresh and vigorous impulse imparted to it during the ensuing winter.

* Our correspondent is right, provided the object to be photographed were a star, or any object subtending a small angle; but in a portrait lens there is something wanted which he does not appear to have taken into consideration, viz., a wide and flat field, and this with a large angular aperture. The kind of objective under consideration was one for taking portraits, not one for viewing either celestial or terrestrial objects through an eyepiece.—EDS.

MR. McLACHLAN'S GREAT COMPOSITION PICTURE.

OUR readers have already been made aware of the great composition picture conceived by Mr. McLachlan, of Manchester, intended as a memorial of the Executive Committee of the Cotton Famine Fund. The *Manchester Examiner and Times* of the 1st inst. contains the following capital description of this pictorial undertaking:—

IN the whole range of technical expression in connection with the fine arts no single phrase is so habitually misapplied as that of "historical painting." The *Finding of the Body of Harold*, the *Miraculous Draught of Fishes*, *Priam Supplicating for the Dead Body of Hector*, the *Trial of Lord William Russell*, the *Wellington Banquet to the Waterloo Heroes*, the *Council of the Anti-Corn Law League*, and indeed almost any other class of work in which some kind of a story is told or illustrated, are all continually spoken of as "historical" pictures. It is true that, in its widest sense, there may be a historical element at the base of all these subjects; but it is not this element, but the object of the artist and the method of treatment which should determine its class in art nomenclature. The object of the historian is to narrate facts and deduce principles therefrom, as in Herodotus, Xenophon, or Gibbon; the object of the poet is to excite the emotions and gratify the fancy and the imagination. Hume's history of the reign of Richard the Third or Henry the Fourth is a very different class of literary composition to Shakspere's dramatic treatment of the same subjects. Historical painting, strictly so called, ought as far as possible to deal with actual individual facts; to the poet or novelist it matters not whether fact or pure fiction forms the subject matter of his story. Hence it is the object proposed, and the artistic standpoint from which the subject is viewed, that determines whether a picture can correctly be styled a historical or a poetical one. No doubt it is difficult, nay impossible, to draw an absolutely distinct line of demarcation between the two styles, inasmuch as any individual work may to some extent partake of both; but the main object or preponderating element ought to determine its class. The *Trial of Lord William Russell*, by Sir George Hayter, is as nearly as was practicable a strictly historical painting, and yet, of necessity, the artist was compelled to draw largely from his imagination for many of the details depicted. His *Marriage of the Queen*, on the contrary, was professedly a faithful historical record of an interesting event actually witnessed by the artist himself. Hence, in works where exactness as to fact preponderates over the emotional element, is the great value of photography to what may with propriety be termed "strict" historical painting, as well as to the student of science when he has to deal with material objects cognisant to the sight. The antiquary prefers a good photographic copy of, say, a newly-discovered dilapidated Roman altar, to the most conscientious drawing by the cleverest living artist, simply because the subjective human element which of necessity enters into the latter, and from which results the greatest charm in "high" or poet art, is absent in the former, and this is a most important condition with him.

Mr. McLachlan, of this city, has for some years been labouring with the most unwearied assiduity to bring the photographic element to bear prominently in what we have termed strict historical composition. A single glance at the picture now on view at Messrs. Agnew's will convince the most sceptical that complete success has crowned his labours —nay, that he has actually distanced all his competitors in this species of photographic art effort. He has been most fortunate, certainly, in his selection of the artists in conjunction with whom he has produced what is unquestionably the finest picture of its class in existence. This is, doubtless, very strong language, and may, perhaps, be thought calculated to induce too high an expectation in the minds of some; but the work is of so unique a character, and has been so elaborately and conscientiously carried out in all its details, that no injury can accrue to its reputation from this source. The artistic design, or general composition and grouping, is the work of Mr. Frederic J. Shields, a Manchester gentleman, who has recently, and deservedly so, achieved a high-class metropolitan reputation. The photographs have all been executed by Mr. McLachlan, and the finished picture in oil, now on view, is the work of Mr. Arthur Hughes, a rapidly-rising London artist.

Photographic groups containing many figures taken at a single sitting are, of necessity, formal and nearly destitute of artistic combination. In order to remedy this a method termed "double printing" has been adopted, by which process each individual figure is separately photographed and afterwards transferred to its destined place in the artistically-arranged group. This enables the photographer to exclude any single figure, which may prove unsatisfactory either in likeness, pose, or expression, or even in its relationship to the other members of the composition. So unwearied in his labours in this respect has Mr. McLachlan been, that he has not scrupled, in some instances, to repeat an otherwise excellent photograph upwards of a score of times, notwithstanding the enormous labour and expense in travelling about the country to which this conscientious self-denial has subjected him. The photographs were afterwards enlarged to their present size, and transferred by tracing to Mr. Arthur Hughes's canvas. The first extraordinary result which attracts the attention of the connoisseur is the astonishing fact that the picture, as a whole, does not remind him of any photographic action at all, except, perhaps, in the almost uniform excellence of the several likenesses and their marked individuality. To some extent this is undoubtedly due to Mr. Shields' admirable composition of the various groups, and the judicious foils and contrasts introduced. All this, however, might have proved abortive, had it not been for the indefatigable perseverance and true art feeling which Mr. McLachlan has brought to the task. It not only utterly casts into the shade all previous attempts at this class of photographic production, but, in spite of the mechanical and other difficulties attendant upon the experiment, it not only takes its place besides some of the very best purely artistic efforts at strict historical painting, but it completely eclipses nine-tenths of the works annually exhibited of this class. The ease of the pose

and characteristic expression and action of many of the figures, considering the means by which this has been achieved, are truly marvellous. Every figure appears to be mentally occupied, in some form or another, with the business of the meeting. In the centre group Major Egerton Leigh is addressing the chairman—the noble earl whose recent demise has called forth expressions of regret from all political parties on account of his many great qualities and the sacrifices he had made for what he considered to be the national interest; and, perhaps, no single act of his life will keep longer green in the garden of the nation's grateful memory than his pecuniary liberality, and, what was infinitely more valuable, his energetic personal labours on the executive committee which superintended the distribution of the funds raised by the national bounty for the sustenance of the compulsory unemployed operatives of Lancashire during the ever-memorable cotton famine. A number of well-known gentlemen listen attentively to the gallant Major's remarks, amongst whom is Lord Edward Howard, the expression of whose head is as earnest and sympathetic as it is artistic in effect and graceful in the pose. Towards the left is another group, with Mr. Wilson Patten as a central object, surrounded by a group of equally anxious listeners. The variety in the character and expression of this group is all that could be desired. Some of the figures are standing, including those of Lord Egerton and Mr. Hugh Mason. One difficulty of the most forminable kind Mr. McLachlan has grappled resolutely with and achieved success, and that is the perspective effect, both aërial and linear. The "keeping," as it is technically expressed, is, therefore, far in advance of anything that photography has hitherto produced, and to this fact much of the fine art character of the work may be ascribed.

Mr. McLachlan wisely determined that the finished oil picture by Mr. Hughes should not be executed in colours, but simply in black and white, his great object being to obtain photographic negatives of various sizes, from which he intends to print copies for publication by the autotype or carbon process, the proofs from which are regarded to be as permanent as those obtained from ordinary engravings. By this means each subscriber will obtain a *facsimile* of the work, which will resemble the finest mezzotint print, which would not have absolutely been the case had the picture been in colours. Besides, unless the gentlemen had all individually sat to the artist, the complexions could not have been truthfully depicted, while the prints would have seriously suffered. We can entertain no doubt that the exceptional merit of the work, the important national historic event which it so faithfully records, and the popular character of the gentlemen represented, will secure to our enterprising citizen such a subscription list as will amply reward him for his skill, taste, labour, and large pecuniary expenditure. It has been suggested that the oil picture now on view should be secured, by subscription, if necessary, for the new Town Hall. No doubt the character of the work, and the important local historical fact which it commemorates, would justify the Council in purchasing it at once. At any rate, its retention in the chief public building in the city, under any circumstances, is highly desirable.

HINTS TO SITTERS.

We are indebted to Mr. Turner, of Southport, for the following sensible hints, which we copy from a circular issued by that gentleman. The truth and good common sense displayed in Mr. Turner's suggestions will approve themselves to every professional photographer:—

Go early in the day, when you are fresh after the night's repose and the morning wash; before you have got fatigued by being busy or by doing nothing during the day; before you have met with some annoyance, which any person may meet with before afternoon, and which will, very likely, show on the countenance, and change the expression. Go early, when the photographer is fresh after a night's sound repose, and before he has met with some nervous, restless sitter or spoiled child to try his temper and patience; for, if the artist be in good humour, you will be more likely to have a pleasant expression than if the contrary be the case. Go also alone, or with one quiet friend, who will retire when the plate is being exposed. More depends upon this being attended to than is generally supposed. If you have a number of friends with you, or one laughing, giggling friend, who will keep you constantly laughing and talking, you will not get a good likeness, simply because they keep your nerves so excited that you cannot keep perfectly quiet, and the slightest movement destroys the expression of the eyes and of the whole countenance. Another reason is, when there is a number of friends in the studio the artist cannot arrange his blinds properly, as he cannot see how the light will fall upon the sitter, as some person is sure to be obstructing some of the lights, and he can only go by guess. The arrangement of the light is most important—in fact, the most important of the whole process, as no two persons almost will bear the same light. Some persons will bear much more light on the face than others; some will bear more side light, some require more top light; others require more front light, to give the proper expression to the face. Therefore, go alone, and give the artist fair play; and if he does not give you a good likeness, then blame him.

In dressing, remember that in photography blue is light, and red or orange is dark; and, therefore, the more blue anything contains the lighter it will be, and the more red or orange it contains the darker it will be. Thus, purple, violet, mauve, magenta will be light, because they contain a large proportion of blue; scarlet, brown, and olive-green will be dark, because they contain a large proportion of orange or red; blue-green or sea-green will be much lighter, because it contains a much larger proportion of blue. Another thing to be particularly observed is, that whatever reflects back light comes out white, such as the polish on boots, the gloss on silks, oil on the hair, &c.; hence black hair with much oil will come out as if grey.

Many err in supposing that sunshine is necessary when taking photographs, as good *cartes* can be got even when raining.

Contemporary Press.

MR. MUNGO PONTON ON THE ACTION OF LIGHT IN PHOTOGRAPHY.

[Engineer.]

To explain the action of light in photography on mechanical principles, in conformity with the undulatory theory, it is needful to dive a little deeply into considerations respecting the intimate constitution of material bodies in general. To account for the various complex phenomena which these present, as exhibited in chemical affinity, electricity, magnetism, &c., it is requisite to make certain assumptions, which, however, must be viewed simply as such.

Let it be assumed, then, that there are four sorts of matter—two exerting an attractive, and two a repulsive force. Let the two former be distinguished by the letters A and B—the two latter by the letters X and Y. Let their relations be expressed thus:—Every one portion of A attracts every other portion of A, and every one portion of B attracts every other portion of B, but the attraction of A for B is stronger than that of A for A, or of B for B.

In like manner, every one portion of X repels every other portion of X, and every one portion of Y repels every other portion of Y; while the force with which X repels Y is the same as that with which X repels X, and Y repels Y. On the other hand, the repulsion between A and X is assumed to be stronger than that between A and Y; while the repulsion between B and Y is stronger than that between B and X.

Every chemical atom may be regarded as consisting of both A and B associated in very different proportions, but united by an attraction so powerful that they cannot be separated. In every combustible A is supposed to be in excess, in every supporter of combustion B is supposed to be in excess. Thus in any atom of silver A will predominate over B; in any matter of iodine B will predominate over A. These two species are assumed to be in each case so disposed that there are certain poles both of A and B; but in the silver atoms the A poles will be more numerous and powerful than the B poles, while in the iodine atoms the case will be the reverse.

The luminiferous ether is assumed to consist of an intimate mixture of X and Y—constituting a perfectly elastic medium, which, mechanically considered, will be the same as if it consisted of one species of matter only. The force of repulsion by which any portion of this medium when disturbed is restored to rest must be almost inconceivably great. If we regard the force by which any portion of atmospheric air, when disturbed by a sonorous wave, is restored to rest, to be gravity alone, then by comparing the velocity of sound in air with that of light in the ether we obtain a measure of the forces by which the restoration to rest is effected in these two cases, the forces being to each other as the squares of the velocities. Now the speed of light in the ether is upwards of a million times greater than that of sound in the air; so that the force by which the disturbed ether is restored to rest is upwards of a billion times greater than that by which atmospheric air is restored to rest after being agitated by waves of sound. On the same principle it may be concluded that the repulsive force existing in the ether is between three and four thousand million times greater than the force of cohesion in iron. It is, therefore, to be expected that when the agitated ether is brought into relation with the chemical atoms there will be a great amount of force called into play.

From the relations above indicated it will follow that when chemical atoms are introduced into any portion of the ethereal medium they will effect a slight decomposition. The Y matter will be in excess at every A pole, and the X matter at every B pole. Hence, in the atmosphere of ether surrounding the atom of any combustible element, such as silver, the Y species of ether will predominate, while in the ethereal atmosphere surrounding the atom of any supporter of combustion, such as iodine, the X species of ether will be in excess; but there will always be a tendency to effect an equilibrium between these two.

In such a substance as iodide of silver there will be a strong attraction between some A pole of each atom of silver and some B pole of each atom of iodine, in virtue of which these two will be held in close proximity, so as virtually to constitute a compound atom or molecule of iodide of silver. They will not, however, be in absolute contact,

but will be separated by a layer of highly-compressed ether. In this intervening layer of ether the Y species will be in excess close to the A pole of the silver, and the X species will be in excess close to the B pole of the iodine, while midway between the two X and Y will be intermingled in equal proportions. Between the molecules of iodide of silver, again, the intervening spaces will be larger, the ether less highly compressed, and the mixture of X and Y will be in equal proportions, as in the general medium.

In the dark, and at moderate temperatures, the molecules of iodide of silver will vibrate gently to and fro, being urged by those slow invisible undulations of the ether intermingled among them which constitute heat. But when the quicker luminous undulations are introduced into the ether, in which the molecules of iodide of silver are at any given moment enveloped, a different and additional effect is produced. A vibration is set up between each atom of silver and its corresponding atom of iodine, which constitutes the molecule of iodide of silver. Owing to the great proximity of the silver atom to the iodine atom the vibrations between them can have but a very small amplitude intervening, consequently their natural rate of vibration must be extremely rapid. Hence their vibrations can be synchronous only with the more rapid of the luminous vibrations, namely, those at the violet end of the spectrum. It is, accordingly, only these last that can originate the minute vibrations between the iodine and the silver; but these, when once established, may be sympathetically prolonged by undulations which are double their length and half their period, as are those at the red end of the spectrum. Thus, supposing the atom of silver to be set vibrating against the atom of iodine by the violet waves at the rate of 800 billion times in a second, every alternate vibration might receive a fresh impulse from luminous vibrations at the rate of 400 billions in a second. This consideration explains why it is that the red waves, although unable to establish the photographic action, are yet able to continue it after it has once been commenced by the action of the violet waves.

In order to explain how these minute vibrations established between the silver and iodine atoms should tend to favour their ultimate separation, it is needful to consider the state of the ether between them. Let the diagonal lines sloping upwards from left to right represent the A species of matter, diagonal lines sloping upwards from right to left the B species, the horizontal lines the X species, the vertical lines the Y species, while the intermixture of X and Y constituting the general ethereal medium is represented by the cross hatching. Then the point of attraction between the A pole of the silver atom and the B pole of the iodine atom may be represented thus:—As A and B will alternately approach and recede, the tendency of the vibration will be to promote the intermixture of the peculiar atmospheres X and Y, and so restore the equilibrium. After the vibratory action has been continued a certain length of time, it may be assumed that the intermixture will be rendered complete, when there will remain between A and B nothing but the compressed ether in its normal state. The effect of this will be to remove A and B a little farther asunder, and so to weaken the attraction between them. For A will no longer be in immediate proximity with Y alone, for which it has the least repulsion, while B will no longer be in immediate proximity with X alone, for which it has the least repulsion; so that both will be acted upon by a greater amount of repulsive force than before, counteracting to a greater extent the mutual attraction between A and B.

These effects being kept in view, two cases of photographic action present themselves for explanation—that of the moist and that of the dry collodion film. In the former, the vibratory action between the silver and iodine atoms, composing each molecule of iodide of silver, may be supposed to continue for a considerable time after the stimulus of the light is removed, like the thermal vibrations in the case of a body which is slowly cooling. When the developer is applied during the subsistence of these after-vibrations its action will be promoted by the motion; because, at alternate intervals, the attraction between the iodine and the silver is weakened, and the moment of greatest weakness is taken advantage of by the developer to effect their separation. If the application of the developer be too long delayed the motion becomes more and more languid, the A and B poles gradually regain their atmospheres of Y and X respectively, and all things return to the state in which they were before the action of the light began. Hence the developer fails to effect the decomposition after a time.

In the dry collodion film, again, it is more difficult to establish the vibratory motion between the silver and iodine atoms, composing the molecule of iodide of silver, by reason of the rigidity of the film—a difficulty evidenced by the longer exposure to the action of light found requisite. For the same reason, it is probable that the moment the action of the light ceases the vibrations are instantly stopped. Now the general tendency of the vibrations has been, as already explained, to widen the interval between A and B, and so to weaken their mutual attraction. Hence, when the vibrations suddenly cease, a large number of the atoms will be arrested, while their separation is greater than what it was before the light began to act. This condition of increased separation may be preserved for a very long time, owing to the hindrance to motion presented by the dryness and rigidity of the film. Hence it is that, in the case of the dry film, the developer will act at a very long interval after the exposure to light. The attraction between the iodine and the silver has been permanently weakened, owing to their poles having been suddenly arrested in positions further asunder than they are in the normal iodide.

The action of ozone in preventing the decomposition of the iodide of silver by means of a developer, after exposure to light, is in all likelihood purely chemical. The ozone probably unites with the iodine, and these two, by their combined attraction, may retain the silver with a force too powerful for the developer to overcome. The prolonged action of ozone might, nevertheless, cause a separation of part of the silver in the form of oxide, as probably happens in the experiments of M. Niepce.

CADMIUM AND ITS USES.

[Scientific American.]

Seven cities dispute the right of having given birth to the immortal Homer, and seven men claim the honour of having discovered cadmium. A learned German has tried to show that Homer was a myth. Cadmium was named after the mythical *cadmia*, but is, nevertheless, a reality.

It was in 1818, just fifty years ago, that the attention of chemists was called to some samples of zinc that were sold for medicinal purposes; they gave, when in solution, a suspiciously yellow colour with sulphuretted hydrogen, and hence were condemned as containing arsenic. A number of chemists were furnished with specimens for examination, and several of them got on track of a new metal at the same time.

Frederick Stromeyer, who was born in Gœttingen, in 1778, and was for many years professor of chemistry at the University in his native city, until his death in 1835, was the first to publish a full account of investigations into the properties of the new substance in September, 1818, and he gave to the metal the name of cadmium.

Karsten simultaneously proposed to call it melinium, from the quince-yellow colour of one of its compounds; Gilbert gave it the name of junonium, from the planet Juno, and John christened it klaprothium, after a famous chemist; but all of these strange appellations have been eliminated from our nomenclature, and cadmium is the only one recognised in modern times.

The discovery of cadmium forms an era in the line of scientific research. It was the first metal found in a compound and not in an ore, and it could not have been detected until chemical analysis had reached an advanced state of accuracy. Traces of it were soon found in zinc ores, but it was not until after the lapse of twenty years from the time of Stromeyer's publication, that an ore of cadmium was discovered. Lord Greenock, at that time, described a mineral which had been picked up on his estate, and which proved to be a cadmium blende, analogous to zinc blende, or to galena. The new ore was called greenockite, and since that time it has been found in various localities; it is, however, a very rare mineral.

For commercial purposes we obtain the metal from zinc ores and furnace deposits. By subjecting zinc to downward distillation the first portions that come over often contain cadmium. The pure metal is obtained by dissolving the regulus in sulphuric acid, and converting it into a sulphide by means of sulphuretted hydrogen, then redissolving and reprecipitating by carbonate of ammonia, and reducing with a proper flux. As thus obtained it is a white, soft, malleable, ductile metal, eight and one-half times heavier than water. It leaves a mark upon paper the same as lead, and when bent gives out a creaking sound similar to that known as the "tin cry." It can be distilled the same as zinc, but, unlike zinc, when it is set on fire and burns it gives a brown oxide. It sometimes happens that zinc-white is contaminated by this brown powder and rendered worthless as a paint. Cadmium melts at about 440° Fahrenheit, and, when alloyed with other metals, causes them to fuse at a lower temperature; a very little of it renders copper very brittle. Seventy-eight parts of cadmium and twenty-two parts of mercury was, for a long time, used for plugging teeth; but, as the amalgam oxidises easily and turns yellow, and the mercury proves injurious to health, this application is pretty much abandoned. Mr. Abel has proposed an alloy for jewellers' use which is said to be very malleable and ductile and to possess a fine colour. It is composed of 750 parts of gold, 166 parts of silver, and 84 parts of cadmium. We had occasion, when giving an account of the properties of bismuth, to speak of the very fusible alloys composed of bismuth, tin, lead, and cadmium; they melt at a point much lower than cadmium itself.

It is as a yellow paint that cadmium compounds are the most highly prized. By mixing a solution of gum arabic, chloride of cadmium, and hyposulphite of soda together we obtain a fine yellow paint, which is one of the most durable known to artists. There are other ways of making it, and the purity of colour depends very much upon the absence of metals that turn black when mixed with sulphur, and the care with which it is dried. The very property that led to the condemnation of zinc-white, and which ultimately brought about its discovery, is the yellow colour, now most frequently turned to valuable account.

The keeping properties of the collodion, made sensitive by the iodide and bromide of cadmium, have made these salts great favourites with photographers, and a new use for cadmium has sprung up of late years in this direction.

Manufacturers are getting more into the habit of saving the furnace and flue dust of zinc works, and of separating the cadmium from them, and in this way the supply of the metal is increasing. Salts of cadmium find application in medicine. The sulphate is applied to the eyes to remove specks from the cornea, the nitrate produces violent vomiting and purging, and, in general, when taken internally, the salts can only be employed in very small doses, as recent experiments of M. Marme have shown them to be violent poisons. The best antidote is the carbonate of soda and the white of an egg.

The following mixture burns with a brilliant white flame, surrounded by a magnificent blue border:—Saltpetre, 20 parts; sulphur, 5 parts; sulphide of cadmium, 4 parts; lampblack, 1 part.

This can be moistened and made up into balls or candles, and ignited after the manner of a fuse.

We have thus given the history and prominent applications of the rare metal, cadmium. C. A. Joy.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 9th	Society of London	9, Conduit-street.
,, 11th	South London	City of London College.
,, 11th	Manchester	Memorial Hall, Albert-square.
,, 11th	Pho. Sec. Lit. & Ph. Soc., Man.	Rooms, 36, George-street.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held on Tuesday evening, the 26th October, at the Free Library and Museum, William Brown-street,—the President, Mr. O. R. Green, occupying the chair.

The minutes of the former meeting were read and passed.

A number of prints and transparencies, produced by the under-mentioned gentlemen, were exhibited:—Fifteen by Mr. Wade, of Manchester, by the collodio-albumen process; shown by the Chairman. Two dozen stereo. prints and some beautiful transparent enlargements by Mr. Hughes—one of the group taken on the occasion of the trip on the Weaver being remarkably successful; also a microscopic enlargement of a flea. Mr. Tyrer exhibited the results of his first year's work with the collodio-bromide process, which were much admired for their excellence. Mr. Roberts showed eighteen prints on Durand's paper. Mr. Murray also produced some printed in the same way, and some economical book mounts for photographs. A print was exhibited of a spider's web spangled with dew, which had been taken at the suggestion of Mr. Watling.

Mr. J. A. Forrest next read a short paper *On the Fading of Photographic Prints*, illustrated by numerous specimens, and said that he had prints in his possession twenty years' old. Those printed by the ordinary process were, without exception, faded; those by development were as good as on the day they were finished. Some years ago he had called attention to the fact that if paper was first coated with caseine, and afterwards with albumen, sensitised and exposed, the film separated from it when placed in the hyposulphite solution; that in this state it could easily be transferred to enamel paper or opal glass, and decay from the action of the hypo. avoided. He showed three specimens on opal glass, which had been left to the action of the light for six years, but did not exhibit any signs of fading. Mr. Forrest added that Mr. Thomas Higgin had this year shown him some specimens of plain paper coated with collodio-bromide, which would enable amateurs to print by artificial light, developing in the same manner as transparencies, by the alkaline process, and toning with gold. Two specimens were exhibited produced by exposure for thirty seconds to the light of an ordinary gas burner. In these remarks he did not shut out of view the many modifications of the carbon process, which at present were scarcely suited to an amateur.

Mr. Bell said that he possessed prints produced by development that had faded as much as sun prints.

Mr. Wilson thought a well-toned silver print would last as long as a developed one.

Mr. Green did not think a silver print as permanent, and recommended that the water marks of the papers should be examined carefully to ascertain whether any defect in the durability of the pictures was caused by a difference in the size used by the manufacturers.

Mr. Henderson, having noticed that some sulphur-toned prints had remained almost unchanged whilst others had faded, wished to know whether the cause could be ascertained.

Mr. Williams stated that he had some prints eighteen years old that had received their final washing in boiling water, and then had remained good till the present time.

A vote of thanks was passed to Mr. Forrest for his paper, which had given rise to a discussion of such consequence.

The members then adjourned to the lecture hall, where, for an hour and a-half, Mr. J. Williams, jun., exhibited, by the oxyhydrogen light, a highly-interesting series of slides, very many from negatives of his own production, and many from the collections of the following publishers:—Picked specimens of Messrs. Stuart, Pumphrey Brothers, Woodbury, and others. They comprised landscapes, architecture, animals taken from life, &c.

At the conclusion of this prolonged and successful exhibition, a hearty vote of thanks was passed to Mr. Williams, and the meeting separated.

OLDHAM PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday evening, the 28th ult., at the Hare and Hounds Inn,—Mr. J. Green in the chair.

It was expected that Mr. Kay, of Bolton, would have been present with further examples of his new photolithographic process, but a telegram arrived during the evening stating his inability to attend.

Mr. Beverley then passed round for examination some beautiful pictures which had been produced by the same process as those shown by Mr. Kay at the previous meeting.

It was stated that several members had been experimenting in the same direction, but, from want of time and for other reasons, they had not been able to have them ready for exhibition at the meeting. It is anticipated that the next meeting will prove a very interesting and attractive one.

A spirited discussion then took place respecting the prizes offered for the most meritorious photograph of any subject taken during the present year.

It was moved by Mr. G. Hall, seconded by Mr. Beverley, that, considering the present state of the Society's funds, and the inclemency of the season, the prizes be withdrawn for twelve months. An amendment was moved by Mr. Given, seconded by Mr. Andrew, that the original motion stand good. Upon its being put to the vote, the motion was declared to be carried.

It was then decided that, in conjunction with the annual *soirée* to be held on the 31st December, an exhibition of photographs be held, and that a special committee be appointed to make the necessary arrangements, and to invite the respective societies and leading photographers to contribute pictures for that purpose.

A vote of thanks was accorded to Mr. Beverley, and the Secretary was instructed to express the same to Mr. Kay.

The business of the evening shortly afterwards terminated.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A meeting of this Society was held on the 8th ult.,—M. Chas. Teisseire in the chair.

The Secretary laid before the meeting a pamphlet (in Italian) by Sig. S. Borlinetto, of Padua, on permanent photographs, which it was proposed should be reviewed and reported upon at the next meeting. Carbon photography, it was stated, had many warm partisans in Italy, and an important work thereon had already been received from M. Montagna, of Florence. The Secretary also exhibited specimens of albumenised paper from M. Mayer, of Paris, which were examined with much interest, and samples were distributed amongst the members. He (the Secretary) laid before the meeting a copy of the initiatory catalogue of gelatino-carbonised paper and albumenised paper, coagulated by vapour, sent by M. Marion.

Letters were read explanatory of the nature and object of the foregoing.

The coloured composition of the paper was stated to have been prepared on this occasion with a particular gelatine sold in the trade under the name of "grenetine," the purity of which and its solubility in warm water were said to recommend its employment in preference to any other quality of gelatine.

The Chairman remarked that he had already made experiments with the material, which he considered possessed great superiority; and he complimented M. Marion on the determination he had expressed not to employ any other in his composition. He would thus save to operators in the carbon process the uncertainty which resulted from the employment of compositions made with other gelatines possessing different properties, the evil of which consisted principally in a variable and often very imperfect solubility in warm water.

M. Vidal also expressed the satisfaction he experienced at finding M. Marion had taken this course, in spite of the rarity and consequent dearness of grenetine. It was most desirable that this method of printing should be generally adopted, and that object could only be effected when operators were furnished with reliable materials, capable of giving products of real artistic value. M. Marion, he said, appeared to have thoroughly understood the importance of this, as he had never ceased making new efforts to improve the preparation of his composite papers. In France they were indebted to him, and him alone, for the practice of the carbon process of photography.

The Chairman announced that, according to the order of the day, the meeting would then become entirely experimental, and that he was going to show, in actual practice, the employment of the papers presented by M. Marion. Without further delay, and all being prepared for the purpose, he gave a practical description, which he accompanied

by experiments, in support of the method of printing carbon proofs, a detailed account of which has already been published in THE BRITISH JOURNAL OF PHOTOGRAPHY. All the different phases of the operation were followed with the most lively interest by the meeting up to the final removal of the image transferred from the unpolished glass to the sheet of paper intended for its permanent support. The mixture employed in these experiments contained grenetine.

M. VIDAL also showed the employment of paper covered with coagulated albumen for printing direct, without recourse to any transferring vehicle. This method is similar to that of the transfer upon glass, and it constitutes a very important improvement in connection with M. Marion. The impressed composition is immersed in water at the same time with a sheet of coagulated albumen paper a little larger. When the two sheets are taken out of the water, and as soon as the composite paper is well stretched, the albumen is placed upon the composition and pressed between sheets of blotting-paper, in order to get rid of the excess of liquid and dry the two exterior surfaces. The effect produced is similar to that of a transfer upon glass, metal, or any such surface. It is left to dry spontaneously for about half-an-hour, after which it is immersed in a basin containing water at about thirty to thirty-five degrees, the composition side uppermost. After the lapse of ten minutes or thereabouts, the gelatine will be sufficiently softened to admit of the two sheets being easily separated. The composition is then removed, leaving the image on the albumen surface. Owing to the great solubility of the grenetine, all excess of black is removed, and the image remains with all its tones. When the weather is suitable for exposing, an over-exposure is preferable to the reverse; as in the latter case there is no remedy, whilst a proof that has been over-exposed may, with the aid of hot water, be brought to the proper condition. The last operation is to plunge the proof, after it has been washed in cold water, in a bath of alum at three per cent., and afterwards in cold water by two successive washings. It is then left to dry. Such is a *resumé* of the new method of operating indicated by M. Marion. The experiment succeeded very well, and those who witnessed it could not but admire its simplicity, against which there is only one serious drawback, and that is the reversion of the image. This is a real difficulty in the reproduction of buildings and engravings, and M. Marion is very laudably endeavouring to complete the system by the employment of pellicular negatives, which, like the wax paper negatives, may be treated on the one side or the other. This important question is yet undecided, and it is much to be desired that a happy solution of the problem may be the result of the attempts made in that direction.

M. VIDAL showed some proofs of pellicular *clichés* which M. Marion had forwarded to him. They gave evidence that the object desired had been almost attained, and that a few further experiments would certainly lead thereto. He (M. Vidal) wished to be allowed to point out a modification which he thought should be made in this last method of M. Marion's. The albumenised paper did not please him, and he advised its being replaced by paper covered with gelatine rendered insoluble by alum. The process thus modified is only the more perfect. The insoluble gelatine succeeded admirably, and more artistic effects were obtained by means of it—proofs on a mat surface being more agreeable than images with shining surfaces, which were only pleasing in *cartes* or small proofs in general. The retouching on gelatine paper was exceedingly easy, whilst the albumen presented a greasy surface which was much less favourable. Lastly, the process, as a whole, was more homogeneous, as there were only two layers altogether —the paper on the one hand and the gelatine on the other. The whites were less liable to turn yellow, which, at the end of a certain time, made the proofs on albumenised paper look so disagreeable. In all these points of view M. Vidal said the fixed gelatine appeared to merit the preference over coagulated albumen; this, however, should not exclude the latter in cases where it might be useful. The firm of Marion might place at the disposal of the photographic community vehicles of both kinds, particularly by changing them according to the tints, as there was no reason why proofs should always be printed on white paper. The half-tinted, grey, yellow, blue, and rose admitted of delicious artistic effects, particularly in the reproduction of landscapes and monuments. On paper a little grained the shining produced by the thick black disappeared, or nearly so, and images were obtained which would compare with the most remarkable black pencil or sepia drawings, according to the nature of the composition. *Apropos* of the shining exhibited by smooth papers in the parts most thickly gelatined, he (M. Vidal) pointed out means by which this was made to disappear, and how a proof could be obtained similar to those on unpolished glass. The process, he said, was very simple:—After treating finally with alum, and the complete desiccation of the image obtained on paper, according to M. Marion, it is again put to soak until the paper is well distended, when it is applied in water upon an unpolished glass previously treated with stearine, all air-bubbles being thus avoided. The excess of liquid is got rid of by pressing it on blotting-paper, and it is then left to dry. The image, shining as it did, has now become dull, its surface is moulded on the unpolished glass, and, during desiccation, the reliefs of the gelatine are marked on the exterior of the vehicle. There is no trouble in separating the two surfaces after the paper has become dry.

M. VIDAL also desired to communicate to the meeting the result of his last observations. He said he had remarked that in cold weather the coloured gelatine would bear a larger quantity of bichromate of potash. He had not been enabled to obtain perfect images on grenetine paper with one and a-half per cent. of the bichromate, except by prolonging the exposure considerably, and he had found it necessary to strengthen the bath up to five per cent., in order to obtain the maximum of value in the shortest time. In general, he had remarked that the sensitising bath required to be stronger for the smallest quantities of colouring matter. This showed the necessity of sensitising in baths of different strengths, the compositions containing two, two and a-half, and three per cent. of colouring matter. Thus one and a-half per cent. of bichromate of potash would suffice for a composition with three per cent. of ordinary gelatine; but with two per cent. of grenetine there was no danger in using a bath of five per cent. The length of time during which the composition should be immersed, he (M. Vidal) said, was three minutes in summer time; but, as in cold weather the composition paper was slower in distending itself, in the winter it should be six minutes. In the process on unpolished glass it had been said that it was necessary to gelatinise the proof after its development by hot water, and washing it to remove all trace of colouring matter deposed from the image by the dissolving of the gelatine. This gelatinising was important in order to avoid gloss in the half-tints, and also to prevent a too rapid desiccation causing the layer bearing the image to tear in its spontaneous separation from the unpolished glass. With regard to the latter, it was well to be careful not to press upon the proof for the purpose of giving it a supplementary layer of gelatine—a mixture of sugar, water, and gelatine, at a higher temperature than thirty-five to forty degrees—otherwise, from its strong construction, it might tear and destroy the image.

M. VIDAL announced that his new pamphlet, which was then finished, contained particulars of all the most recent suggestions and practical applications such as had been demonstrated experimentally. It was an indispensable appendix to his former treatise.

The Chairman presented a remarkable collection of carbon proofs, which were a striking confirmation of what had been said of that process. They were the objects of universal admiration in every point of view.

The Chairman and MM. Jacquemet and Vidal offered their services to those of their colleagues who might feel disposed to commence carbon printing, so that their first attempts might be properly directed.

The CHAIRMAN said that the object of the Photographic Society of Marseilles was to neglect nothing in their efforts for the propagation of stable processes. They would strive resolutely against the continuance of silver printing. The Society considered the most important desideratum in the art of photography was the encouragement of printing by the carbon process or helio-engraving.

The meeting was then adjourned.

ALBUMEN UNDER A NEW ASPECT.—Strange accounts are given of the healing properties of a new oil, which is easily made from the yolks of eggs, and is said to be much employed by the German colonists of South Russia, as a means of curing cuts, bruises, scratches, &c. The eggs are boiled hard, the yolks removed and crushed, and then placed over a fire and stirred carefully until the whole substance is on the point of catching fire, when the oil separates and may be poured off. Hen-eggs are considered the best, and nearly two teaspoonfuls of oil may be gained from a single yolk.

SURVEYING BY PHOTOGRAPHY.—Herr Meydenbauer, a Berlin photographer, has recently measured distances and drawn out plans and maps by photography. With much trouble he succeeded in convincing the Prussian Government of the correctness of his theories, and was commissioned to survey a fortification. The task was beset with innumerable difficulties, which, for the most part, sprung from the defective nature of the instrument. In six months, however, he had succeeded in obtaining 800 plates, and, in doing so, had gained invaluable experience, so that he met with no great difficulty in completing a photogrammetric instrument of such simplicity that a workman quite unacquainted with the art was able to draw up a special plan of a fortress on the scale of 1 to 2,500 after a few short instructions.

DISTRESSING DEATH IN THE HOUSE OF A PHOTOGRAPHER.—Mr. Favell, the coroner for North Durham, held an inquest at Gateshead, on Monday, on the body of Emily Skelton, 13 years of age, daughter of a photographer residing in that town, who had been accidentally shot by her brother, William Skelton, 10 years of age, on Friday last. The father of the children had been in the habit of keeping a loaded pistol between the mattress and the bed in the sleeping apartment, and the mother, in doing up the bed on Friday, had taken the pistol and had placed it on the window-sill. The little boy, unknown to his mother, had come into the room and removed the pistol into the kitchen, and, not knowing that it was charged, he pulled the trigger and it went off, and the result was that he shot his sister, who was employed looking after some domestic matters. The charge took effect in the region of the heart, and, though the best surgical assistance was called in, the poor little girl sank and died on Sunday, forgiving Willie before she expired. As the unfortunate affair was purely accidental, a verdict to that effect was returned; at the same time the father was admonished not to keep loaded weapons about the house.

Correspondence.

Foreign.

Paris, November 2, 1869.

"Our library table" requires clearing of a few matters which have been upon it for some time. The latest arrival is the complete initiatory catalogue of M. A. Marion, about one hundred pages of which are taken up with descriptions of processes for the production of photographs—notably the carbon process in its many forms—and the rest is devoted to a price list of every article named in the foregoing one hundred pages. The catalogue, pure and simple, is offered to the public for nothing, but if the processes are required the moderate sum of one franc must be paid. This kind of book is not unknown in England, as is shown by the numerous "text books," "manuals," "guides," &c., published by various dealers in photographic articles. I have only to occupy myself with the photographic section, and only that part of it which I have not already brought under the notice of your readers, for some of the descriptions of processes have been published months ago, and duly noted by me. The arrangement of the carbon process proposed by Mr. Johnson is favourably noticed, and is stated to have been practised with success by M. Leon Vidal, of Marseilles. M. Marion remarks upon this process:—"Thanks to this mode of operation being so simple, the question of printing portraits (in carbon) is now entirely resolved, and there is no photographer, how little clever, who, after a few trials, will not be able to deliver to the public photographic portraits in carbon fron the *carte* size up to the enlarged. This is our profound conviction."

In connection with this subject a writer in the *Moniteur Scientifique* remarks:—"One had good right to be astonished that at the time of the communication of M. Andra to the French Photographic Society of a process identical with that proposed by Mr. Johnson, no one rose to observe that, for two or three months previously, this process (Johnson's) had been a subject for the English photographic journals." The writer thinks it a curious coincidence that two persons quite independent of each other should undertake a series of researches resulting in the same thing.

There is an important note respecting the use of gelatine in the carbon process, which I must not overlook in M. Marion's work. He says that there is a great difference in the gelatine of commerce when tested by the requirements of the carbon processes. In a batch from one house or one maker some will be found to give good results, and other portions will afford nothing but inferior pictures. M. Marion now affirms, as the result of very numerous experiments, that the substance sold as *grenetine* is the very best for the carbon processes. I may mention that my own observations in another direction lead me to confirm this opinion.

M. Edmond Martin, of Paris, has published an ingenious suggestion for photographing telegraphic messages! At first sight this looks a rather difficult operation; but when we remember that the variations of the magnetic needle are registered by day and night at Kew by means of photography, the photographing of telegrams assumes a less difficult aspect. The arrangement adopted at the Kew Observatory has been so well described in these pages that I need not attempt to give M. Martin's account of his disposition of the telegraphic apparatus for producing photographs of the message transmitted by it, further than to say that the vibrating telegraph needle is used to interrupt the light of a powerful source from falling upon a sensitive surface through a fine slit or diaphragm. Thus, when the needle and diaphragm coincide, no light passes; when they are opposed to each other light passes, and an impression is produced. The light proposed is the electric light concentrated by a mirror when the sun cannot be utilised. The paper to receive the impressions must be of considerable sensitiveness, and is rolled upon a cylinder like those used in the Morse telegraph.

This reminds me of a paragraph which came under my notice a short time since, describing an experiment of a "sensational" character performed by an American professor. He was lecturing to his audience upon the pulse, its variations, qualities, &c., and to illustrate his subject he projected upon a screen the pulsations of an hospital patient some fourteen miles away! This would be accomplished by a sphymograph, I suppose, in connection with an electric magnetic arrangement and telegraph wires. The pulsations of the patient would be recorded by the sphymograph which was attached to his wrist, the "writing" produced by this instrument would be received upon a proper surface, and transmitted through the wires to the lecturer, as autograph messages are sent by telegraph. The lecturer would have a proper apparatus for receiving these pulsation messages, and the transmitted movements could be readily projected on the screen by an electric lamp.

Your readers may remember that their attention has been frequently solicited to the *planchette photographique* of the late M. Auguste Chevalier. An account is now going the round of the scientific journals of a piece of apparatus brought out by Herr Meydenbauer, of Berlin, which accomplishes no more than that brought to perfection by M. Chevalier. Honour to whom honour is due. M. Chevalier lost his life in experimenting with his apparatus and demonstrating its utility to the Government, whose officers have reported so favourably upon it, and now his widow is endeavouring to carry on the work of her husband, namely, to introduce this *planchette photographique* to all to whom it will render immense services. If, after all this, the credit of these labours endured and this life lost be forgotten, and the profit and honour be conferred upon another, it will be one proof more that the real inventors do not reap the reward of their own inventions; they work for others and not for themselves. Still, as far as the readers of this Journal are concerned, I hope we shall not forget the claims of the late M. Auguste Chevalier as the inventor and perfector of the best apparatus for surveying by means of photography.

M. Hofman, the celebrated maker of prisms, &c., of Paris, has recently produced a new polarising and analysing prism. Since the introduction of this class of prism, in 1839, by Professor Nicol, of Edinburgh, many attempts have been made to modify it with a view to increase its field, diminish its length, &c., and the recent researches of M. Jamin have been recorded in these pages. M. Hofman has succeeded in doing away with the cementing matter which joined the two pieces of matter constituting Nicol's prism, and he has also diminished the length of the prism by one-half; its bases, also, are perpendicular to its axis. This prism, it is said, will replace, in a great number of apparatus, the achromatised tourmaline, and will be the best polariser known.

I should think—at least I hope—that the question whether solution of sulphate of quinine is opaque to actinic radiations will be for ever set at rest by the exhaustive experiments of Mr. Spiller, given in your last number. Yet it is curious to observe how the statement that such a solution *is* opaque has been again and again repeated since Robert Hunt's conclusive experiment in 1853.

I have not seen the following information recorded before:—Five hundred pounds of manganate of soda furnish two and a-half cubic yards of oxygen every hour. This charge is placed in a retort, and superheated steam passed over it; in *five minutes* all the oxygen is extracted from this quantity of the salt. Hot air passed over this residue for *five more minutes* restores all the oxygen given up, and the result of an hour's continuous work, or six extractions of oxygen and six re-oxidations, is two and a-half cubic yards of oxygen. This oxygen, when it issues from the gasometers, contains about fifteen per cent. of nitrogen, but, by letting the first portions escape, the quantity of this mixture can be reduced to two and a-half per cent. M. Tessie du Mothay affirms that one ton of manganate of soda will yield one hundred cubic yards of oxygen daily, or more than 36,000 per year, *and this without having to renew the salt once.* R. J. Fowler.

Home.

PHOTO-ETCHING.

To the Editors.

Gentlemen,—Have you made any progress in producing a suitable photographic picture on copper plates already prepared in the usual manner for etching?

Excuse my saying that the process described in your Journal, No. 437, Sept. 18, 1868, is rather roundabout, considering that a beautiful silver picture is obtained by using the ordinary collodion positive process, taking care to cover the edges and back of the copper plate, as well as the front, with the etching composition. But any process wherein collodion is the "medium" is unsuitable, inasmuch as the collodion is liable to tear in a variety of ways, and takes the etching-ground with it as soon as you apply the etching needle; and, at best, a stroke is produced much wider than is intended.

I use the etching-ground sold by Mr. Fenn, of Newgate-street, London, which, of course, is of a pitchy-waxy-asphalty non-absorbent nature, and I black the ground with the smoke of wax tapers.

The next thing required is a picture upon this surface—a powdery deposit of some sort, and of a colour that will contrast with the black ground—say white, red, or yellow; and I prefer to take the picture direct from nature by the aid of the camera, for then I have it wrong way about upon the plate. As the composition, however, resists most photographic mixtures, a "medium" is required, as a substitute for collodion or paper, that will not offer any resistance to the etching needle. If waxed paper be made to take the solutions, I should think waxed copper might be.

White of egg brushed over seems to be a good medium; but on turning to the albumen process described at page 25 of your Almanac for 1866, I find that a spirit-lamp is necessary, which would so harden the albumen as to make it chip under the needle.

In looking over the various photographic processes, old and new, I am lost for the necessary chemical knowledge requisite to know the quality of the image produced by the several systems, and the mode of procedure in substituting one thing for another, under the altered circumstances of utilising any process to suit copper plates. For instance: suppose I wished to substitute albumen for collodion, I don't know what part the pyroxyline plays, nor whether the same iodising process would produce similar results.

If pure silver could be deposited on the etching ground by any of the processes mentioned in your ALMANAC for 1866, pages 81 to 84, I could produce a Daguerreotype, as I am fully equipped with iodising box and mercury box, but I want something more simple, and the heat necessary for vapourising the mercury would probably be too hot for the varnish.

In No. 223, August 12th, 1864, you publish a modification of Obernetter's printing process without silver. The picture formed, in the first instance, is composed of an insoluble white powder, which is turned red with a solution of ferrocyanide of potassium. Either of these colours would be just the thing that is wanted on a black ground, but, then, there are such compounds as sesquichlorides, with certain specific gravity, and sulphocyanides, which would require to be put into plainer English to be at all intelligible to me, and I should require also the quantities to be stated in weights and measures. The process is said to be based on the employment of paper *saturated* with chloride of iron and copper, and that is just where the difficulty again arises. I find that solutions applicable to paper usually crystallise on a hard surface. It is so with bichromate of potash, described in No. 381. I have not tried it with nitrate of mercury, as proposed by M. Guardbassi in No. 380, because, being very awkward at these things, and not unfrequently taking up the wrong bottle and spoiling my solutions, I might accidently make something which would blow myself up.

There is Mr. Willis's aniline process, described in No. 306, March 16, 1866, where you say that the developed print can be changed to almost any tone desired.

Can you modify any of the above processes so as to be applicable to the etching ground? The end, if successful, would be worth many experiments. Our woods and parks are now in their best attire for reproduction by the art of etching; but I want to produce some faithful sketches of various scenes by the aid of photography, to employ the long winter nights in etching on copper.—I am, yours, &c., H. L.

New Ferry, November 1, 1869.

ADHESION OF PRINTS TO THE MOUNT.

To the EDITORS.

GENTLEMEN,—On obtaining some new tinted mounts lately I found that the photographs mounted with starch peeled off when dry. A few drops of ammonia added to the starch when made prevented their doing so. Would this be likely to affect the permanency of the photograph?—I am, yours, &c., PHOTO. MOUNTER.

Bath, November 1, 1869.

[The few drops of ammonia required will not injure the prints.—EDS.]

PHOTOGRAPHY AND EMIGRATION.

To the EDITORS.

GENTLEMEN,—In reply to your correspondent's letter of inquiry in reference to "Photography and Emigration," it is undoubtedly true that "there are far too many photographers in this country," and it is also true that "photographers' assistants are generally underpaid;" but neither of these plaints are, I think, exceptional to photography. In all trades and professions we hear the same cry, and "failures and bankruptcies" are not more common to the one than to the other; in fact, one of the distinctive features of the 19th century is the severity of the struggle for existence.

As one who has worked for photographers in the old and new worlds, I am of opinion that the chances of success are much the same in both cases. In Canada, and all the more civilised states of America, the supply certainly equals the demand. If the less civilised be tried, success depends, chiefly, upon the stamina and *savoir-faire* of the individual emigrant. The man that might succeed in the one case, with all the latest appliances to his hand, would be lost among the difficulties that roughing it in the "far west" would present. While he who, far less proficient perhaps, brought to the task ready resource, a good constitution, and a "Mark Tapley" adaptability to circumstances, might stand a fair chance of success.

To establish a successful photographic business in the present age of advertising, competition, and limited liability companies requires a large amount of capital, and the motto must *now* be—"*Aut Cæsar, aut nullus.*" But for those who have money to invest, and can also have with it a thorough knowledge of the requirements of the business, I think the chances of success are as good in England as anywhere else. Unto those who have not the means to do this, and are obliged to be assistants (to which class I unfortunately belong), I can only recommend patience and a belief in the old adage, that we "may go farther and fare worse."—I am, yours, &c., A. V.

Scarborough, Nov. 1, 1869.

THE "SPONTANEOUS ARTIST."—Under the somewhat singular title of *L'Artiste Spontané* a new plaything for children has been invented. A piece of white paper and a phial containing a coloured powder are presented to a child, and he is told to produce a picture. He is puzzled, of course—and yet nothing is easier. A little of the powder is shaken on the paper, and spread evenly over it by means of a brush. Then, lo! the little artist sees before him an image almost as distinct as if done by photography. The image represents a lady with a tremendous chignon, an old man with a big nose, Mother Hubbard, Mr. Punch, Jack the Giant Killer, a garden, a landscape, a tree, or public buildings, or historical scenes, or even copies of the works of great masters. It might also be made to give the veritable portrait of papa and mamma, any member of the family, or of friends and acquaintances. As the reader will have divined, the paper has received an impression beforehand, so slight, however, as not to be perceived by the eye; and the spreading of the powder on it produces lights and shades in such a way as to present a distinct figure.—*Paris Correspondent of the Globe.*

EMIGRATION OF PHOTOGRAPHERS TO CANADA.—In reply to a letter on this subject which appeared in our last number, a correspondent has forwarded to us a clipping from a local paper, containing a letter from an Englishman who resides in Toronto, from which it would appear that the prospects of emigrants are not particularly bright. The writer says:—"If you should know any one who thinks of coming out here, tell them to stop where they are, more particularly females. There are four females to every one male already, and the only opening for women is domestic service—to a low set of people. And there is no other way to get a living here unless you are a good machinist; and that, if you should be so lucky as to get a job, is very poorly paid—three dollars a week, two and a-half of which you must pay for bed and board, leaving only half-a-dollar for dress, washing, &c. Or you might get into a tobacco factory to spin tobacco, provided you can chew and smoke yourself; the wages the same as at the machine. And, after all, you are as likely to be out of work here as at home in the old country."

GAS IN LIGHTHOUSES.—A correspondent of the *Scientific Review* thus writes:—"In connection with an interesting article which I read a few months ago in the *Scientific Review*, allow me to inform you that I believe gas will after all prove a serious obstacle to electricity or magnesium as a source of light in lighthouses. Gas has now been furnished to the lighthouse at Howth for some time past, and on the score of economy as well as brilliancy of illumination it is found to possess great advantages. The burner employed consists of a series of concentric rings furnished with fishtail jets. The first three rings from the centre comprise a group of twenty-eight jets; but to these other rings with 20 jets each can be added, so that as many as 108 jets can be brought into use. Compared with the most powerful oil lamp in use, the light given by the 28 jets of gas is two and a-half times more intense; and when the 108 jets are ignited the oil flame, when burning alone, appeared to shrink and become pale. These experiments will probably lead to the general use of gas in all lighthouses to which it can be carried. As regards the cost, it would seem that taking the light of 28 jets to be only equal to the oil flame, there would even then be an annual saving of 25 per cent. by the use of gas. But the ease with which the light can be increased according to the weather will be even a greater recommendation than the economy. I think it is only justice to Mr. Wigham to state that his burner—in which the jets can be lighted successively, so that as the night is clear or thick 28 to 108 can be lit up at once—has contributed not a little to the success of which I speak."

THE MAGIC LANTERN.—When ready for display Lopez, accompanied by the bishop and three or four generals, made the tour of the exhibition to the sound of martial music, and attended by us as showmen. We had great difficulty in preserving our gravity; the childish delight and misconceptions of our fat patron were so absurd as he stood on tiptoe to gaze through the bulls'-eyes at *The Bay of Naples by Moonlight*, or a *Chasseur d'Afrique Engaging Ten Arabs at Once.* The magic-lantern scene was more ridiculous still. A wide passage or *zaguan*, connecting two courtyards, was closed with curtains at one end and by the screen at the other; the machine was placed within, and chairs arranged in a semicircle for the great man and his *suite*, whilst the soldiers for whose amusement the exhibition was principally intended, it was said, found standing room without. Many of the slides represented battle scenes from the recent Franco-Italian campaign, but we took the liberty of rechristening some of them thus:—*Battle of Copenhagen, Between the Persians and the Dutch.* "Ah! that was a terrible affair," said Lopez, patronisingly, to the bishop. *The Field of Trafalgar after the Battle: Mamelukes Removing the Wounded.* "What Christian humanity sire!" softly observed the bishop. And so we went on. *Capture of the Jungfrau in the Final Charge at Magenta*, cried Thompson, with an unsteady voice, and kicking my shins under the table; and *Death of General Orders at the Moment of the Victory* was the title of the next, which sounded very imposing in Spanish, and closed the series. Then came the comic slides, when the bishop was very nearly the death of us. There was light enough reflected from the screen to see him distinctly, and his contortions, as he tried with handkerchief stuffed into his mouth to stifle his laughter, were excruciatingly diverting. He dared not laugh out, yet his delight at the figures, especially at one, where the nose of a dwarf gradually reached portentous dimensions, was utterly beyond his control. This was very well for one night; but we had succeeded so well that the performance was to be continued till further orders, and that was no joke; however, I was taken ill a few days afterwards, and was allowed to return to the capital.—*Seven Eventful Years in Paraguay.* By George Frederick Masterman.

EXCHANGE COLUMN.

I will exchange the *Circle of the Sciences* (published in thirty-one numbers at 2s. each, quite new, some of the numbers still uncut) and THE BRITISH JOURNAL OF PHOTOGRAPHY from August, 1865, to present date, for a whole-plate portrait lens or studio accessories.—Address, LUX, Post-office, Totnes, Devon.

Pair of Dallmeyer's No. 1B stereo. lenses, a Dallmeyer's triple achromatic for $7\frac{1}{4}$ by $4\frac{1}{2}$, a Ross's actinic doublet, new, for ditto, excellent camera to suit above by Payne, tent, plate-boxes, baths, backgrounds, camera stands, and every accessory, will be exchanged for a first-rate double oxyhydrogen lantern, &c., complete.—Address, W., 2, Barnfield-terrace, Prestwich, Manchester.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

R. M.—The information required was forwarded through the channel indicated.

REV. G. J.—Thanks for your complimentary remarks. The articles will be republished, but in a very condensed form.

M. E. Z.—Your first query we shall reserve till next week. With respect to your second, write to Mr. A. L. Henderson, King William-street, E.C.

JOHN BRINLEY.—Thanks for the three pretty scraps. *Harford Bridge* is a very beautiful picture; it is to be regretted that it was not more imposing in its dimensions.

A NOVICE.—Undoubtedly it is possible to enlarge by means of the lime light, and indeed this source of light is extensively employed for the purpose. The subject has been thoroughly ventilated in our three last volumes.

"LIME LIGHT."—In our last ALMANAC you will find an account of the various kinds of lime light in use, and in the ALMANAC of the preceding year (1868) you will find much information respecting the preparation and modes of using oxygen.

F. W. REYNOLDS.—1. If you send a stamped and addressed envelope a specimen of the kind of pyroxyline required will be sent to you.—2. Iodide of silver is not soluble in water, but it is sparingly soluble in a solution of nitrate of silver, and the stronger the nitrate solution is the more energetic is its solvent power.

F. C. S.—Chrome red is merely the red chromate of lead. There are five or six ways by which it can be made; we give you one of them:—Add to a solution of nitrate or acetate of lead a solution of chromate of potash, to which has been added an equivalent of hydrate of potash. It is of a splendid scarlet colour.

COLLODIO-BROMIDE PROCESS.—In the Rev. A. Johnson's practical article on the collodio-bromide in our last, instead of the statement that the racks should be "admixed," *read* "varnished." It may further conduce to its being better understood if, instead of "unincumbered" bromide, the reading be *uncombined* bromide, or *free* bromide, the meaning ef these terms being to some extent similar in connection with this as with some other subjects.

G. H. (Barnet).—Ebonite certainly contains sulphur, but, notwithstanding this fact, a nitrate of silver solution may be kept in a vessel made of it for several months without becoming sensibly deteriorated. There may be specimens of ebonite which would cause the negative solution to be destroyed in a few weeks; but, on the other hand, we know photographers who have kept their solution in receptacles of this material for some years without finding that it was in any respect inferior to glass.

D. A.—Place a mirror of tolerably large size on a low table in that window of the house which your own knowledge informs you is best. Let the invalid subject be placed opposite to the mirror, but very slightly to one side, so as to provide for the camera being placed on the other. When the camera is directed to the mirror, the invalid child will be seen as lighted by the full luminous power of the window. To prevent any rays from entering the camera except those necessary in the production of the picture, have a shade or shield made of pasteboard attached to the lens. The chemicals must be in the best condition.

R. W. (Worcester).—1. The size of the retort is rather smaller than we prefer, but it will do. The internal diameter of the tube is too small. We use one of twice that diameter. However, if it do not become choked it will, as formed, carry away the gas. We quite agree with your opinion respecting a "blowing up." It would not, we fancy, be pleasant to find oneself being conveyed through the roof of a house in consequence of a mishap with the oxygen.—2. If you consult the article, *Oxygen*, at page 45 of our ALMANAC for 1868, you will find that you *should* fill your five-feet bag from one pound of chlorate of potash mixed with a quarter of a pound of the oxide of manganese; but, in practice, all that you will obtain will be four and a-half feet. —3. Crush it finely, or powder it roughly; in this case both mean the same thing.—4. Use the gas stove; nothing else that we know of answers so well.

AN OLD SUBSCRIBER (Clapham-common).—1. To answer this question is quite out of our power, because so much depends upon your glass house. Some photographers prefer a lens of short, others of long, focus for *cartes*. A large aperture with a short focus will prove the most useful, because while it will work rapidly when used without a stop, any degree of depth of definition can be obtained when a stop is employed.—2. Try the following, which we recommend as a good formula for an acetate toning bath:—

Chloride of gold	1 grain.
Acetate of soda	30 grains.
Distilled water	8 ounces.

Let it be mixed for at least a day before it is made use of, after which it may be used over and over again.—3. We have forwarded your query to Mr. Johnson, who will probably favour us with a reply in our next.—4. For a sample of the paper send us a stamped and addressed envelope. Your card was *not* enclosed.

A YOUNG LADY.—Mr. Dunmore, 280, Camden-road, N.W., gives instructions in colouring photographs. You should arrange to come to London for a few weeks, at the end of which time you would have acquired such rudimentary knowledge as to permit the lessons being carried on successfully by correspondence.

GEO. WALLACE.—In the centigrade thermometer the freezing point of water is 0, equivalent to 32° of Fahrenheit's scale; while the boiling point is 100°, or equal to 212° Fahr. The simplest way to reduce the centigrade degrees to those of Fahrenheit is to multiply by nine, divide by five, and add thirty-two to the quotient.

"TOBY."—1. If your bath turns red litmus paper to blue it is alkaline.—2. What Mr. Davies meant was the bicarbonate. Carbonate of soda is the popular and commercial name for the bicarbonate. The real carbonate of soda of commerce is "washing soda." It is also known as "Scotch soda." It forms large, transparent, oblique rhombic prisms. The ordinary carbonate of soda generally contains sulphates and chlorides. The bicarbonate is known in commerce popularly as *carbonate*, more particularly as *baking* soda; sometimes as *sesquicarbonate*, and occasionally as aërated soda. If your question be not answered to your satisfaction write again, and more definitely.—3. Respecting your third query, what are we to say? One contributor you like; the other you do not, because he is "disagreeable and cantankerous." The feelings you express are unworthy of one who writes so sensibly as you do. Let each article stand on its own merits. We are amused at your idea, implied, although not definitely expressed, of either of the two gentlemen having adopted pseudonyms. Both are well-known gentlemen, and write under their proper names.

A WEST-END PHOTO. says that in a window in the Strand he saw a photograph 34 × 16 inches in size, being a group comprising forty men and half that number of dogs—all sharp and distinct, even to the extreme ends of the picture. He considers this one of the most effective pictures that he has ever seen, and inquires by what means it is possible for him to take a similar group, as he has an order for a picture of the same description. The picture to which reference is here made is a photograph from a composition picture in which the figures are photographed from life, and the landscape put in by the artist. In no way that we know of could a "legitimate" photograph of a similar kind be taken, except by the pantascopic camera, which can easily be made to travel over a field of 120° with the lens working at full aperture. With this apparatus the extreme end of the picture is quite as sharp and well lighted as the centre, because both portions are produced under precisely similar conditions. The greatest rapidity possible to be obtained may be secured with this camera; for, although the angle of view included is great, the lens is only required to cover a very small portion at a time, and hence a wider angular aperture may be used than when a large field has to be covered.

LITHO-PHOTO.—We are not sufficiently conversant with the practical details of lithographic printing to enter into a disquisition upon the nature and properties of the various kinds of transfer ink now in use. We presume from your question that you are an amateur, as most professional lithographers make their own ink, and even those who do not are generally sufficiently well aware of the methods by which it may be prepared, although they may prefer purchasing it—a step we recommend you to adopt. However, the following is the formula published by Sir Henry James as that which is, or was, used in the printing department of the Ordnance Survey Southampton:—

Lithographic printing-ink	8 ounces.
Middle lithographic varnish	4 ,,
Burgundy pitch	4 ,,
Palm oil	4 drachms.
White wax	4 ,,

The latter three ingredients are melted in an iron pot until they begin to burn, stirring all the time; then add the ink and the varnish, and mix intimately. Before using it reduce it by means of turpentine to the consistence of treacle. The closer and finer the lines of the subject are, the thinner must be the coating of ink.

METEOROLOGICAL REPORT,

For the Week ending November 3rd, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Oct. 1869.	Bar.	Thermometer. Max.	Min.	Wet.	Dry.	Wind.	Rain Inch.	Remarks.
28	29.83	44	28	30	33	WNW	—	Overcast
29	30.15	49	31	38	41	NNE	0·01	Fine
30	29.90	51	37	42	43	WSW	—	Cloudy
Nov.								
1	30.35	56	37	45	47	WNW	—	Fine
2	30.31	57	41	52	53	WNW	0·02	Cloudy
3	29.94	—	48	49	53	NW	—	Fine

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 497. Vol. XVI.—NOVEMBER 12, 1869.

GELATINE AND "GRENETINE."

Some of our readers will, no doubt, have noticed that in the report of the Marseilles Photographic Society, printed in our last number, a substance is repeatedly referred to under the name of "grenetine." If we are to judge from the remarks of the speakers at the meeting aforesaid, nothing but "grenetine" should be used in carbon printing.

When asked what "grenetine" is, we were reminded of the bitter crystalline substance extracted from the rind of the pomegranate, and called "grenedine." The difference in orthography of the name is certainly very trifling, but the chemical difference between the two substances is very great. "Grenetine" is simply a species of gelatine prepared in such a manner that it shall be completely soluble in warm water, and for this reason it has been thought necessary to give the purified article a new name. So far as we have been able to ascertain, this fine gelatine is more satisfactory to work with in carbon printing than the less pure English make. The eulogiums of the Marseilles photographers are, therefore, no doubt, well deserved.

There are two impurities in ordinary commercial gelatine which tend most materially to interfere with the satisfactory use of the article in carbon printing. These impurities are matters insoluble in hot water, and substances which are readily dissolved by cold water. It is obvious that if we use a sample containing the former kind of impurity it will be very difficult to develope a print so as to get clean lights, since the insoluble particles adhere to the paper or mount, and retain minute specks of colouring matter. By judicious friction these specks may be removed; but this is always a risky operation, since delicate half-tones are just as likely to suffer as the offending specks of pigment. Again: when a sample of gelatine contains substances easily soluble in cold water there is the risk of loss of detail in the print, owing to the partial solution of those portions of the print which have been exposed to the action of light.

Almost all commercial gelatines which we have met with contain more or less of both the above-mentioned impurities, and the samples are, in most instances, much improved for carbon printing by their removal. The substances insoluble in warm water can be removed by the pressure of the gelatine dissolved in warm water through a three-fold flannel bag. Prior to dissolving the gelatine in water it is always necessary to allow the solid substance to soak in cold water for an hour or so, and then change the water three or four times, or until a little, when placed in a test-tube and mixed with some spirit of wine, ceases to show any turbidity. In fact, it is convenient to treat a considerable quantity of gelatine slices in this way, and then to spread the residue on paper and expose to the air for some hours in order to dry. The gelatine is now free from matters soluble in cold water, and can be stored for use; of course, the substances insoluble in warm water which may be present are removed by clarification at the time the gelatine is dissolved in warm water for use.

If the clean and cheap varieties of Russian glue be treated in this way, the gelatine obtained is quite as suitable for use in carbon printing as the finest samples in the market. With a little care in the preparation of the gelatine, we can obtain very cheaply a substance which works quite as well as we understand the "grenetine" to do. But in the preparation of a solution of gelatine of any kind it is always necessary to remember that frequent heating of the liquid tends to promote the formation of a substance which is permanently soluble; for, by repeatedly heating and cooling, a highly gelatinous liquid, which at first sets to a firm jelly when cool, gradually loses the property of "setting" at all, owing to the passage of the gelatine into a soluble modification under the influence of the continued heat.

M. GIRARD'S RESEARCHES ON SOME DERIVATIVES OF PYROGALLIC ACID.

Within the last few weeks various accounts of some recent experiments of M. Girard have been published. These investigations were made for the purpose of proving that a colouring substance could be prepared from pyrogallic acid by oxidising the latter with any suitable agent—permanganate of potash, for instance. As any new facts connected with pyrogallic acid cannot fail to possess some photographic interest, an account of the mode of preparing the new colouring matter according to M. Girard's method was given a few weeks ago by our excellent Parisian correspondent.

On examining the matter a little more closely, however, we were not much surprised to find that the new colouring matter of M. Girard, obtained by the limited oxidation of pyrogallic acid, is a substance suspiciously similar in appearance and in most of its properties to a colouring matter which can easily be prepared from ordinary gallic acid. The derivative of gallic acid has been long known under the name of "rufigallic acid," and it may be interesting here to state the process by which we have frequently prepared comparatively large quantities of the coloured product of gallic acid.

If a quantity of commercial gallic acid be taken and added to five or six times its weight of oil of vitriol—the latter contained in a flask—the gallic acid dissolves gradually, and on warming the liquid the solution assumes a rich violet-red tint. After digesting the whole for an hour or so the solution acquires so deep a colour that it becomes opaque, except in very thin layers. When this point has been reached the solution is allowed to cool, and is then poured, in a steady stream, into a large quantity of cold water. The colouring matter, or rufigallic acid, though soluble in strong oil of vitriol, is not dissolved by the dilute acid, consequently dilution of the liquid throws down the colouring matter as a red crystalline powder. This substance is the rufigallic acid, which is insoluble in water, but, dissolved by strong sulphuric acid, by caustic and carbonated alkalies, or by alum solutions, producing highly-coloured liquids which can be used in dyeing, but yield red tints deficient in brilliancy.

When the dry red powder of rufigallic acid is very cautiously heated over a gas or spirit flame, a fine, red crystalline sublimate is obtained. The orange-red needles procured in this way are precisely alike in appearance to the red colouring matter, alizarine, obtained in a similar way from madder extract.

A comparison of the above-mentioned properties of rufigallic acid with those ascribed to M. Girard's new derivative of pyrogallic acid will be sufficient to show that, at least, a very strong resemblance exists between the two substances.

In the present state of photography, it is important to note and consider any possible reactions of the substances with which we have almost daily to operate, since, though a special property of a chemical agent may at present, apparently, admit of no practical application to our art-science, yet, as investigation proceeds, properties of but little present value are often found to be capable of receiving important applications in practice. It is in this spirit that we have above referred to a matter which, though not directly connected with any photographic operations, deserves some notice at the hands of photographers.

ALKALINE DEVELOPMENT.

I was much interested in the remarks of Mr. Davies on this subject contained in your number for October 15, which has just reached me. It seems to afford a new proof how much final results are influenced by trifling differences in the mode of operating, and how much is to be gained by comparing, as does Mr. Davies, cautiously and dispassionately his views with those of others.

Curiously enough, however, he has scarcely touched upon the point discussed by me. I affirmed that bicarbonate of potash was, as an alkaline developer for collodio-bromide plates, altogether inferior to ammonia, as it most undoubtedly is. Soda seems to have met with so much disfavour and so little use for years past—even those who at first praised it having given it up for ammonia—that I did not include it in my trials. Mr. Davies's experiments are chiefly directed to the comparison, not of potash and ammonia, but of soda and ammonia. With respect to potash, he considers it decidedly inferior to ammonia; nevertheless, he says that a fine negative may be developed by it. If so, I think it can only be with a greatly increased exposure. I took, in the experiments already sent you, two plates, made, dried, and exposed with scrupulous equality; developed one with carbonate of ammonia, which came out rapidly and gave a good negative. The other refused to advance beyond the sky line. To judge therefrom, I should say that for development with potash a double or triple exposure was needed.

This, for me, condemns the method absolutely. Mr. Davies, I think, scarcely attaches sufficient value to rapidity. I think it priceless. It is not that one may save a little of one's time in exposing—that is nothing; but in that important little space of time whilst the cap is off, if there come but a light puff of wind on the foliage the plate is gone. If an animal be included, every additional second adds to the risk. All hope of seeing clouds included in the plate depends upon rapidity; and it is for that reason that I prefer to use those means that will enable me to expose as rapidly as possible. But I do not employ pyro. anything like so strong as Mr. Davies. Instead of one and a-half to two grains to the ounce of developing bath I make it three-quarters to one grain. I find no trouble with ammonia—never get the grey plates that he speaks of, and which I think he is right in supposing to have been very much over-exposed for ammonia development.

I also discard altogether the acid development of dry plates, and use the alkaline exclusively. I do not need ever to redevelope, either, with acid, but find that with the method I have described in your pages I get density sufficient with alkali alone, and at the same time much detail and softness—more than I can obtain with acid pyro.

If, therefore, any photographer find it desirable to use potash regularly as a developer, it will be, I think, with some process very different from those now in use. As far as I know, every one's experience is opposed to it.

In answer to what Mr. Davies says of the tendency of ammonia to give veiled plates, I do not attach any importance to the veiling; on the contrary, a veiled plate often gives the best prints. Veiling generally depends upon the nature of the preservative, and especially upon its acidity. It is easy to prevent veiling, but one always risks in doing so a diminution of sensitiveness and a loss to some extent of detail in shadows. I have tried immense numbers of plates with different preservatives, carefully timing exposures and selecting days of equal light, then carefully comparing results. Another effect has been that whereas I formerly liked negatives in which the deepest shadows were represented by clean glass, now I rather avoid that character, knowing that it is so apt to be purchased by a want of sensitiveness. In fact, the point seems to me to be this—that one can counteract the tendency to veil by using bromide of potassium in the development, and can go as far as one pleases in this direction but not in the opposite one. It seems, therefore, best to use the most sensitive preparations, and to control their action with bromide. Something can also be done by strengthening the dose of ammonia.

M. Carey Lea.

PRACTICAL SUGGESTIONS FOR OBTAINING NEGATIVES.

Your article on the lenses used in photography, page 493, would appear to have been what is called a suggestive one, for it suggested some useful observations from "Medicus," at page 512, which, in turn, have suggested my publication of the following.

Some time ago you had an article in which you spoke of the advantages, in respect of flexibility and portability, of using sensitive collodion films which had been removed from the glass plate on which they were formed. This, if I remember aright, was in connection with a notice of some sensitive films of this kind which had been prepared by Mr. Woodbury. Referring to what has been said concerning the transparency and homogeneity of the varnished or oiled paper of Mr. Blair, while I believe that they will, from their possessing these qualities, prove useful as a support for a collodion pellicle, I think that the collodion itself may be rendered sufficiently tough for obtaining pictures on without the transparent paper backing or support. I have not seen any of Blair's paper, but am at no loss to understand what it is like. In a rule-of-thumb manner, suggested by reading your account of his operations, I have managed to varnish paper so successfully as to impart to it a quite unexpected degree of transparency.

It is impossible to shut one's eyes to the fact that a transparent paper coated with sensitive collodion will cost less by *many times* than a solid sheet of collodion. The cost of the paper amounts practically to nothing, and the collodion film imposed on it is of the same nature and thickness as that used upon glass. I grant at once all the advantages that have been claimed for the Woodbury films, but while the same may be claimed for that which I am now advocating, it (the latter) further embraces that of extreme cheapness.

My experiments have as yet been confined to stereo. sizes, examples of which I enclose. I have not tried large films. Aware, however, as I am, that in mechanics success in the performance of a model does not necessarily guarantee that the like measure of success should be expected in a machine of large dimensions, this principle—if principle it may be called—does not apply to photography; for, in this art-science, what can be done on a small, can also be effected on a large, scale; and this matter relates merely to the coating of a plate.

It is easier for the experienced manipulator to coat a plate twelve inches square than one of the dimensions of only two or three inches; and it is not difficult to find some who would much prefer undertaking the laying down of an even film on a twenty-inch plate than on one of stereoscopic size. Hence, if an experiment in films succeed on a small scale, it is even more certain to do so when it is repeated on a large scale. On a small scale I have succeeded to my entire satisfaction, and I argue from this that I and every other person can also succeed when operating on the largest scale.

M. Silvy has, during the past year, obtained a patent for a sensitive band of paper manipulated between a pair of rollers, one at each side of the camera. His application of it, I am aware, is confined solely to panoramic views taken on a curved plate by Sutton's lens. But the idea may be much extended. A vertical roller, closely wound round with sensitive paper which passes across the field of view, and is wound up, after being exposed, on a second roller placed at the other side of the camera, is, I know, not a new idea. Melhuish, Burnett, and others have long ago written it up, and, I presume, practised it successfully. Their ideas, however, were somewhat too elaborate, and, whatever may have been their intrinsic merits, were not enthusiastically received, certainly not acted upon, by photographers.

The following method of obtaining pictures *en route* is suggested by me as an improvement upon any yet described; but, although I make use of the word "suggested," I wish it to be understood that I have had it actually carried out in practice, and very successfully too, although the rudeness of the home-made apparatus employed in doing so would infallibly serve to shock the more fastidious among our fraternity.

The camera slide contains a roller, placed in a vertical position, at each end. Each roller is a prolonged bobbin capable of holding a strip or band of paper of any suitable size. In my experiments I used a plain circular roller capped at each end with a flat piece of brass the size of a penny. Through each of these a hole is pierced longitudinally, and through this is passed a thick wire pin in which it revolves. Let us now suppose that the dark slide is furnished with two of these rollers, one at each side, and that the one on the left hand side has been "charged", with a band of sensitive paper, or, preferably, with a band of any kind of thin, tough paper rendered transparent *à la* Blair, and faced with sensitive collodion. A

piece of wire presses like a spring against the edge of one of the ends of the roller caps and prevents it from revolving, unless when a certain amount of force is applied to the outer end of the band, which is thus retained under tension. This outer end, however, is attached to the roller at the right hand side, the axis of which rises through a hole in the top of the slide, and is fitted with a milled-headed nut. On twisting this nut round, the band of sensitive paper will travel across the field of the camera from the one roller to the other, and, if proper precautions have been taken, it may, in its course of passage, be stopped so exactly where the former picture terminated and the new one is to commence, that not an eighth part of an inch of the sensitive band will be wasted.

The method of ensuring such accuracy is as follows:—The whole length of the paper band is divided into widths equal to that of the field of view of the camera, and at the division between the lengths must be placed, on the back of the sheet, a short stroke or any other similar kind of mark, made either with a black pencil or a pen charged with ink. These marks should be placed at or near the edge of the sensitive band, and on the back of the dark frame must be a hole half-an-inch square or thereabouts, in which is fitted a piece of glass of a deep orange colour. When a view is taken where one of the marks on the edge of the sensitive paper is opposite this yellow window, it is only requisite to revolve the milled head of the right-hand roller until a sufficient portion of the sensitive band has been passed from one roller to the other to bring the next mark on the back of the paper opposite to the little yellow window. When this is the case, the next exposure will take place on quite a fresh or unexposed portion of the film. In this way one may, with absolute certainty, go on exposing from one end of the sensitive band to the other, no matter what number of picture-widths there may have been upon the left-hand roller.

If instead of the marks on the back of the picture, to which reference has been made, a progressive series of figures be adopted, the subject of each negative may be entered in a note book, with reference to these numbers. By carelessness the registration marking may be shot past the yellow glass window. To obviate the inconvenience that would arise from this, it would be better that the axis of the left-hand roller should terminate in a milled heading, the same as the other. By this means it would be as easy to wind the sensitive band in one direction as in another, and any overshooting of the mark could thus be provided against.

To ensure sharpness the sensitive surface must, during exposure, be pressed firmly in contact with a very fine and colourless plate of glass placed in the dark slide. To secure the requisite closeness of contact it is only necessary that there be behind the glass a pad, which, when pressed forward by means of a button behind, shall force up the paper against the glass. This pad may be made of any suitable material. A piece of black velvet nailed upon a light wooden board and stuffed with lamb's wool answers quite well. The surface should be slightly convex, because it thus presses out any cockling which might be present if the pressure were applied first at the ends. When the button is released the pad should be withdrawn to a sufficient distance from the glass to permit the paper band to pass freely between them.

I have ascertained by careful experiment that the interposition of the glass in front of the sensitive film is not attended with any noticeable inconvenience. The loss of light from reflection is so little that as yet I have been unable to detect it. It certainly does not lengthen the exposure one second in thirty, although if I used a very wide-angle lens I know that it must produce a greater stoppage of light. Then, as for the loss of definition, it is absolutely nothing.

I am quite aware that object glasses for the microscope are now made with such a large aperture that a special adjustment is required for every variation in the thickness of the extremely thin glass by which the objects are covered; but no such delicacy prevails in photographic object glasses, nor, indeed, would it be possible, I suppose, to construct one with such delicacy of focus, unless the plate of glass intervening between the sensitive surface and the lens were some inches in thickness. The glass, however, should be carefully selected, and as free from colour and blemishes as possible.

In my first trials of the roller system here described I adopted a somewhat clumsy wheel contrivance for making the rollers revolve. The upper ends of the rollers were capped, each by a wheel containing a certain number of teeth. Between them was geared a large wheel which, when it revolved, caused both the rollers to revolve in a similar direction. This method is not good. Nothing surpasses the simple means I have just described.

In my next I shall send a more imposing negative taken by this camera than the scraps now enclosed. Alfred Irvine Taylor.

COLLODIO BROMIDE.

In penning a few lines for the Journal a fortnight ago my object was not to presume to give general instructions for working the process, but concisely to state a few peculiar features in the production of certain pictures which the Editors honoured with their approval. I proceed, however, to supply the omissions noticed by Mr. Dawson.

1. I did *not* omit to describe the composition of the preservative, but I did so wrongly. The bath should consist of 200 grains of tannin and 200 grains of gum arabic in 20 ounces of water. I stated that I was chiefly occupied with landscapes, in which I sought for aërial effects. Had brilliancy or contrast been my first object, I should have increased the proportion of tannin and much diminished the quantity of gum.

2. In saying that I followed Mr. Dawson's instructions for preparing the collodion, I left it to be implied that I also adopted his excellent plan of sensitising it when bromised—that is, by shaking up the powdered nitrate of silver with 25 per cent. of the alcohol, reserved for the purpose, and of ·815 sp. gr., or thereabouts, and then adding the bulk of bromised collodion gradually. I do not find it necessary to use the tube mortar. The mixture is filtered through cotton wool in a funnel.

I am glad that Mr. Dawson approves of intensifying with citro-pyrogallic acid and silver under certain circumstances. I was afraid that he might condemn it as a retrograde step.

I fancy—but I write diffidently—that the character of the pyroxyline and the condition of the collodion have more to do with the sensitiveness of the film than has the composition of the preservative; *cœteris paribus*, a powdery pyroxyline or a partially-decomposed collodion favours rapidity of exposure. Gum in the preservative does the same for the development; but if this great advantage be gained, we must be content to seek for intensity from redevelopment.

Having sensitised some very old bromised collodion and prepared plates with my ordinary preservative, I found that a faint but perfect image, full of detail, was produced with a rapidity quite equalling that of wet collodion. It was perfectly bright and free from fog, although no bromide was used in the developer, but refused to intensify with alkaline pyrogallic. It did so well, but very slowly, in the presence of pyrogallic acid and silver.

It is an instructive experiment, in making pyroxyline, to take acids of a standard strength and temperature—say four ounces of nitric acid, sp. gr. 1430; twelve ounces of sulphuric acid, sp. gr. 1840; water fifteen drachms—and note the great difference which the addition or subtraction of a single drachm of water and the reduction or the reverse of a single degree of temperature makes in the condition of the pyroxyline.

It is to be wished that Mr. Dawson would tabulate for use the relations existing between the respective specific gravities of the acids and their temperature. From some rough experiments I find that, using the quantities stated above, the effect of adding a drachm of water is about equal to that produced by raising the temperature two degrees, and *vice versâ*. Andrew Johnson, M.A.

NITRATES IN THE PRINTING BATH.

In your last number I notice an article by Mr. Nicol, in which he strongly advocates the use of nitrate of ammonia in the positive printing bath. He mentions two advantages which accrue from the use of this ammonium salt in conjunction with nitrate of silver—namely, a finer-coloured and more brilliant print than can be got by the same weight of nitrate of silver alone; and, secondly, a decided and considerable saving of silver. In this matter my experience, which has been extensive and systematically carried out, differs entirely from Mr. Nicol's on both points—so much so, that I am of opinion the gain lies altogether in the other direction.

Several years ago I detailed in these pages a series of exhaustive comparative experiments on the advantages claimed by some for a similar addition of nitrate of soda to the sensitising solution, and proved to my own satisfaction, and that of many others, the baseless foundation on which these claims rested. I have still in my possession an interesting collection, labelled and tabulated, of the prints obtained from these experiments. Any one interested in the matter may examine them, by calling at my laboratory. Subsequently, I made similar experiments with the nitrate of potash and ammonia, with like results.

Oxide of silver dissolved to saturation in a concentrated solution of nitrate of ammonia was more promising; but I abandoned the investigation after satisfying myself of its offering no advantages over a plain solution of silver. Colonel Bell's "queer" bath, referred to by Mr. Nicol at page 529, was one of this type, although formed

after a roundabout fashion on the rule-of-thumb sort of principle. Mr. Nicol's nitrate of ammonia and nitrate of silver solution is a different substance from that obtained by dissolving oxide of silver in nitrate of ammonia. The latter is a *definite compound*, the former a *mixture*.

But, *cui bono*, are one or any of these photographic extravagancies? Supposing such additions or modifications to have a beneficial effect (which I do not admit) upon a weak solution of nitrate of silver in improving the vigour of prints on albumenised paper, is there any real saving of silver, any increase of sensitiveness, or, in short, any other gain derived from their use? Let us examine this question with the light derived from a few facts, which, I presume, nobody will dispute.

A full-sized sheet (22 × 18 inches) of albumenised paper, according to the modern system of salting undiluted albumen, will contain a minimum of five grains of chloride of sodium or ammonium. The former chloride will take about fifteen grains of nitrate of silver to convert it, and the other nearly sixteen. Then, again, some of the silver is abstracted from the bath in combining with the albumen and other organic compounds in the paper. Altogether, I may consider myself considerably within the mark when I say that twenty grains of silver are expended solely in converting the insensitive chlorides, &c., in a sheet of albumenised paper (22 × 18 inches) into the sensitive silver compounds. But then, as everybody knows, the latter would be comparatively insensitive, and, at the best, would yield but feeble pictures, were there not, also, a large excess of nitrate of silver present on the surface of the paper to continue and intensify the actinic reduction to any shade up to bronzing.

In order to secure the highest sensitiveness and the most brilliant prints, a large excess of nitrate of silver on the surface of the paper is necessary, and, within certain limits, the larger the better. Let any one try the experiment of sensitising a sheet of albumenised paper salted, say, with ten grains of chloride of ammonium, on a seventy-grain silver solution, cutting the sheet into two parts, washing the one half in water before drying it, and leaving the other to dry with its adherent nitrate. In attempting to print on these he will practically comprehend the true function of plenty of free nitrate of silver. No one seems to assert that any other nitrate save that of silver can fulfil that function.

The only advantage claimed for other nitrates is that they help to coagulate the albumen—a claim which I consider unfounded, at least in so far as the nitrates of ammonia, potash, and soda are concerned.

My experiments, both of the past and of the present, if they have any significance at all, tell me most plainly that all the nitrates hitherto recommended as adjuncts or aids to the silver printing solution are inert or injurious. In the case of old baths, the organic matters derived from the albumen, &c., of the paper, or added to them purposely, I find to be positively useful; that is, they are good for positive printing, inasmuch as more brilliant prints are thereby obtained. Thus it is, I apprehend, why an old sensitising solution improves by use provided it be kept up to its proper strength, and why a new solution is better fitted for vigorous prints, if a little sugar or other soluble organic compound be dissolved in it previously to being used.

As to the other advantage claimed, namely, the *economy* of using a weak solution of nitrate of silver, it is high time such an idea was finally abandoned. Supposing the prints to be equally brilliant from a weak solution (say thirty grains) and from a moderately strong one (sixty grains), there is both waste of time and light in printing from the former, because the paper is less sensitive, and it can easily be shown that there is no economy of silver.

When I make these assertions let me not be misunderstood.

The strength of the sensitising bath should be regulated by the amount of soluble chloride in the paper. If the albumen be weakly salted (five grains) a thirty-grain solution of nitrate of silver may sensitise it nearly as effectively as a stronger one; but such papers are but slowly impressed, and, except in rare cases, the prints are destitute of vigour and brilliancy. Weakly-salted paper, however, it must be admitted, is well adapted for some classes of negatives. If the albumen be more strongly salted (ten grains) a silver solution weaker than sixty grains is not advisable. These papers are much more sensitive than the weaker salted kinds, and, perhaps, give vigour to the prints equal to what can be secured by any other means; but if the highest sensitiveness and brilliancy are required, or when printing in a very dull light, twenty to thirty grains of soluble chloride may be used in the albumen, and the paper afterwards sensitised on a 90 or 100-grain bath.

On occasions, therefore, of feeble or bright light, peculiar class of negatives, &c., it would be advantageous to practise sometimes one and sometimes another system of salting and sensitising; but in order to avoid complication a medium course is now generally adopted in both by most photographers.

Nevertheless, when it is found desirable to employ a strong silver solution, there is no necessity for incurring any waste of material, whether the paper has been weakly or strongly salted. In any case the whole, or nearly the whole, of the silver which is not taken up in forming the image can be recovered with little trouble and expense. I have recently enlarged on this subject in your columns; it will, therefore, be unnecessary for me to say more about it at present.

For the above reasons and others which I have lately urged I cannot admit the existence of economy either of time or silver by using weak sensitising solutions; nor have I yet read or heard any arguments, except vague assertions, to convince me of the practicability of gaining greater sensitiveness or additional vigour by adulterating the sensitising bath with nitrates of ammonia, potash, &c. If any one will carefully perform a series of comparative experiments with and without these nitrates in the silver solution, as I have done, I have little doubt he will arrive with me at the same conclusions. When I see some evidence of such experiments having been conscientiously gone through in corroboration of an opposite view, it will be time for me to alter my opinion, if I find the facts are against me. Till then I must ground my conviction on the experience which I have already had. GEORGE DAWSON.

[From the above it is evident that Mr. Dawson has been allowing his photographic reading to fall into abeyance, otherwise he could not have failed to discover that the carefully-performed comparative experiments which he desiderates are accomplished facts, recorded at considerable length in our last volume, and corroborated in their results by several professional photographers of large experience. While readily granting that Mr. Dawson's experiments on which he grounds his assertions may have been quite conclusive so far as regards himself, the fact cannot for one moment be ignored that his theories respecting this matter are at variance with the practice of many practical and professional photographers, who have found that albumen can be coagulated by the addition of other nitrates than that of silver to a bath which, previous to that addition, entirely removed the albumen from paper; and, arising out of the application of this principle, that quite as brilliant prints may be obtained *on the same kind of paper* by a weak silver bath containing such a salt as by a much stronger solution of the nitrate of silver alone. In further corroboration of this let the following incident suffice:—A customer of one of our largest manufacturers of albumenised paper called at his establishment and spread out before him a number of prints, all executed upon one kind of paper (that in common use for a sixty-grain bath), requesting him to separate from the others all the best ones. A certain number were accordingly selected as being better than the others. Each print contained a note on the back, upon examining which it was discovered that all the best prints had been prepared upon a bath containing twenty grains of silver to the ounce with a large admixture of another nitrate, while the worst prints were prepared upon a bath containing the same amount of silver *minus* the other nitrate (called "inert" by some). A few days afterwards the same gentleman presented a fresh batch for selection, but the manufacturer found them to be so nearly alike as regards quality that he could not indicate his preference for any. On examining the note on the back of each print, some were found to have been excited upon the weak silver bath before mentioned, while others had been treated with a seventy-grain silver bath. These are only one or two jottings, of which we could cite many, in support of Mr. Nicol's doctrine. But we know that gentleman to be such a good chemist and careful photographic experimentalist, that we have full confidence in the result of his recorded experiments.—EDS.]

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER XII.—CONCERNING LENS MOUNTINGS.

THE optical portion of our subject connected with the construction of photographic lenses having now been treated of, something concerning the methods by which they have been, are, and might be mounted is next presented for consideration.

In the first place, the material of which the mounting is made is worthy of more than a mere passing remark. The rigidness, duc-

tility, and beauty of brass render it a most invaluable metal of which to construct the mountings of every kind of philosophical instrument, and among them photographic lenses. There is only one thing in connection with it which we should wish to see carried out, and that is, a serious reduction of its specific gravity. In the case of a lens of small size the weight of the brasswork is immaterial; but, when the lenses much exceed three inches in diameter, then it becomes a somewhat serious matter, especially to the tourist.

In portrait lenses of a given size the brasswork of the English is generally stouter than that of the French makers; indeed, the substantiality of English work is of the highest order. What we are desirous of seeing is, that this solidity should be obtained at a less expenditure of metal.

We do not, however, see how this is to be secured unless some other metal or alloy than brass be pressed into service. Aluminium is now being used for opera-glasses, and similar binocular instruments, with an immense advantage, in respect of weight, over brass. Those instruments of the kind that were examined by us did not seem to have gained their lightness at the expense of any other quality; for the aluminum tubes, having been rolled or drawn very hard, and being at the same time tolerably thick, were quite as rigid as instruments of similar power mounted in brass. The difference in weight between two marine glasses—one mounted in brass and the other in aluminium, but both alike in every other respect—was as follows:—that in brass weighed eleven and three-quarter ounces, while that which was mounted in aluminium only weighed six ounces. The greater expense of aluminium may offer an objection to its being employed for photographic lenses; but there are many among the photographic fraternity to whom price is no object provided their special wants are provided for.

Ebonite, also, puts forth its claims as a useful substitute for brass. It is both light and rigid. Some time ago a civil engineer of our acquaintance had a landscape lens mounted in ebonite, and we can testify, from personal experience, to the value of that material when used for this purpose.

How should a portrait lens be mounted? To reply to this question a little circumlocution will be necessary. Many photographers desire to make the most of their lenses that they possibly can. Now the front lens of a portrait combination will, in every case, make a landscape lens when used by itself, under certain conditions. These conditions are—that it be reversed in its position with respect to the landscape, and that it have a diaphragm placed in front of it. Some front lenses make better landscape objectives than others; but we have never yet seen one which could not be utilised for this purpose. Here, then, is an additional power latent in a portrait combination.

In order that this power be rightly and conveniently employed, the back lens should be removed and laid aside, and the cell containing the front one screwed in its place. In the majority of French and German lenses the screws of the front and back cells are dissimilar, and hence one cannot be screwed in any other position than in its own proper place. Lens mounts of this description, in order to permit the front combination to be used for landscape purposes, must have a special "adapter" made. This adapter usually consists of a thin and narrow ring of brass, the thread of the outside being fitted to the tube, and that of the inside to the cell.

The principal English lenses, and also the more modern French ones, have both ends of the tube alike in internal diameter, so that the front and back cells are interchangeable. This is very much the better plan. The objection which has been urged against it is that, whereas a portrait combination can only work properly when the front and back lenses are in their proper places, the facility of their being made to change their places (afforded by their being interchangeable) may lead some photographers to use them when they are wrongly put together. But in every combination of the kind that we have seen the maker has anticipated this objection by so forming the outsides of the respective cells that the hood or sunshade will not screw on when the back lens is placed where the front one should be.

The ability to make the lenses interchangeable is of great use when one is engaged in copying, for the relative position of the lenses must then change according to circumstances. If a copy *smaller* than the original be required, the front and back lenses must be in their usual places; but if it be desired to take a copy *larger* than the original, then the respective positions of the front and back lenses must be changed. As we have previously remarked, if a copy of an object be wanted of the normal size, it will be better to lay aside the back lens, and supply its place with another front lens similar in power to that already in the tube.

For portrait lenses a rack is considered indispensable. Where this is absent the camera must be fitted with one. In selecting a lens pay attention to the fitting of the rackwork. It ought to work easily; but there should be none of that quality which is technically known as "loss of time"—that is, the fitting should be such that the pinion cannot be turned without effecting a corresponding motion of the tube.

A very ingenious method of focussing was some years ago introduced by Mr. Grubb. The tube had a very wide and flat thread cut on it, and a corresponding screw inside of the jacket. By revolving the tube in the jacket a very delicate degree of motion backward or forward was given to the objective. Mr. Grubb has also introduced a portable mount for landscape lenses, by which the stop can be brought closer to or farther from the lens, to suit the special subject to be taken. When it is not desired to include a great angle of view, some advantages (*e.g.*, a flat field with a wide aperture) are gained by having the stop at a considerable distance in front of the lens. To have the tube of this length would greatly increase its normal bulk. Mr. Grubb's tube is made of two pieces—one sliding inside of the other, and capable of being adjusted in the manner described.

A foreign maker, M. Darlot, two or three years since, introduced a method of mounting lenses which is so convenient that this chapter would be incomplete were no mention made of it; but the demands on our space are so great this week we must defer the completion of this chapter until our next number.

THE EXHIBITION OF THE LONDON PHOTOGRAPHIC SOCIETY.

On Tuesday evening last the opening of the winter session of the Photographic Society was signalised by an exhibition and *conversazione* in the Hall of the Architectural Association, Conduit-street. The assemblage was very numerous, many ladies being present. The President, Mr. Glaisher, F.R.S., the Vice-president, Rev. J. B. Reade, F.R.S., and the Secretary, Mr. Spiller, F.C.S., were present and received the visitors, among whom were several photographers from the principal provincial cities and towns.

At the first glance round the rooms it became evident that whatever comparison might be instituted between the present and previous collections of pictures with respect to quality, in mere quantity the present exhibition was superior to any of its immediate predecessors. The two large rooms were everywhere loaded with photographs, necessitating the placing of some of the pictures rather inconveniently high for minute inspection.

In previous years the want of a catalogue was much felt; this year that need has been supplied, to the material increase of the comfort and interest of the spectator.

In this, to some extent, preliminary notice of what, for various reasons, we consider to be the best exhibition that has been held in the metropolis, we may state that the number of exhibitors whose names appear in the catalogue is 108, but several more contributions were received after that document was printed. The number of subjects or contributions given in the catalogue is 403, but this does not convey an adequate idea of the number of works exhibited, inasmuch as under one entry is sometimes included several pictures. The exhibition is essentially English, seeing that the sister kingdoms, Scotland and Ireland, are represented by so very few pictures as to warrant us in considering them to be practically unrepresented. The honour of these countries is safe, however, in the keeping of some of their sons, many of the finest works exhibited being by "natives" of those kingdoms.

As on previous occasions, the exhibition will be open for one week, from ten o'clock till dusk, finally closing on Tuesday next, at five o'clock in the evening—the public being admitted free of charge.

In such an exhibition one naturally expects to find the works of such artists as Rejlander, Robinson, Blanchard, England, Mayall, and other photographers equally well known to fame; and in the present one all the gentlemen named contribute more or less largely. As it may prove interesting to our readers to know who are the exhibitors, we here give, in alphabetical arrangement, their names:—J. Albert, C. Alfieri, Lieut. S. Anderson, R.E., Henry Ashdown, Autotype Co., J. M. B., W. J. Baker, F. Beasley, Jun., J. C. Belton, V. Blanchard, Breese and Co., Frank Briggs, Netterville Briggs, W. Brooks, T. M. Brownrigg, Bullock Brothers, Burgess and Grimwood, E. C. Buxton, Jun., N. K. Cherrill, E. Cocking, D. C. Dallas, T. Davies, Henry Dixon, F. Downer, E. Dunmore, W. Durrant, F. C. Earl, B. J. Edwards, W. England, C. A. Ferneley, A. S. Fisk, N. E. Fitch, E. Fox, Fradelle and Leach, S. Fry, P. Gardet, R. Gillo, R. M. Gordon, W. J. A. Grant, B. Greene, H. Hayman, Vernon Heath, A. L. Henderson, E. Hewett, Fred. Hollyer, G. Hooper, F. Howard, J. Hubbard, Charles Hunt, A. H. Irvine, Col. Sir H

James, W. Jeffrey, J. H. Jewell, Rev. A. Johnson, J. C. Jones, A. F. Lafosse, H. G. Lemenager, J. G. Livesay, F. G. Lloyd, Lombardi and Co., Capt. E. D. Lyon, J. G. MacAndrew, Marion and Co., J. E. Mayall, R. Mitchell, N. A. Monnickendam, W. F. Morgan, F. A. Mowels, A. Nicholls, Ordnance Survey Office, C. Ocker, Capt. F. Pocklington, Miss E. Pritchard, Pumphrey Brothers, Rabending and Monckhoven, T. H. Redin, O. G. Rejlander, Geo. Restall, C. Reutlinger, Robinson and Cherrill, W. W. Rouch, H. R. Rump, W. D. Sanderson, O. Sarony, R. Sedgfield, A. and E. Seeley, R. Slingsby, A. F. Smith, J. Spiller, J. Spode, W. G. Stillman, A. A. Taylor, A. and G. Taylor, S. Thompson, Twyman and Son, Vandyke and Brown, W. F. A. G., W. Wainwright, Marshall Wane, G. Wardley, F. H. Warlich, H. Watkins, S. V. White, H. Whitfield, M. Whiting, Jun., F. R. Window, Col. Stuart Wortley, and F. York.

Upon entering the west or smaller hall the eye is arrested by a large display of pictures taken in the East by Captain Lyon, but, previous to our "noticing" them, or any others, we shall bestow some attention on the objects placed for exhibition on the various tables.

There are several ivory miniatures by Lock and Whitfield, exquisitely painted, presumably upon a photographic base, although this is not discernible.

Mr. C. E. Elliott exhibits the very ingenious dry-plate camera recently described by us at page 480. It is a matter for regret that no person was present to explain, or rather to *exhibit*, its mode of action.

Mr. Ross contributed one of Helsby's patent heliograms, of which he is the maker. This instrument is a camera fitted with twenty-five lenses, and which is capable of taking fifty small portraits of a sitter in two positions.

Messrs. Pumphrey Brothers, of Birmingham, show a frame containing a large number of transparencies, plain and coloured, for the magic lantern, which fully sustain their high reputation. The variety displayed in the collection of Messrs. Pumphrey is so great that if the pictures were referred to *seriatim* they would of themselves form ample *matériel* for an article.

The elegant little satchel camera of Mr. C. D. Smith is exhibited by Messrs. Negretti and Zambra, together with an ingeniously-contrived developing box for small plates.

Specimens of the graphoscope, very elegant in construction, are exhibited by Messrs. Murray and Heath.

An album of those choice cabinet portraits for which M. Reutlinger, of Paris, has acquired so much fame are exhibited by that artist. The brilliancy and general treatment of his photographs, together with the attractive *personnel* of so large a portion of his fair sitters, secure for this album a large share of the visitors' attention.

The instantaneous stereoscopic transparencies of Messrs. Breese and Co. are of such an exquisite character that, to be properly understood, they must be carefully examined. They are not merely charming, but sensational, while, at the same time, they are true to nature.

Having thus briefly adverted to the objects exhibited on the tables, we now proceed to devote attention to the artistic treasures on the walls and screens, commencing with the works of Captain Lyon, which comprehend views of the *Pyramids*, the *Sphinx*, *Hindoo Pagodas*, *Temples*, &c. Some of these are so exquisitely sharp, while yet soft—for example, a very large view of the *Sphinx*—that the geological character of the stone and the various granularities and indications of the inroads of time upon it are, probably, better seen and appreciated by an examination of the picture than might have been the case from an inspection of the original itself. In pictures of this class it is of the utmost importance that sharpness, in its most absolute sense, should be obtained; and of this fact Capt. Lyon appears to have been quite aware. Apart from the interest attaching to the originals, and apart from the pictorial merits evinced in the treatment of the subjects, as mere photographs they are marvellous. Of these Eastern pictures there are upwards of twenty exhibited.

Hung in close proximity, although somewhat above "the line," are several of Herr Albert's photolithographs, if it be not a misnomer to call by this name pictures which are *not* printed from stone. It is well known that, although the general lithographic operations are resorted to in this method of printing, the printing surface is not stone but gelatine. The specimens exhibited are very large, and possess much brilliancy. Herr Albert, we understand, not only does not keep the details of his printing process a secret, but he teaches it, on certain definite terms, to all who desire to study his process.

We shall resume our notice of this excellent exhibition next week.

GOUPIL AND CO.'S WOODBURYTYPE ESTABLISHMENT.

Mr. H. Baden Pritchard has recently paid a visit to M. Goupil and Co.'s establishment at Asnières, near Paris. It will be recollected that the above firm purchased from Mr. Woodbury his patent rights, so far as regards France, connected with his photo-relief process, and have been working out that process on a very extensive scale. Mr. Pritchard has communicated to the *Journal of the Photographic Society* the details of his visit, from which we extract the following interesting particulars:—

It is very possible that at Asnières not more of the working of the process is to be seen than at the seat of the Photo-Relief Company in Brompton; but there is this notable difference, which to cynical minds is of importance: in London the work is carried on under the auspices of the inventor, to whose interest it is that everything should appear in its best light, and that the manipulations should all seem perfect. In Paris, at Messrs. Goupil and Co.'s, no suspicion can be entertained on this score (that is to say, as to a desire to hush up any defects of the process); for the latter has simply been purchased in the way of business, and is worked methodically like any other ordinary branch of industry.

The establishment is under the direction of M. Rousselon (to whose courtesy I am much indebted), and at present capable of turning out 500,000 impressions per annum. The various operations, with the exception of those relating to the preparation and exposure to light of the gelatine, are carried on in one vast and lofty workshop, partitioned off into enclosures. In the printing department five circular tables are fitted up, each furnished with six presses; one workman is sufficient for each table, who, by causing the latter to revolve the sixth part of a circle, brings each press successively under his hands. A quantity of warm gelatinous ink is poured over the engraved plate, the paper is placed upon the ink, and the lid of the press is then shut down upon the paper. A short time is necessary to allow the ink to set; and, by arranging half-a-dozen presses in the manner described, an interval elapses between the application of the ink and the removal of the finished print. Most of the presses employed are fitted with a hinged lid, fastened by means of a hasp; but M. Rousselon states that the pressure exerted by this description of press is not always perfectly equal, and he contemplates, therefore, adopting a screw press, of which he has already some half dozen under trial. Moreover, so much work has he at present in hand that five more tables are required to be fitted up at once. In the majority of the presses two pictures, about cabinet size, are printed at one operation, while the largest impression thrown off appeared to measure about a foot in length; the size of the pictures to be produced depends solely upon the amount of pressure at one's disposal in pressing the gelatine matrix against the metal plate, and upon the size and evenness of the latter.

The obtaining of a perfectly uniform impression upon the metal plate is an operation of some difficulty, and has only been arrived at after great study. The metal used is an alloy of lead and antimony, or, one might say, lead hardened with one per cent. of antimony. The gelatine mould is laid upon a steel plate, and a sheet of alloy placed thereon, the latter being confined on all sides so as to be incapable of spreading out and thus distorting and otherwise injuring the engraving. Hydraulic pressure is then applied, and an impression obtained upon the alloy. M. Rousselon believes that an improvement will be effected by using a press recently invented by a French engineer, M. Deugoffe, in which the last squeezing action is developed by the introduction (by means of a fine screw) of a piston into a reservoir of oil, and the latter, being thus displaced, exerts a steady and uniform pressure. The operation of pumping, in the ordinary hydraulic machine, causes the latter to move by jerks; and particles of the metal becoming affected thereby after continual employment, uneven pressure is the result. The machine of M. Deugoffe is capable of exerting a pressure of 1,000 kilogrammes on a surface two centimetres square, and is now employed in the Imperial arsenals for the testing of cannon.

According to M. Rousselon's experience, the gelatine matrix will serve for the production of twelve engraved plates if care be exercised in their preparation.

The paper on which the prints are taken was at an early period of the process a subject of considerable anxiety. At first Mr. Woodbury was unable to procure a material suitable for his purpose under £10 per ream; but now a paper sufficiently good can be purchased for fifteen francs. The inks employed may be of any tint; but, in making up the neutral colours, it was found necessary to add always a slight quantity of blue pigment to counteract the yellowish tinge imparted by the other ingredients. There is now, however, no difficulty experienced in regard to the supply of the various tints, which are specially manufactured for the purpose by an English house, Messrs. Newman and Co., of Soho-square, a firm which has given the subject special attention. Sometimes a sepia tint is used, sometimes bistre, sometimes neutral; but in all cases, the more it is worked (that is to say, the more frequently the parings and droppings are employed) the better the material becomes.

The pictures produced by Messrs. Goupil and Co. are, for the most part, reproductions from paintings and cartoons—more especially the former. The pictures are of small size, and, when mounted and finished,

are sent into the market to compete with ordinary photographs, without any special attention being called to the manner in which they have been produced. They simply bear the word "*photoglyptique*," and are sold entirely on their own apparent merits. No portraits were being executed; but that was simply, said M. Rousselon, because no order for that class of photograph was at present in hand. At my request, however, some large heads were shown, displaying the various degrees of depth and vigour to be obtained; and these were, without exception, of the most promising character.

As regards the preparation of the gelatine mould or matrix, but little difficulty is now experienced. Printing by means of direct rays only is necessary, the exposure required being generally about the same as that of a silver print; the gelatine employed must be of a certain quality, and prepared with care. No photometer of any kind is employed, as the operators prefer to depend entirely upon their own judgment; and the subsequent operations of washing and hardening the film are so simple as hardly to necessitate special instruction in the matter.

In one division of the workshop, near the hydraulic presses, are stationed other machines used in facilitating the various manipulations. A small steam-engine, always ready to be set going, and capable of driving a shaft running along the workroom, is used for various purposes; a circular saw for cutting and trimming the engraved plate to the exact dimensions of the press, a lathe for turning purposes, and a large magneto-electric machine are all set in motion by this steam-shaft. The electric machine is of the same description as those at present employed on the large Atlantic steamers for signalling purposes, and at forty centimetres distance gives a light about a fifth part as strong as that of the sun. By its aid engravings and paintings are frequently copied; but the pose is necessarily a somewhat lengthy one. Near to this machine was a powerful electrotyping apparatus, capable of furnishing in half-an-hour a copper deposit, or sheet, of considerable thickness, which, unlike in nature to the greater number of rapidly-precipitated electrotypes, was of exceedingly fine quality, and quite free from all traces of coarseness. This apparatus was employed by M. Rousselon in perfecting a modification of the Woodburytype, of which I will now say a few words before closing.

That gentleman's endeavours are directed to transforming, if possible, a photographic portrait into a copperplate engraving, capable of being printed by ordinary copperplate printers with greasy ink; and this aim he is sanguine of fulfilling with the aid of Woodburytype. A gelatine matrix is obtained in the ordinary manner; and to this is then imparted, by a secret method, a species of grain, which is afterwards conveyed to a metal plate. "Woodburytype, *c'est la pression*," said M. Rousselon, thus broadly defining the process; "and this I chiefly employ in elaborating my method." The specimens shown did not profess to be more than mere outlines, but they were still sufficient to warrant a continuation of the experimental research to which M. Rousselon has devoted himself.

Before leaving, the complete series of manipulations, with the exception of that of washing the gelatine, were successfully demonstrated. The negative, the gelatine matrix, the impressing of the image upon metal, the trimming and fitting up of the plate, the adjustment of the evenly-polished surfaces in the press, the actual printing, the fixing, mounting, and finishing of the pictures were all shown one after another; but of all these the most marvellous was certainly the conversion of the flat, dull, metal surface into an engraved plate of exquisite delicacy and finish, a proceeding which, here accomplished in minutes, in the ordinary course is often a matter of years.

EARLY REMINISCENCES OF PHOTOGRAPHY.*

It is always extremely interesting and instructive to trace the early dawn of a discovery to its higher and fuller development in its application to purposes of utility and ornament. Every new discovery is the unlocking of another of Nature's boundless storehouses, from which new facts are drawn, giving interpretation to some of Nature's hidden and mysterious processes.

The old philosophers seem to have had some slight conception of the influence and power that the sun's rays had upon coloured bodies. Some colours were deepened, others were discharged, by their influence. It has been sometimes asserted that the jugglers of India were in possession of a secret by which they were enabled to obtain the likeness of their friends and patrons through the influence of light. The searchers after the philosopher's stone came upon the combination of silver and chlorine—a combination previously unknown to them, and which they called "horn silver," as by fusion the white powder they obtained by precipitation was converted into a hornlike substance which blackened by light. They seem never to have turned this discovery to any practical end.

Scheele was the first who gave a philosophical description of the peculiar action of the different-coloured rays upon the salts of silver. It was not until 1802 that these observed phenomena were turned to a practical purpose by Wedgwood and Davy. They succeeded in obtaining impressions by the solar microscope upon paper saturated with nitrate of silver, but were unable to give permanency to the image so obtained from their want of knowledge of a fixing agent.

M. Niepce, of Chalons, on the Saone, appears to have been the first who directed his attention to the production of pictures by light. His experiments date twelve years subsequent to those of Davy and Wedgwood. After continuing his experiments about ten years, with not very great success, he became acquainted with Daguerre, who had been for some time absorbed in similar researches. They agreed unitedly to continue their investigations. M. Niepce communicated a paper to the Royal Society of London on the subject in 1827, retaining the secret of his process; but, agreeably to the laws of that body, it could not be received. The paper was accompanied by a number of designs in metal. I believe some of them are still extant in the possession of Mr. Robert Brown, of the British Museum.

The discovery of Daguerre was announced to the world in January, 1839, but was not published until the July following, after a bill had been passed through the French Legislature conferring on him an annual pension of 6,000 francs, and a pension of 4,000 on Isidore Niepce, the son of M. Niepce, with a half in reversion to their widows.

In the same month (January) in the same year Mr. Fox Talbot communicated to the Royal Society of London his photographic discoveries, and in February he gave to the world an account of the process which he had devised for preparing the sensitive paper for obtaining photographic impressions.

About the end of October, or the beginning of November, a friend of my father's, in England, sent me a newspaper, in perusing which my eye fell upon a paragraph announcing that a Mr. Fox Talbot had discovered the means of fixing the image in the camera obscura, by first subjecting ordinary writing paper to a weak solution of salt, and afterwards to a solution of nitrate of silver. I had long amused myself with sketching by means of the old camera obscura, so, being in possession of the instrument, I resolved to lose no time in testing faithfully the meagre instructions contained in the newspaper paragraph.

Although it was the morning of the first day of the week, I made for the nearest apothecary's shop for the very large quantity of a pennyworth of nitric acid. I possessed a slight smattering of chemistry.

A sixpence was immediately subjected to the hammer, beat out, clipped up, and enveloped in the nitric acid. After its solution was accomplished, partially evaporated, and diluted with a little water, no time was lost in applying it to a few sheets of paper that had been previously subjected to a salt solution.

All this was done very stealthily, as no doubt a certain portion of my person would have been subjected to a rather severe process if it had been known that I had been engaged in so desecrating the first morning of the week.

The sketching camera was quickly removed into a neighbour's house—a gentleman (Mr. Milne) who took a very lively interest in everything connected with scientific discovery. After a little conversation with my friend as to the best procedure to be adopted, the camera was erected, and the image of a very beautiful geranium was cast down upon a sheet of white paper. One of the sensitive sheets of paper was placed in the bottom of the box, and the image cast on it. Hours passed without any very perceptible change; but, ultimately, a slight indication of the stems and leaves began to make their appearance, and hopes of ultimate success began to rise. Hour after hour did my enthusiastic friend accompany me to that dark chamber, and, lifting gently the enshrouding curtain, watch with intensest gaze the progress of the further delineation of that memorable flower.

This printing process went on during the whole of the first day, and until the dusk of the succeeding day; and that piece of paper was then extracted from the camera, bearing with it a very well-defined negative image of the plant. This photograph was exhibited in Carrubber's Close Chapel, after the delivery of a lecture on natural philosophy, by my friend Mr. Milne. The photograph was not fixed, but was shown between the folds of white paper in a portfolio, screening off the heavy glare of the gas, not knowing at what moment the whole thing might vanish.

The enthusiasm with which I returned to repeat my experiment can only be appreciated by those who have just soiled their fingers for the first time, in the development of their first negative. Day after day, leaves, bits of lace, and grasses were laid on the sensitive prepared sheets of paper, and pressed in contact by a sheet of glass laid over them with weights at the corners. Such was the simplicity of our early printing-frame.

In 1841 Mr. Talbot made another great stride in the preparation of his sensitive medium by the impregnating of the paper with iodide of silver. By this great sensitiveness was obtained. By this time the rude sketching camera was replaced by one better fitted for the new chemical process, being nothing less than the present photographic camera, with all its essentials.

Not long after this, Hill and Adamson's calotype portraits became the wonder of every gathering of scientific or artistic men. Time after time have I gone and stood on the projecting rock below Playfair's monument on the Calton Hill, and drawn inspiration from viewing Mr. Adamson placing a large square box upon a stand, covering his head with a

* Read at a meeting of the Edinburgh Photographic Society, November 3, 1869.

focussing-cloth, introducing the slide, counting the seconds by his watch, putting the cap on the lens, and retiring to what we now know to be the dark room. Oh! if I only could have got an introduction to these men, it would have been the consummation of my happiness! But it was destined that I should continue to work unaided in my experiments for a considerable time.

The first popular treatise written by Robert Hunt was published by Griffin and Co., Glasgow, and this contained a vast store of information for a young enthusiast. The various processes of Sir John Herschel were given, together with the innumerable processes and experiments of the editor. Repeating these occupied my time very closely. I shortly acquired an ambition to master the details of the Daguerreotype; this led to my introduction to the late Mr. Howie, the first who made the work of the Daguerrotype a profession in Edinburgh. He was a great character, as many of you no doubt will remember, especially those who have been *thumbed* round his room when he was in the act of enforcing his photographic propositions.

I remember my old friend Thomas Davidson having constructed a new lens. Sir David Brewster and two other scientific friends were at the testing of it, when it was resolved that they should adjourn to the space of ground now occupied by the East Prince's Gardens. Mr. Howie's camera stand was rather ricketty, so a large window or clock weight always accompanied it. One of Sir David's friends was placed on a chair in the best light—in fact, with the full blaze of the sun in his face. Mr. Howie got his camera focussed, and the clock weight laid on the top of his camera to keep it steady, and was just about to draw up the slide when his sitter began to mutter something about his hat going to be blown away, when old Howie at once satisfied him that there would be little danger of it moving far, as he, with the rough exclamation of "—— your hat," at once transfixed it with the clock weight. The exposure being over, the gentleman found his hat thoroughly ventilated, as the clock weight had passed right through the crown!

The next great improvement was photography on glass. It was first published by M. Niepce de Saint Victor, followed by Blanquart Evrard. This was the application of albumen containing the sensitive salts. I obtained great sensitiveness by the addition of a small quantity of saccharine matter—so much so, that I took many portraits on albumen plates. Messrs. Ross and Thomson, of this city, made this process peculiarly their own. Many present will remember their beautiful views of Edinburgh; also their albumen glass positives backed up with plaster of Paris. Many of these were exhibited at the meeting of the British Association when it was held here.

Albumen answered for many purposes, but an increased sensitiveness would have been a great desideratum. This sensitiveness was found two years afterwards in the beautiful collodion process first given to the world by M. Le Gray, published in Paris in 1850, translated by Thomas Cousin, and published by T. and R. Willets, opticians, in the July of 1850.

There has been a great deal of discussion as to who first suggested collodion in connection with photography. There cannot be the shadow of a doubt but that Le Gray was the first who published it. Mr. S. Archer's famous letter in *The Chemist* of March, 1851, no doubt mentioned iodide of silver and iodide of potassium as essentials in his collodion process, but this was nearly twelve months after Le Gray had published his process, by which he had obtained pictures in the shade in five or six seconds—a sensitiveness scarcely exceeded at the present time. I have never doubted but that Mr. Archer was an independent discoverer, but undoubtedly priority of publication belongs to Le Gray.

My first collodion was made from Le Gray's formula, and I had taken many pictures before *The Chemist* made its appearance in March, 1851. Mr. Archer's letter gave a great impulse to photography; but for it, perhaps, Le Gray's process might have lain in abeyance for some time.

I continued to work the Daguerreotype and the collodion processes together; but the dry and the wet were ill assorted, so I had to divorce the former.

When I state the fact that, in 1851, 1852, and 1853 211 pupils passed through my hands, it will give you some idea of the enthusiasm with which amateurs had received the new process. As an instance of this enthusiasm I may mention that the Burgh schoolmaster of Burntisland, on his way to the Exhibition of 1851, saw, at the establishment of Mr. Kemp, chemist, some portraits I had taken. He asked Mr. Kemp if he would introduce him to the person who had taken them. He did so, and after a little conversation he (Mr. Davidson, the schoolmaster) hinted that he should very much like to know a little more of the process, slily adding—"I suppose ye'll be gaun to keep it a secret." "Oh! no," I replied, "all that I know would not be very difficult to communicate." A bargain was struck that he was to receive four lessons for two guineas. The four lessons were given, and Mr. Davidson did not proceed to London according to his intention when he left home, but remained with me for three weeks, his family being under the impression that he was in London. Before leaving I provided him with all the necessaries for at once taking photographic portraits on his return home.

There were still eight days of my friend's holiday unexpired, and he left with a glowing enthusiasm in the prospect of devoting the remainder of his vacation to immortalising his numerous pupils. But, alas! he was doomed to disappointment. Plate after plate was collodionised, dipped in the nitrate bath, exposed, and an effort made to develope the latent image; but no image ever made its appearance. Hour after hour—day after day—was devoted to fruitless efforts; and at last he gave the matter up, assuring himself that he had fallen in with an Edinburgh sharper. Not only had he been robbed of his two guineas, but, what now appeared of much more value, his three weeks' time, which he might have so profitably employed at the Great Exhibition of 1851. All his chemicals were nearly exhausted when the thought struck him, "Would the flap o' the camera hae been turned down?" Upon examination, the square of the key had been worn round, so that it had never turned the spindle which carried down the flap. This discovery restored me to the good graces of one of the best men I have ever known.

I may mention a circumstance showing my friend Davidson's enthusiasm. For many years he came across the Firth, and spent the Saturday with me. I can assure you it was not an idle day with him; for he was ready for printing, cleaning glasses, making gun cotton, or even drying it, notwithstanding the danger of its exploding and carrying him through the adjacent window, a calamity which, by the bye, has happened more than once.

Mr. Davidson was in the habit of taking forcible possession of me after the day's work and transporting me across the water to spend the Sunday with him. I at one time made an agreement with him to go quietly across to Burntisland if he would not ask me to look through his camera on the Sunday. He tacitly consented, but, to my surprise, my bedroom door was opened at the unseasonable hour of four o'clock in the morning, and there stood my tormentor asking me if I did not think it a shame to be lying there when Kinghorn was lighted up with the most magnificent sun that ever shone on it. I pleaded for another hour. He granted it; but the fates did not let me realise it. In less than half that time he made his appearance again, exclaiming—"Tunny, get up! I think the schule's on fire!" I sprung to my feet, and then into my pants. Down the stairs I went, and, no mistake, the school really was on fire. As the flames met us on opening the door, the gaspipes were melting, and I was just in time to get the gas screwed off at the meter. In a few minutes the flames were subdued. The cause of the fire we ascertained to be the falling down of some carbon in an ignited condition from an iron plate suspended over a large gas jet to collect carbon for the polishing of Daguerreotype plates. Everything was set right again, and the repose of the family remained undisturbed.

In going up stairs once more I was thinking there would be no "Kinghorn beautifully lighted up" nor camera spoken of that day; but think of my surprise—no sooner had we entered the dining-room when the camera was placed on the window-sill, and my attention was drawn to the magnificent landscape on the obscure glass. In no way could I get out of it; I had to superintend the coating of a plate. The picture was taken and the development commenced, when instantly I was called on to hold the white sheet of paper below the negative to let him judge of the development. My eyes were confused, and the sheet of paper, which usually lay convenient, could not be found. Mr. Davidson was not to be disconcerted by such a trivial matter; for in one moment I saw a large display of the opposite end of that garment to which his shirt-collar was attached. This was too much for me. Just think of that sheet of linen receiving all the surplus solution of pyrogallic acid and silver!

However, a neighbouring friend came in, the negative was washed and placed in his hand for examination, and the first exclamation he made was—"Dear me, Mr. Davidson! ye'll no show that picture tae onybody, for there's Mr. Steedman's gig stan'ning at Effie Watson's door, an' ye ken its never there but on the Sunday!" Mr. Davidson quickly replied:—"Ou dunna be sae particular; we'll just say it was the fast day!"

The negative was laid aside, but it was not so easy to restrain our risible faculties, as there stood Mr. Davidson wringing his soiled linen, which, by this time, was as black as the densest part of his negative.

But I must here abruptly conclude these reminiscences, and wait until another opportunity presents itself to resume them. J. G. Tunny.

Contemporary Press.

ENCAUSTIC PHOTOGRAPHS.

[Journal of the Photographic Society.]

There is, perhaps, no photographic process respecting which so much has recently been written as that of producing permanent pictures upon enamel, porcelain, and glass. And yet, although the subject has monopolised so large a share of photographic literature, the practical results have been very few indeed. The names of Grüne, Geymet and Alker, Lucy, Lafon de Camarsac, Henderson, and Oidtmann may be mentioned as having attained some success in this branch of photography; but the productions of none of these gentlemen, with the exception, perhaps, of the three last, are of such excellence as to warrant us in believing that perfection in the art has been attained. Whether it be the uncertainty of the manipulations, or actual defects in the theory in

processes employed, we know not; but certain it is that pictures of this nature appear very difficult to produce endowed with sufficient half-tone and free from excessive hardness.

This fact is much to be regretted; for, were encaustic photography a simple and efficient process, capable of employment with ease and certainty, an important application of our art would thus be secured for industrial purposes. Porcelain painting and printing is a very extensive and important branch of industry, and a considerable amount of capital is expended in its pursuit. The costly dinner and dessert services turned out by manufacturers of porcelain ware find a ready sale both in this country and abroad, and are disposed of at such high prices that liberal allowances can be afforded to the designers and artists engaged upon the embellishment of the various articles. In the best class of goods every separate piece passes through the hands of an artist who paints each individual design, and finishes the same entirely by hand. From the fact that the paintings are often of great variety and require considerable elaboration, and, moreover, seeing that they are necessarily the work of a practised and skilful artist, it follows that the labours of the latter must form a notable item in calculating the total cost of production. If, therefore, porcelain manufacturers are prepared to pay handsomely for the beautifying of their wares, a well-paid field for labour may be said to exist, in which photographers have some chance of participating; for, were it possible to produce with any degree of facility upon china the same beautiful results as are so often obtained upon highly-glazed paper, there would be no doubt as to such pictures being very suitable and welcome for the adornment of pottery.

In the ordinary methods of encaustic photography there are two points of a mechanical nature which are very apt to interfere with the attainment of a perfect result. In the first instance, the fusible pigments employed may not be sufficiently finely ground for the purpose, some of the metallic oxides used being exceedingly difficult of reduction to a powder; and, in the second place, this finely-divided pigment may not be applied with the care necessary for the development of a good picture. Inattention or carelessness upon these points is certain to render the results unsatisfactory, and to create a hardness which does not actually exist in the original *cliché*.

Moreover, the manipulations, at present, appear to be by far too numerous and complicated. The simplest plan, and perhaps the best, now in operation is that yclept "pyro-photography," recently described by Dr. Liesegang as being used with considerable success by MM. Oidtmann and Co., of Linnich—who, by the way, have recently been awarded a silver medal for their exhibits of this nature at the Industrial Exhibition of Altona. The method adopted by MM. Oidtmann and Co. is to prepare a mixture of honey, glycerine, and other substances of a gummy nature, and to coat a plate with an aqueous solution of the same; a little bichromate solution is added, and this modifies the hygroscopic character of the film in such a manner that the more it is exposed to the action of light the more it loses the property of absorbing moisture. After exposure a finely-ground pigment is dusted over the surface of the film; and, inasmuch as a positive *cliché* or diapositive is always used for printing, a positive print is, in like manner, produced upon the film, and this is then burnt in upon its siliceous support. Different metallic oxides are employed, according to the tint desired to be secured.

These are the whole of the manipulations necessary; and "pyro-photography" therefore presents the advantage of being a much more simple process than the ordinary methods of enamel photography, which require the subjecting of the print to the action of acid, the covering it with a film of collodion, and, finally, the transferring it to another basis. It seems to us, however, that a simpler method still would be that specified by Mr. Johnson in his recent carbon patent, which appears, moreover, exceedingly practicable. The tissue is made up of a fusible pigment, instead of the usual Indian-ink or lampblack compounds (a modification being, perhaps, necessary in the binding material); and this is simply exposed under a negative, swollen in cold water, and then applied to the basis upon which it is to be burnt. The latter being an impermeable surface, the tissue will cling to it tenaciously, and the image can then be developed in warm water in the usual way. After drying, the image would probably, without further manipulation, be ready for introduction into the muffle-furnace.

The fact of the picture being reversed would, in the majority of instances, be of no import; but, in cases where an absolutely correct view is required, the *cliché* itself might be employed reversed. In this mode of working, no injury to the picture could possibly arise from clumsy manipulation; and the necessity of developing by dusting over fine powder would be obviated. The fixing down of the particles of fusible pigment, a most delicate operation, would not here be performed by hand, but by the action of light; and, therefore, the result would not only be more faithful, but would be conducted with greater nicety. Indeed, no operation of importance, with the exception of the actual grinding of the pigments, would have to be performed by the operator; and this would probably be the duty of the manufacturer of the tissue.

Designs might in this manner be easily transferred to porcelain, &c., and could then be painted in by artists in the usual way, or it might, perhaps, be possible, by using two or three tissues of different tints, to produce a painting direct upon a china surface. If, for example, we wished to reproduce a branch of holly or a sprig of forget-me-nots, in this case two colours only would be necessary, as the stalk is generally as green as the leaves. A carefully-shaded monochrome is executed of the green portions; and from a *cliché* thereof pictures are obtained on a green tissue and burnt in. Another *cliché* of the red or blue portions could afterwards be prepared and treated in like manner; and, if a black tint were required, this also might be applied in a similar way, the operation of burning-in being performed after each application.

The above is, of course, merely a crude suggestion, and would, very possibly, present difficulties of a practical nature in its elaboration. Nevertheless there is no doubt that the working out of a simple method by means of which photographs, coloured or otherwise, could be produced upon porcelain with facility, is well worthy of the attention of investigators, inasmuch as it is one of those arts for which there exist at the present time many uses, and which, therefore, would be of considerable value in many branches of industry. A method, for instance, by means of which those charming coloured reproductions of flowers sent to us from Germany, which stand out so marvellously in relief, could be transferred to porcelain and china, could not be otherwise than a popular and valuable invention.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 17th	Edinburgh....................	Hall, 5, St. Andrew-square.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

This Society met on the 3rd instant—Mr. J. Cooper in the chair.

The Honorary Secretary, Mr. John Barnett, then read the following statement in connection with the present aspect and future prospects of the Society, and it was agreed that a copy of it should be sent to each member:—

In calling your attention to the proposals and suggestions made at a special meeting of the committee, held on Wednesday, the 13th October, to consider the future of the Association, I think it right that some explanation should be offered of the reason for holding such a meeting, and the views of some of the members of the committee respecting it.

The North London Photographic Association was formed in the year 1857 by a number of amateurs, and its objects comprised the reading of papers, discussion and conversation on all points connected with the art, the exchange of specimens, experimental demonstrations, &c.; and for many years it stood second to no other society in its efforts to develope the art it sought to foster. It ranked amongst its members many who have since become famous, and the meetings generally were crowded and the interest fully maintained by the mutual interchange of experience or the desire to obtain it. The journals of that day being limited in number and published at long intervals, the principal means of obtaining information was by attendance at the meetings of this and kindred societies.

This state of things is now entirely changed. The journals take the initiative, and by their liberality obtain the papers and information which would otherwise be made known through meetings only; and there are few to be found who, for the mere pleasure of writing a paper, are also willing to read it to empty benches to receive the usual "vote of thanks" without a word of discussion on its contents.

Hence many of the members feel that the mission of the Society is fulfilled, and suggest the wiser course of omitting all formality and converting the Association into a club with occasional meetings of a strictly conversational character, and an annual distribution of photographs to the extent of the funds in hand. Others, again, differing from this course, would wind up the Association, and distribute the accumulated funds of the Society (about £20) in photographs to the members. The other course proposed is to hand the funds to another society in lieu of payment of entrance and subscriptions by such members as like to join it.

It was desired by the committee that the November meeting should be made special for the consideration of these suggestions; but the rules not admitting of such a course, it is decided that the meeting to be held on the 1st December be made special for that purpose; and, as it is desirable that the opinions of all should be obtained (if possible), it is hoped that each member who cannot attend will, before that day, inform the Secretary of his wishes on the subject.

The following are the proposed resolutions:—

1.—That the Association be continued as an art-union and club, and that the funds in hand be appropriated to that purpose.

2.—That, in the event of the dissolution of the Association, it is proposed that the funds be appropriated to the advancement of photography, by handing them to the Photographic Society of London in lieu of entrance-fee and subscription for any member of this Association who may join that Society during the present year, such members to be entitled to all the privileges of the Society to the

end of its current year without further payment, provided the said Society is willing to accept the funds on such conditions.

3.—That the funds of the Association be expended in the purchase of a photograph to be presented to all members who paid the subscription for the year 1868-9, and the Association be dissolved.

No other business having been brought forward the meeting adjourned.

EDINBURGH PHOTOGRAPHIC SOCIETY.

This Society met in the Hall, 5, St. Andrew-square, on Wednesday, the 3rd instant.

The routine business having been accomplished, Mr. J. G. Tunny gave an address on the *Early Reminiscences of Photography* [see page 545], which was listened to with great attention and evident relish by all the members present. The paper contained little that could be called controversial, and in the conversation that ensued a number of very interesting facts were elicited, which Mr. Tunny was requested to embody with his paper when written, it having been delivered *vivâ voce*.

After the meeting proper was over, a Council meeting was held, and arrangements made for holding the annual meeting, which was fixed to be held on the 17th instant.

Correspondence.

Foreign.

Paris, November 6, 1869.

Last Friday evening the first meeting for the new session was held by the French Photographic Society. The programme was not very rich in subjects, and the *séance* closed earlier than usual.

The modifications of the carbon process occupied most of the attention of the members, and upon this subject we had observations presented to us by MM. Despaquis, Placet, and Marion; and a series of very fine and large pictures were presented to the Society by Herr Albert, of Munich. In course of conversation we learnt that this gentleman could print one hundred pictures from one *cliché* per day, and all guaranteed satisfactory. Those printed for the various photographic journals were struck off with greater rapidity, and consequently all the specimens would not be found of equal perfection. It was also stated that although the outlines of the process by which Herr Albert produces these fine pictures have been published, there are details of manipulation which are reserved for his own use by the inventor. No one could complain of this.

M. Despaquis read a communication respecting the application of a process which he had patented. The process was not new, and M. Despaquis wished it to be understood that all he claimed was his application of it. It is well known that gelatine moulds can be obtained by the action of light, as in processes by MM. Poitevin, Woodbury, and others. M. Despaquis proposes to utilise these moulds by using them as stamps for stamping note-paper, documents, &c., &c.; and he exhibited a sheet of paper having a small medallion portrait stamped upon it. The impressions from these moulds might either be in relief or flat.

M. Placet opposed the possibility of M. Despaquis obtaining a patent, and contended that the application he claimed was not new, as it was included in a patent he (M. Placet) had taken out eight years ago, from which he read extracts, and this patent had been since renewed. Specimens of the application had also been exhibited at the Society's exhibition, and in 1867.

To this M. Despaquis replied that he was unaware of these patents in the first place, and he asked M. Placet if he had produced impressions upon paper in the form he (M. Despaquis) had exhibited and described. It is a pity if patents are not properly worked out, and all the advantages given to the public. Idle patents which never work, and yet prevent others from working, are worse than useless, and should be protested against.

M. Marion sent in the following remarks upon a modification in his mode of operation for obtaining carbon pictures by transfer on to albumenised paper. It may be remembered that M. Marion advised that the exposed carbon picture should be made to adhere to a sheet of albumenised paper, and that the two should then be plunged into hot water or exposed to steam, for the double purpose of coagulating the albumen film and developing the carbon picture. Now, M. Marion finds that "the coagulation of albumenised paper by steam has quite an opposite effect to that produced by alcohol; that is to say, instead of softening the sizing of the paper, the steam hardens it, and gives to the film of albumen a surface so horny that water glides off it as if from glass, and the sheet only absorbs moisture from the back." This property of steam-coagulated albumenised paper M. Marion now says is very important, and much facilitates the application and adherence of the albumenised sheet against the surface of the carbon paper. The manipulations now recommended are the following:—Plunge the coagulated albumenised paper into a dish of water, face upwards, taking care that no air-bubbles shall form at its surface. Introduce gently into the same dish the exposed carbon picture, face downwards, and be careful that no air-bubbles form between the two sheets. The edges of the carbon paper have a tendency to curl inwards at first, but soon they stretch out, and oppose no resistance to the pressure of the fingers. Now is the moment to use the caoutchouc "comb," before the edges of the picture begin to curl upwards. Pass it gently and with slight pressure over the two sheets in order to drive out all air-bubbles. Glass dishes are the best for this process, or those in which a sheet of plate glass is placed at the bottom. Whilst the two sheets are damp with excess of water, put them upon a sheet of glass placed horizontally, and pass the hand over them gently to squeeze out all moisture. The passage of a metal roller at the last will finish this part of the operation. The two sheets are then placed in a press, and should remain there from half-an-hour to an hour. The hard surface of the albumenised paper which has been coagulated by steam requires all this time; but the process is more sure, and there need not be any fear of the disintegration of the paper, or of the scaling off or unequal setting of the albumen. The development of the picture is accomplished as usual, only with greater facility, on account of the impermeable nature of the albumen film. The use of *grenetine*, instead of gelatine, as mentioned in my last letter, is also said to render the development of the carbon pictures easier. An albumenised gelatine paper might be substituted for the coagulated albumenised; but the former is to be preferred—at least for the present—as it resists the action of the hot and cold water baths better. Instead of plunging the albumenised paper in the dish of water first, the sensitised carbon sheet may be introduced, and the albumen placed upon it. There are some advantages in this way of operating, but it is a matter of experience; some may prefer one way and some another. Whichever primary operation be adopted, the subsequent processes for driving out the moisture and air-bubbles remain the same.

M. Belbeze, to whom M. Davanne paid the compliment of saying that he was a careful and great experimenter, sent two communications respecting the Taupenôt dry collodion process. Your readers may remember that M. Belbeze introduced tea to the notice of photographers, some months since, as a good preservative, in place of tannin, on simply washed collodion plates, and stated that it imparted a rapidity which was not found in the use of tannin. Not being satisfied with the keeping qualities of the albumenised collodion plates—which he found to deteriorate by age, probably from some combination of the albumen with the free nitrate of silver—M. Belbeze experimented upon the use of the infusion of tea as a preservative for these plates, and found it to answer well. Plates were good eight or nine months after preparation, and were better a week after the preparation than upon the very day—probably from more perfect draining and drying. M. Belbeze has also been experimenting upon the alkaline development applied to Taupenôt plates, and finds it a great success, whether it be used upon Taupenôt plates pure and simple or upon those prepared with tea. Certain precautions have to be observed, however, or a fog in developing will be the result. Three solutions are prepared:—No. 1 is a saturated solution of carbonate of ammonia; No. 2 is composed of pyrogallic acid, alcohol, and water; and No. 3, bromide of ammonium in solution. The last-named solution added to the bath, composed of proper proportions of the two others, prevents the fogging. M. Belbeze finds that a solution of carbonate of soda is ineffective, and gives no results. This process of alkaline development may be applied with equal success to the coffee, tea, or albumen preservative processes.

The Secretary, M. Laulerie, announced that the Exhibition of the Society in the Palais de l'Industrie, this year, may be considered as a success. More than 20,000 persons have visited it; and this is a large number for a special and comparatively small exhibition. The pictures must have been well looked at. In a pecuniary point of view, also, it has not been unsuccessful, as there will be a balance in hand when all expenses are paid. The Emperor and Empress have both visited it, and more than once.

The death of M. Leiber, the talented editor and publisher of the *Moniteur de la Photographie*, rendered it necessary to find a successor to him, and although several offered their services, M. E. Lacan determined to take the whole responsibility upon himself. This is the tenth year of the existence of this periodical, and I am informed that the number of its readers has been constantly increasing. M. Lacan says that experience has shown him that it is not sufficient to reply to correspondents in the columns of his journal, but that, to meet all needs, he offers himself as an intermediate for the purchase of all apparatus, products, &c., which his readers may require. "In this manner they will find in our intervention at once an economy of time and money, and a serious guarantee with respect to the quality of the goods acquired and delivered by our care. We have resolved to undertake this, and our new premises permit us to do so with advantage." To carry this out fully, M. Lacan proposes to put himself in daily relations with the best makers, and he is persuaded that these will aid him in his undertaking, by letting him know of all the novelties they bring out. He will hold at their disposition supplementary copies of his journal in which their inventions are described. "It is evident that this exchange of correspondence and these multiplied connections will furnish us with new and precious elements for even the matter of the journal. We are decided not to stop before any sacrifice to give this portion of our publication all the development possible." M. Lacan thanks his readers for past ser-

vices, and avows a lively gratitude that he has been seconded in his efforts by all those who understood that he wished to make a work of his journal, and not a mere speculation. Will your readers be good enough to observe that for the future the address of the office of the *Moniteur de la Photographie* is—"M. Ernest Lacan, 54, Rue de Rivoli, Paris." As an elder *confrère*, we must wish M. Lacan every good success in his undertaking.

Is it not a curious coincidence that the paragraph respecting Herr Meydenbauer and his "new invention" should have appeared in your pages at the same time as my warning to your readers not to allow the honour of the invention of the best instrument for application of photography to land surveying, &c., to be taken from the late M. Auguste Chevalier, and the fruits of it from his widow?

"Another" from America. It is related in the *Journal of Applied Chemistry* that, during the late solar eclipse at Earlville, a young lady, who wore a highly-polished silver pin, whilst looking at the phenomenon discovered afterwards that the eclipse had Daguerreotyped itself upon her pin at the time the sun was about half obscured. "The impression remains upon it, permanently resisting the action of rubbing as well as exposure to the atmosphere." This excels Mumler—some.

R. J. Fowler.

Home.

PHOTO-ETCHING.

To the Editors.

Gentlemen,—Having been engaged for some years in trying to discover some practical means of etching by light on metal plates, will you permit me to offer to your notice some of the results of my long course of experiment, working with (as applied) entirely new agents?

Fully convinced that the first step must be a ground or coating, sensitive enough to receive the subject and admit of its being fully developed—in fact to possess the most important qualities of the common etching ground used by engravers—I proceeded until fully worked out, and so simplified it that, to a photographer, it is a matter of certainty.

The advantages to portrait engravers and amateur etchers are these—that all the time consumed in drawing or tracing and transferring to the plate is entirely saved; and, as the ground admits of "stopping out," the work may be bitten in to any required depth.

I then sought to effect the etching by light alone, and the enclosed specimens will show how far I have succeeded. It is line work, with cross hatching—a very different thing to smooth tint work; and, although a few hours' work would give it more force, I prefer leaving it for what it really is—a photo-etching, done in a few hours, and untouched by graver, point, or burin.

I think I may venture to say that the open work in all Hogarth's plates could be rendered by the same means, and, with the aid of rebiting grounds, all the spirit of the originals be perfectly introduced.

In the course of my experiments I have stumbled over some things which may possibly be new—for instance, to print any subject on to a bare, polished plate, the impression being bold, distinct, and permanent.

I should like to publish the details, for I believe that, as a means of reproducing and multiplying works of art, I have at least discovered a "sound base of operations."—I am, yours, &c., Henry S. Sadd.

36, *Gipps-street, Melbourne,*
Sept. 8, 1869.

[Two specimens were enclosed with the above communication. These indicate that our correspondent has attained a great measure of success. We shall be glad to have further details.—Eds.]

COLLODIO-BROMIDE OF SILVER.

To the Editors.

Gentlemen,—With reference to a passage in my article of last week, on collodio-bromide, &c., I find, on re-reading Mr. Johnson's communication of the previous week, that he was sufficiently explicit in his formula for the preservative solution, whereas I stated the contrary. I wrote from memory after a first reading. Hence the mistake, which I hasten to correct.

Mr. Johnson's formula is 1,000 grains tannin and an equal weight of gum arabic to twenty ounces of water.

Mr. Johnson is aware of my having used a similar mixture of gum and tannin, although in very different proportions. Any increase over one grain of gum in each ounce of tannin solution is, in my experience, prejudicial in the collodio-bromide process, inasmuch as, unless there be a very adhesive stratum between the collodion and the glass, little blisters are apt to form on the film in the course of alkaline development. I have no doubt Mr. Johnson has met with these frequently in the course of his experience. They generally show themselves by an irregularity of development—deeper development, I should say, in those parts where the alkaline solution has got underneath the film and is acting from both sides.

It is possible also that such a large dose of gum as Mr. Johnson recommends might interfere in other respects with alkaline development, but I hardly think it would. The proportions which I recommend for a good preservature, and which is the one I now use, are twelve grains of tannin, one grain of gum arabic, and one ounce of water. When I can find out a better I shall of course communicate it to your readers.—I am, yours, &c., George Dawson.

King's College, Nov. 8, 1869.

DISSOLVING LANTERNS.

To the Editors.

Gentlemen,—A correspondent of one of your contemporaries which is devoted to mechanical subjects describes a dissolving lantern which he says he has used successfully. In it one optical system is placed over the other, as in the biunial lanterns; but, instead of having two lights, one for each, he has only one, which, by means of rackwork, is alternately raised or lowered from one to the other, this transition constituting the dissolving.

Now, according to my notions of these things, no dissolving effect could be produced in this manner, for, as soon as the lime light left the first condenser, in its passage to the other lantern perfect darkness would result, and continue until the light reached the centre of the other system. Am I right?—I am, yours, &c., Edinensis.

Edinburgh, November 9, 1869.

[You are quite right; such a method of dissolving must have been devised by one who was practically unacquainted with the lantern. He could not have used it "successfully," or even with partial success; and, if he says otherwise, it clearly shows that he has never tried it.—Eds.]

Miscellanea.

Leaving her Measure.—"Has Miss B. been in to-day to leave her measure for a porteygraph?" asked a hopeful Canadian of one of our subscribers. "No, sir," he was answered. "Well, if she does come, please have her tooken with ringlets, a small waist, with ear-drops and a brooch, and don't take any money from her, I will pay the bill." The photographer managed all but the waist when Miss B. came, but refused to waste his energies on that.—*Phil. Phot.*

A New Explosive Compound.—The indefatigable Captain Nöbel has produced another explosive, in the composition of which nitro-glycerine is an ingredient. It is intended, of course, to avoid the risks to which nitro-glycerine alone is liable—that is, the risk of spontaneous explosion, or explosion from slight percussion; and it is also possessed of greater force than dynamite. The composition is very nearly that of coarse meal powder, saturated with nitro-glycerine. It is ignited by means of a percussion fuse, or fulminate of mercury ignited by electricity. No doubt this compound may be carried about with perfect safety, and it would not be dangerous if a light were applied to it; but any compound containing nitro-glycerine will always be regarded with suspicion.

The Bristol Photographic Society.—From the following letter by Mr. Ennel, which appeared in the *Clifton Chronicle*, it appears that a lecture which he was announced to deliver did not "come off" for the reasons therein given:—"Dear Sir,—I promised you a report of the proceedings of our ordinary meeting, on Thursday last. If I were now to stop short, and simply add, *voilà tout*, I should have fulfilled my promise. But, as your readers may be curious to know 'all about it,' I will be more explicit. To begin with, it was impossible to vote anyone in the chair. The president *could* not preside, because he is at Gloucester. My colleagues, the three V.P.'s, *did* not, because they had not put in an appearance; and I myself was out of the question since I was to hold forth. There was but one member of the committee, but he would rather not; and any of the ordinary members——. Well, you shall hear presently. There was another difficulty: not a single word of my lecture could be heard in any part of the hall, not because there was much loud talking going on, oh, no!—not because I did not speak loud enough, for what I did say was perfectly audible. But as to the lecture—why, to be brief, I did not deliver it; because the minutes of the previous meeting had not been confirmed and passed, 'you know.' This omission was entirely owing to the circumstance of there being no one in the chair, for the reason aforesaid; and perhaps I may ascribe it to another cause, viz., there was, in the accepted sense of the word, no meeting at all. There was the hon. secretary, the member of the committee alluded to above, myself, assistant, and there were also two ladies. While the minutes of the 'meeting' were passing (to the number of thirty) I was cogitating what verdict a jury might pronounce on the possible dissolution of the society. Not 'natural death,' nor 'suicide,' since some members were still alive and kicking their heels about. Perhaps they might invent a new form of verdict, such as '*unnatural* decay, caused by a temporary fit, or unfit temporary absence of body.' But these thoughts may be premature. Sufficient of the evening was the evil thereof.—Yours truly, Ennel.—*Philosophical Institution, October* 28."

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

For a 12 × 10 camera I will exchange collodion and varnish, value for value—Address, W. W. STAINTHORPE, Corbridge-on-Tyne.

A *carte* lens or a half-plate lens will be exchanged for a rolling press or a background, or slips, or anything else useful.—Address, PHOTOGRAPHER, 232, Pentonville-road, London, N.

A pair of six-inch focus (Wilsonian) stereo. lenses, half-plate portrait lens, also for views and groups 9 × 7, quarter-plate portrait lens, half-plate camera, $7\frac{1}{4} \times 4\frac{1}{2}$ bellows camera, 1-1 square walnut camera, developing box for 9 × 7, box tent for 15 × 12, THE BRITISH JOURNAL OF PHOTOGRAPHY and *Photographic News* from 1862 to present time, will be given in exchange for a Dallmeyer's rapid rectilinear or Ross's narrow-angle doublet lens for 9 × 7, microscope, operaglass, lantern slides and apparatus, glass and paper stereo. slides, scenic backgrounds and slips, studio accessory, Chambers's *Encyclopedia*, *Art Journal*, or similar works, or anything useful.—Address, A. L. TATE, Post-office, Sunderland, Durham.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

W. and W. Hunter, Newton Stewart.—*Portrait of Rev. Dr. Hately Waddel.*

A. E. Lesage, Dublin.—*Four Portraits of the Most Rev. Dr. Kelly, Bishop of Derry.*

H. Hayler, London.—*Photograph of Sculpture by F. M. Miller, the Lady in Comus Entranced in the Enchanted Chair.*

William Heath, Plymouth.—*Portraits of* (1) *Dr. Vaughan, Bishop of Plymouth;* (2) *Rev. Father Graham;* (3) *Rev. J. O'Dwyer;* (4) *Canon Mansfield.*

☞ *Correspondents should never write on both sides of the paper.*

G. F. R.—In our next.

G. E. ALDEB.—The writer of the "Notes" desires us to say that he will write to you in the course of a week.

GEO. HOWES.—Reject every sheet of paper which displays any mark of imperfection. To detect these examine each sheet by transmitted light.

G.—An entry at Stationers' Hall is of no use whatever unless you have previously received permission, in writing, from the person photographed.

S. PIERCE.—You can remove the ink stains from the photograph by immersing it in hydrochloric acid. The picture itself will not be affected by this treatment.

ALCHEMIST.—To fuse nitrate of silver place the crystals in a porcelain evaporating dish and expose to a gentle heat. In a short time they will liquefy, and may be poured out on an iron slab.

S. S. B.—One of the best, if not the very best, kinds of eyeglass to be employed in focussing a view is that known as a Ramsden eyepiece. It consists of two plano-convex lenses so mounted that their convex sides are next to each other.

W. J. (Essex Road).—Do not allow the film to become so hard before immersing it in the silver bath. It is possible to err in the opposite direction; but from the description of your manipulation you are not likely to fall into that error.

ROBERT N. CHAMBERS.—The print that you enclosed is enamelled in the way we described in the last ALMANAC (see page 131), namely, the application to a plate of glass of tough plain collodion, followed by a layer of *gelatine*, not spirit-varnish, which you appear to have used. If you try it again, and follow carefully the directions there given, success will attend your efforts.

A NEWSPAPER READER.—The article is wholly incorrect. The writer has obtained his knowledge from the cursory reading of a communication on the subject; but, being unable to comprehend it, he has smothered the ideas in a cloud of elegant phraseology; and while the article as it now stands may inspire the ignorant with admiration, the really sensible and scientific reader must regard it with utter disgust.

WILLIAM O'FARREL.—Apart from actually taking a picture, there is no better way of ascertaining the photogenic value or equivalent of a landscape than that which was described in these pages, namely, viewing the landscape through a piece of pure blue glass. In this way you will form a good estimate of the appearance it will have when photographed. The browns and reds will be darkened, while the blues and other photogenic shades will appear lighter.

T. N. H.—It is difficult to indicate the proper remedy for a mark or stain on a Daguerreotype unless we know of what it is composed. If, in falling upon the carpet, it sustained a scratch or similar damage to the metallic surface, it cannot be remedied; but if the stain be caused by the adhesion of any piece of dirt, charge a soft camel's-hair brush with a rather weak solution of cyanide of potassium and apply it to the spot with gentle friction, following it by the application, first of common, and finally of distilled, water.

A MEMBER OF THE PHOTOGRAPHIC SOCIETY.—In our estimation the best *portraits* in the Exhibition are those by Mr. Blanchard; the best *picture*, one by Mr. Hubbard of a girl snatching a stolen moment in which to read a letter; and one of the best *landscapes*, so far as we have yet examined them, a small picture by Mr. Gordon. We may have occasion to modify these opinions after further examining the collection, but meanwhile we do not hesitate to express them.

AN EAST-END PHOTO.—Take the negative of the ship by the wet collodion process. The dry process is objectionable for two reasons:—First, the liability of the vessel to move during a protracted exposure; and, secondly, the impossibility, from the same reason, of getting pleasing pictures of the men in the positions you wish to assign them. You can extemporise a dark room in the ship You must use a wide-angle lens, on account of the impossibility of otherwise getting the masts all represented.

M. D.—1. We quite agree with you in your estimate of the foreign journal named. The number you obtained appears to have been rather better than the average. All the articles you name have appeared in our columns, and one of them was originally contributed to them.—2. An account of the exhibition appears in the present number. Intimation of the date of opening has several times been given in our pages.—3. The name may be printed in a variety of ways. We do not quite know what method you allude to.

RECEIVED.—Peter Chr. Koch (Copenhagen); J. Shaw (Liverpool).

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York-street, Covent Garden, London, W.C.**

TARDY JUSTICE.—We are pleased to learn that the committee of the Royal Cornwall Polytechnic Society has awarded Mr. N. Briggs a special bronze medal for his photographs. The peculiar circumstances in connection with the withholding of this act of justice are so fresh in the recollection of our readers that we need not here refer to them.

THE LADY IN COMUS.—We have now before us a charmingly-executed photograph, by Mr. Hayler, of one of the most graceful pieces of sculpture that we have ever seen—*The Lady in Comus Entranced in the Enchanted Chair*, by F. M. Miller. In photographing sculpture the lighting is everything, and in this picture Mr. Hayler has studied his effects with care and mastered them with skill. It is one of those subjects which, speaking commercially, will probably have a great run.

THE PRINCE OF WALES IN YORKSHIRE.—The Prince of Wales was the guest of Lord Londesborough last week, and a distinguished party was invited to meet the Prince to enjoy a few days' shooting over his Lordship's estate. On Wednesday, the 3rd inst., at His Royal Highness's request, Messrs. Sarony and Smith, of Scarborough, attended on the field, and were successful in taking photographs of the party present. On Friday last, the Prince of Wales visited the studio of the same eminent artists, and honoured them with an indoor sitting.

APPLICATIONS FOR NEW PATENTS.

October 19, 1869.—"An Improved Process for Producing Photographs in Pigments. No. 3,049."—FREDERICK RICHARD WINDOW.

October 27, 1869.—"An Improved Box for Enclosing Portraits and Photographic Cards. No. 3,117."—HENRI ADRIEN BONNEVILLE.

October 30, 1869.—"A New and Improved Photographic Process for Preparing Printing Surfaces. No. 3,151."—JOHN CLAYTON NEWBURN.

METEOROLOGICAL REPORT,

For the Week ending November 10th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
4	29.48	55	44	48	53	NW	0·02	Fine
5	29.81	55	40	41	43	WNW	0·20	Fine
6	29 55	51	42	43	47	WNW	—	Fine
8	29 72	58	38	50	51	WSW	—	Dull
9	29.77	55	38	48	49	SW	0·13	Raining
10	30.00	43	35	36	38	SW	0·03	Cloudy

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 498. Vol. XVI.—NOVEMBER 19, 1869.

DR. VAN MONCKHOVEN'S EXPERIMENTS ON THE PRODUCTION OF ARTIFICIAL LIGHT FOR PHOTOGRAPHIC PURPOSES.

In another column will be found the first part of a paper *On the Different Sources of Artificial Light*, read by Dr. Van Monckhoven before the Photographic Society of Vienna. At the beginning of the winter season the arrangement of substitutes for the solar rays becomes an important matter, and, in this respect, the members of the Viennese society are determined to be early in the field. Apart from this matter, however, the communication of Dr. Monckhoven possesses peculiar interest, since it includes some points of novelty which are well worth attentive consideration.

Some time ago we gave an account of some experiments which we made with a view to obtain a flame of high chemical power, by passing a current of coal gas over intensely-heated magnesium and zinc. The vapour of each of these metals was dissolved—so to speak—by the gas, and the mixture, when burnt at a jet, gave a powerful but very fitful flame. Mr. Winstanley has also saturated gases of different kinds with bisulphide of carbon, and obtained a brilliant light on combustion of the compounds at a jet. Nitric oxide gas, when saturated with bisulphide of carbon vapour in this way, affords a most brilliant light of an intense violet-blue colour, and possessing considerable chemical power. The inconveniences and even danger attending the manipulation of special lamps for these artificial lights are so great that the general use of any of the plans which have hitherto been proposed cannot certainly be recommended. Of course, in this remark, we do not include the magnesium lamp, which is now an established photographic adjunct.

At this juncture Dr. Monckhoven comes in with some interesting and rather novel experiments, which give some promise of future success. In addition to magnesium, it has been well known that compounds of the metals chromium and titanium emit an intense and highly "actinic" light when strongly ignited. According to Dr. Monckhoven, when a mixture of oxygen and hydrogen gas is passed through either the sesquichloride of chromium or the chloride of titanium, and the compound gas then burnt at a jet, a light of a fine blue colour is obtained, possessing a very high degree of chemical power in either case.

When the gas charged with sesquichloride of chromium is ignited the latter body is at once decomposed into hydrochloric acid, which retains its gaseous form, and a solid, infusible compound of chromium and oxygen, which is intensely ignited at the moment of its formation. This compound of chromium and oxygen Dr. Monckhoven states to be chromic acid; but, since neither this body nor its anhydride can exist at a very high temperature *per se*, it is more probable that it is the sesquioxide of chromium which is formed. In using this plan certain difficulties have arisen, which Dr. Monckhoven hopes to be able soon to overcome. In this hope we cordially concur, as the construction of a really handy lamp and the production of a cheap light would give a great impetus to the practice of photographic enlargement.

We may add a few words here relative to the preparation of the sesquichloride of chromium only, as it is unnecessary to enter into details of the manufacture of chloride of titanium, since the production of the latter body would be attended with much greater cost than that of the former.

In order to prepare sesquichloride of chromium, it is only necessary to take a quantity of the chromate or bichromate of ammonia and heat this very strongly. After ignition a dull-green powder remains, which is sesquioxide of chromium. This green oxide is washed with hot water, dried well, and then mixed with half its weight of common resin, in powder, and the whole heated in a partially-covered crucible until combustible gases cease to be evolved. The residue is powdered, mixed with some powdered charcoal, and then made into little lumps with very weak starch solution. The lumps are dried, heated strongly in a crucible, and then placed in a hard glass or porcelain tube, which is passed through a furnace and heated to redness. When in this condition dry chlorine gas is passed through the tube; this gas combines with the chromium forming the chloride, which distils over and condenses in fine crystalline masses on the interior of the cooler extremity of the tube, and can then be preserved for use out of contact with moisture.

The foregoing process appears complicated, but no real difficulty would be encountered in carrying it out on a large scale if there were any demand for the sesquichloride of chromium, since chloride of aluminum has been manufactured in large quantities at Newcastle-upon-Tyne, in a precisely similar manner, for the preparation of the metal aluminum.

MR. BLAIR ON ACCELERATION OF EXPOSURE.

A well-known contributor to this Journal—Mr. Blair, of Perth—gives a paper this week on the means which he employs for accelerating exposure. Mr. Blair adopts a very ingenious and interesting line of argument in seeking to show that, by the judicious employment of ordinary diffused light, the first impression on a sensitive plate may be so heightened that details which were, under ordinary circumstances, incapable of development, acquire sufficient strength to attract silver to themselves.

In order to realise this position, it is necessary to admit that our ordinary exposed plates contain an immense number of matters of minute detail which have not reached the developing point for the particular reducing agent employed, just as water, when heated by a spirit-lamp, becomes warmer from the first moment that the flame is applied to the vessel in which the liquid is contained, but a considerable interval elapses before the water reaches its boiling point. If we thus associate the ideas of the boiling point of a liquid and the developing point of a photographic plate which has been exposed in the camera, it is easy to understand that a considerable interval may elapse between the first impact of light on a sensitive collodion film and the production of a sufficient degree of change in the silver compounds to enable them to suffer reduction under the influence of the developer. An under-exposed plate is partially in this condition. A portion of the image has reached the proper point; but the more delicate details have not had time, not to impress themselves as it is usual to state, but to so repeat their impressions as to bring the silver compounds into the proper developing condition. Mr. Blair

seeks to add such a process by taking an under-exposed plate and making diffused light act upon it for a sufficient time to bring the details up to the developing point, but to stop short of the time required to confer on the previously-unexposed sensitive compounds the power of reacting with the developer.

That there is much that is most valuable in the theory referred to above we must at once admit; at the same time, the difficulty of so graduating the amount of diffused light with which an insufficiently-exposed plate should be treated is so great that it would be extremely hard to avoid veiling the negative, and materially interfering with the depth of the shadows. Mr. Blair probably possesses the knack of hitting the happy medium, but in most instances considerable risk would be incurred of greatly overstepping the mark. We know that slight exposure to diffused light prior to or during development tends to the production of softness, and in this way is often useful; but it is difficult under such circumstances to ascertain whether any real gain of detail is obtained.

Mr. Blair's white paper lining for his camera we should consider an innovation of at least doubtful utility, since in his own hands it does not appear to have been productive of any good in the matter of acceleration or otherwise; and anyone who has had a camera with even a slightly glazed interior will fully appreciate the trouble pretty certain to result from irregular reflections within the dark chamber.

PHOTOGRAPHIC PRINTING ON PAINTERS' CANVAS.

It is now some six months since the attention of photographers was directed, in a paper read before the Edinburgh Photographic Society, to the value of an emulsion of lac and size or gelatine, which an Editor of this Journal facetiously called the "French polish process."

In that paper attention was mainly drawn to its use as a means of allowing drawing, crayon, and indeed papers of all colours, kinds, and qualities to be made use of for photographic purposes, and I showed the possibility of using such unlikely material as brown packing paper, printed matter, &c., for purely photographic printing.

Since then I have rather extensively used it for the preparation of painters' canvas for oil painting, as well as for enlargements on paper of various kinds and qualities never intended for photographic use, and the results have been so uniformly good that it is really worth while again to call attention to the matter with the additional light gained by six months' use and experience.

In using the emulsion any description of gelatinous material will do—I believe even glue, if made sufficiently weak. I have principally used gilders' clear size, which is simply gelatine made from cuttings of parchment, vellum, white leather, or untanned skins of any kind which are clean or can be made so. Buffalo hide is perhaps the strongest in gelatine, and does very well; but size from any of these sources, or from Cox or Nelson, or French gelatine, does perfectly well, and it is used of such a strength that the emulsion just *sets* and no more—in fact, is considerably weaker than the jellies we use at table, which, if unsweetened, would do perfectly well.

Gelatine, as purchased, is like glue, and contains by no means a fixed quantity of the quality we call "strength," inasmuch as some qualities will absorb twice as much water as others to bring them to the same strength, and the resulting quantity of melted gluey matter is, of course, about double the quantity in the one case as in the other, in addition to being different in quality. It would, then, be merely a misleading formula if the same quantity of dry gelatine of all qualities were given to a certain quantity of water.

It is the same with the quantity of dissolved gum which the size will take up, as may be shown by a very simple experiment. Instead of size take water, heat it, and add the spirituous solution of gum lac, and it will be seen that the whole of the gum in the solution will be precipitated to the bottom of the vessel in a curdy state, more or less coloured, according as a more or less coloured sample of gum lac has been used. Add now a portion of size to the water and proceed as before, and a smaller precipitate will be the result. By continuing to add size a point will be reached where all the gum is taken up; this is the right strength for paper. This demonstrates that, without some other medium, union cannot be secured between these bodies. It is true the gum can be dissolved and made to enter into solution with water by the aid of bichlorate of soda, which gives a semi-glutinous kind of varnish sometimes called "water varnish," and which is, I believe, the medium which M. de Constant makes use of for a similar purpose. It can also be dissolved in several of the ammonia compounds, and in this state is used largely in the arts for many purposes.

What has been said of gum lac is true also of many of the other gum resins, such as mastic, benzoin, sandarac, anime, elemi, amber, &c., as in thin solutions they may be substituted for the solution of gum lac, indicated as the most useful. Sandarac or benzoin, for instance, give a pure milk-white solution with the size; so does mastic, to the extent that it dissolves in spirits of wine, which is small. And so with the rest; any one of them, together or separately, may be used with more or less varying results.

Looking to the composition of most photographic varnishes, they may be advantageously substituted for the solution recommended, with probably the single exception of the Sœhnée varnish, the base of which, I think, is copal, and that I have not tried. They have the advantage also of being just the proper thickness.

There will necessarily be a difference of tint in the reduced silver according to the base used in the varnish and its mode of manufacture; but the effect will not be great, nor the difference of much matter—more especially if the pictures are to be painted, which will always be the case with prepared canvas.

There is a great variety of results visible with different samples of prepared canvas, determined, apparently, both by the original material with which it has been painted and the time it has been kept after manufacture. In some samples it is hardly possible to prevent a spontaneous reduction of the silver in the form of a brown deposit, which forms even in the dark, deepening in the light to an intense black. What this reducing agent is I have not been able yet to discover; but I have an idea that it is caused by the coat of oxidised oil on the surface of the painted material—as, until the paint be thoroughly hard, there is a constant tendency of the whole of the oil used (which does not enter into chemical union with the lead base of the paint) to come to the surface, there becoming bleached and oxidised by the light and air, and being, to a large extent, left on the surface of the body of paint. Be that as it may, the best cure for it is thorough washing, before preparation, either with carbonate of soda or with spirits of wine diluted to half strength, and thoroughly washing after it has been so cleaned with the spirits or soda.

Care must be taken that no water gets to the cloth side of the canvas, as the first preparation of it for painting consists of a coating of size, and sometimes of two. This, on being wet, expands, and it never returns to its normal position, but leaves an ugly bulge in the canvas. The only way to remedy this is to lightly damp the whole surface with a wet sponge, when it will dry equally. But it is better to prevent than to cure; and the same care must be taken through all the stages of the work to prevent the watery solution from touching the back.

Although the silver be spontaneously reduced, or if by accident a print should be spoiled, it is by no means a piece of canvas thrown away. That would make it very expensive work. I adopt this remedy in such a case:—A tolerably strong solution of iodine and iodide of potassium is made, keeping it about the colour of port wine; this is sponged or flowed over the silvered part until the silver is converted into iodide of silver. A very weak solution of cyanide of potassium is then sponged over it, when the whole of the silver comes easily away. This must be immediately well washed. When dry it is again ready for preparation; and it is a peculiar fact, showing the need for good washing at first, that the second printing on a piece of canvas is always better than if that had not been done. However, it must be borne in mind that I do not recommend this as a good plan to get the best prints, or as a desirable way to simplify the process, but only as showing need for careful washing.

A very good method to pursue is to take a piece of *set* size of the strength indicated, add half its bulk of water, and heat until melted; Then pour in the gum solution gently, stirring all the time till it is of the colour and somewhat of the appearance of cream, but not so thick; now add salt in the proportion of five grains to the ounce of the emulsion, and it is ready for use for paper. But, if for canvas, it will be better to dilute it with water about one-third to one-half more, and add half-a-grain of citric acid per ounce, which, while it prints more slowly, yet prevents to a large extent the spontaneous reduction of the silver on the oil-painted surface.

In printing, the treatment is the same as in the case of paper, and after it is removed from the frame the superfluous silver is washed away. If of a small size, American clips at the corner will make it into a dish; but if large, special appliances must be made use of.

Hypo. which has been used for prints seems to be the best for fixation, thus showing that a weak solution is the thing for this kind of work. A good guide for knowing when the print is fully fixed is this: before it is fixed, the silver is firmly attached to the print—no

amount of rubbing will remove it; but, after fixation, it can be easily removed by rubbing with the finger while the hypo. covers the image. This quality can be taken advantage of to remove any objectionable stains or marks, or the reduced silver outside the limits of the negative plate, and a certain effect of vignetting can be given to the image. As soon as this is observed the hypo. should be removed and the surface well washed.

As much washing is necessary as a negative fixed with hypo. receives; but great care is necessary in order to prevent the water from falling on the surface with a rush, as at this stage the particles of silver are very loosely adherent to the ground. When dry, however, it will stand any amount of hard usage, being then as firmly fixed to the paint as if it formed a part of it.

As before mentioned, in all the operations care must be taken that the various washings do not touch the back, or cloth side, of the material. W. H. Davies.

ACCELERATION OF EXPOSURES.

Photographers, like other people, often get into a rut and can't get out of it. So many great authorities have from time to time laid down their *dicta* that such and such rules must be observed, that it requires some daring innovator—one who seems capable of setting everything like law and established order at defiance—to look at the matter in a sceptical spirit, or suggest the slightest modification. We are thus sometimes crushed down under such a weight of authority that we cannot move, and to attempt to do so might be deemed the height of folly. Two classes of people, however, have an advantage here, and manage sometimes to scramble out of the rut in which the rest of their brethren are jogging along, viz., those that don't know what has been done and said by others before them, and those who don't care, but desire to test everything for themselves as far as they can. Accident, also, or what passes under that name, will sometimes jolt us out of the rut.

The above introductory remarks may perhaps raise an expectation that some marvellous and unheard-of novelty is now to be announced. So far, good. Without some such expectations the reader would perhaps not read on; but, if his expectations are unreasonably high, he must not complain of a little disappointment. If he suppose that I am to call in the aid of more light—very well, let us talk over the possibility of such a thing in a reasonable way; but, if he fancy that I am to propose flooding the inside of the camera with light, or illuminating the dark slide with tapers to assist the sun in impressing the latent image upon our sensitive plates in the act of exposure, then he will require to be reined up a little, even although he is perhaps on the right scent. In getting out of a rut, we must take care not altogether to go headlong off the road.

Hitherto, I believe, our dark slides have been kept very dark, and the inside walls of the camera as black as the inside walls of our chimneys. There shall be no light there, nor anything that will reflect light, has been the long settled rule of construction and use. I propose to inquire whether this rule may not in certain circumstances be advantageously modified.

Let us take a case of ordinary carbon printing (but for the present experiment and illustration the pigment used should be white, so that the impression may be visible). On withdrawing the tissue from the pressure-frame it is seen to be under-exposed, and it is impossible to replace it against the negative for further exposure. The faintest details are slightly touched with the light, but so slightly that, if we proceed at once to wash up, some of these are sure to be lost in the finished picture. To prevent this the whole surface should be flushed with light for a little, whereby the faintest impressions will be strengthened, and the whole picture may be secured. This is often a useful expedient when the *cliché*, whether a positive or negative, is rather strong in the contrasts.

Well, there must be a reason for this. The slight additional exposure does not greatly affect those parts which have been well exposed already through the clearest parts of the glass, but it makes a great difference, comparatively, in those parts which have been but slightly impressed. These latter may, in a second or two, have their actual exposure doubled, and will thus be so much better fixed; whilst those parts which, from the density of the *cliché*, have not been touched at all by the light—though they will, no doubt, be now slightly impressed—will still be less so than the parts formerly printed in the pressure-frame, and may be washed away. An after exposure of this sort reduces the contrasts between the highest lights and deepest shades, and, if not carried too far, tends to secure the *whole picture*.

Let us apply the principle detected in the foregoing experiment to the taking of a negative in the camera. It has always been thought that the very first and faintest impact of white light on a sensitive surface produces a photographic impression, although it requires a certain amount or quantity of it to bring the latent impression within the reach of our developers. It seems to be a matter beyond all doubt that feeble impressions are made by weak pencils of light, which are not utilised at present, because they cannot be developed. But a little more light, even of a diffused nature, over the whole plate might give these first and weak impressions just that addition which is necessary to let the developer get hold of them and carry them forward to a visible impression.

Let me illustrate the matter in this way:—Suppose I plant a sensitive plate in my camera, and let in a weak ray of light upon one spot of it, and it requires an exposure of three seconds to make a developable impression; the part impinged by the light becomes, of course, visible under the developer, but the rest of the plate remains clear glass. Now I repeat the experiment with another plate, but expose to the same weak ray for only *two* seconds. The impression made would, in the case supposed, not develope to a visible image. But I diffuse light over the whole plate, of the same strength as the former weak ray, for another second. It is evident that I have now brought up the part previously exposed for two seconds to the point of development, while the rest of the plate is still not injuriously affected by the light, and would remain clear glass. Indeed, to repeat the experiment for a third time, a small portion of the plate might be exposed in the camera for only one second, and then the whole plate might be exposed to light of the same strength diffused over its whole surface for two seconds. Even in this case the portion first exposed would still develope, and the rest of the plate would not.

Here, then, I think we have a well-ascertained principle which ought to be turned to some practical account, as it will be seen that it is possible by the cautious use of diffused light to accelerate exposures considerably, however sensitive our chemicals may be, so long as our developers are unable to reach the very faintest impression of light.

Great sensitiveness has no doubt already been attained by various processes. The sensitiveness of the chemicals, the strength of the developers, and the illuminating, or, rather, actinic power, of the lens, have each and all been pushed to their utmost, or are in course of being so, to secure rapidity of exposure; and every advance in these departments has been hailed as a valuable addition to photography. I now desire to call in a fourth power to aid us in the same direction, and which, if judiciously handled, cannot fail, I think, to be found of service, so long as absolute instantaneousness is not otherwise reached; and that is the use of weak diffused light to strengthen faint impressions.

Various ways will at once suggest themselves in which this weak light may be used. I recollect noticing, some time ago, in one of the journals that a patent had been taken out for holding a piece of black velvet in front of the lens for a short time after exposure for a portrait or other picture. It was said to give softer negatives, and I believe it would, upon the principle that I have been explaining; but, it appears to me that if the nature of the operation were understood by the patentee, it was a foolish thing for him to confine his patent to that particular way of attaining the effect desired. It is very apparent that by slightly opening the door of the dark room and letting in a *little* diffused light, after the plate was taken from the dark slide, the same effect would be produced.

When this matter first dawned upon my own mind, the plan that I adopted to give effect to it was to line the front part of the inside of my camera with *white* paper, so as to produce a slightly diffused light within the camera during exposure; but I did not carry the white paper entirely back to the dark slide, in case of producing lateral or partial reflections too powerfully. This is a matter, however, that would naturally fall to be regulated by the shape of the camera and the field covered by the lens. Another way of attaining the same end may be to have the window of the dark room not *entirely proof* against actinic light, so that the plate might be subjected to a slight stimulation during development.

I have not been able to carry out any complete set of experiments to test the theory above propounded as I could have wished. It would, of course, have been more satisfactory that I could have done so, but it is not within my power at present. All I can say, in the meantime, is that I have taken some negatives with my white-lined camera, without noticing any bad effects from that source; but it was not under circumstances to enable me to say whether I had gained much in the shape of acceleration.

If the above theory be true, it may help to explain other things which are at present involved in doubt; for instance, there seems to be a great variety of experience in regard to the keeping qualities of negatives after they have been exposed but not developed. It is

believed that the impression wears off in the dark, but some can develope them after months have elapsed, and others cannot after a few weeks. Is it not possible that this difference of experience may arise—in part, at least—from the manner in which they are kept? If kept in *total* darkness they are likely to fade soonest. If kept in a box or in a room where they have occasionally had the benefit of a little diffused light, is it not possible that their vitality and power of endurance may be thereby somewhat enhanced? This appears to me to deserve further attention.

I may here further mention that I have also lately been attempting the introduction of white paper, &c., within my dark slides, in contact with the sensitive plate, with a view to the farther acceleration of exposures; but, as the principle of operation involved in that case is somewhat different from that above adverted to, I must defer the explanation of this to another opportunity. WM. BLAIR.

Bridgend, Perth, Nov. 12, 1869.

P.S.—Since writing the above I have ascertained that Mr. John Eastham had used a white-lined camera some considerable time ago, and noticed an accelerating effect, but apparently without recognising the correct principle on which it acted. Mr. F. B. Gage also appears to be the patentee above referred to.—W. B.

THE LENSES USED IN PHOTOGRAPHY.

CHAPTER XII.—LENS MOUNTINGS—*(Continued)*.

THE lens of Darlot now to be described is designated the "casket lens," from the fact of its various components being packed in a casket. The idea embodied in this casket is exceedingly good, and it is very desirable that our own opticians should adopt it.

There is only one mounting to which such a variety of lenses may be adapted so as to suit every purpose. In one which we examined there was a *carte* portrait lens of the usual kind. When the front and back lenses had been unscrewed two others from the casket were screwed in their places, and the combination, which previously was adapted for portraits, as, by this alteration, converted into an architectural or copying doublet, covering a plate of very large size. These, in turn, could be supplanted by lenses of shorter focus having the same characteristics. Two lenses of dissimilar foci might thus be united; or, where desired, a single lens could be used as a landscape objective. The variety thus obtained is very wonderful.

The cells in which the lenses are burnished are so constructed that when a pair of long-focus lenses are employed they are, when screwed into the tube, much farther apart than when those of shorter foci are used. The shorter the focus the farther does the lens project, so to speak, in front of the cell.

But, in addition to this adaptation, the tube itself is capable of being lengthened or shortened within certain limits. One advantage of this is that an objective which, when the lenses are at their greatest distance apart, includes a certain angle may, by pushing them closer together, be converted into a wide-angle lens.

But the thoughtful reader will at once start as an objection to the employment of doublets of which the front and back lenses are of different foci their liability to give curvilinear distortion, owing to the stop not being in the optical centre of the combination. The inventor of this mount has foreseen this and actually provided for it. The stops used are Waterhouse's; but instead of being confined to one position in the tube, as in the ordinary portrait lenses, they are in this mounting inserted in a short secondary piece of tube, which traverses a short space longitudinally inside the main tube, and thus permits the diaphragm to slide from its central position to either end. There is in this an additional advantage which, it is possible, was not contemplated by its maker, and the exact nature of which may be perceived from the following considerations:—

In a doublet lens the position of the stop determines either its freedom from distortion or the nature and extent of the distortion permitted. If the stop be placed in the centre there will be no distortion; but if it be brought close to the front lens, the straight lines near the margin will be rendered convex or barrel-shaped. On the contrary, if the stop be pushed near to the back lens, concave distortion, or the direct opposite of the foregoing, will result. Now, in copying a photograph, no matter how much it may be distorted, this sliding diaphragm provides an efficient remedy; in fact, a picture can be copied by it which may be either distorted in a convex or a concave direction, or be altogether free from distortion.

We should like to see English opticians turn their attention to the more mechanical part of the lens—the mounting. They have achieved splendid successes in the strictly optical department, and we see no reason to doubt that equal success would attend their efforts in the direction here indicated. Large emoluments assuredly wait upon him who enters this field with suitable enterprise.

In conclusion: it would be very desirable, although we do not see how it could be brought about, if a definite series of screws were universally used in the flanges of lenses. Were this the case, one flange would serve for a variety of lenses of different makers; instead of which the photographer is now compelled to use *adapters*, even for lenses which differ from each other in a very slight degree. Some of the lenses of Ross, Dallmeyer, and Grubb are interchangeable in their flanges; it would be desirable if this means of optical interchange were extended. The Microscopical Society has adopted a certain screw for objectives, and every microscope now made is fitted with the Society's screw; and, as a consequence, every "Fellow's" object glass can be screwed into the microscope of every other fellow. The varying diameters of photographic lenses preclude the possibility of one definite and individual flange being used, but a progressive series of flanges, as few in number as possible, might and ought to be adopted by English opticians. Here is an object demanding the attention of a committee of the London Photographic Society. The late president of the Royal Microscopical Society (Mr. Glaisher), now presides over the Photographic Society, and the president of the "Microscopical" (the Rev. J. B. Reade) is a vice-president of the "Photographic;" these two gentlemen might comprise a committee which would secure for the photographic world that unanimity in this matter which has been obtained for microscopists. *Verb. sap.*

PYROXYLINE.

THE Rev. Andrew Johnson, whom I know to be an excellent photographer and a careful experimentalist, especially in the collodio-bromide process, makes, in your last number, a few observations, to which I wish to add a few more.

Mr. Johnson truly remarks that it is an instructive experiment, in making photographic pyroxyline, to note how remarkably the temperature and strength of the acids affect the quality of the product. In truth, a very slight deviation on either side of an approved and serviceable standard of temperature and strength of acids and of bulk of cotton immersed in them, although perhaps it may not prove fatal to success, yields a pyroxyline possessing different properties. There can be no rule-of-thumb sort of practice in successfully preparing this compound, and none know this fact better than they who continue to manufacture commercially a constant and uniformly good collodion.

I am asked to tabulate, for use, the relations existing between the respective specific gravities of the acids and their temperatures. Such a table might be interesting, and perhaps instructive to a few; but its compilation would impose a most tedious and unpleasant task on the operator, were he to tabulate, from experiment, all the changes and modifications of which that indefinite compound, pyroxyline, is susceptible. Photographers need only trouble themselves to secure a good preparation of three varieties, namely, one for the wet collodion process, a second for dry plates, and a third for transferring negatives or for protecting positive prints.

My plan for preparing all these three kinds of pyroxyline is very simple, and never fails me; nor will it deceive anyone else who is careful in carrying out details. My formulæ are based on a most convenient standard—that is, the almost constant strength at which I receive the acids from the manufacturer. But I never rely on the indications of a label attached to the bottles; they are sometimes wrong. It is, therefore, advisable to test the specific gravity before commencing to make up the mixture for the first batch of pyroxyline. Usually the sulphuric and nitric acids register, within a degree or two, 1845 and 1450 respectively. These are the normal strengths of the best commercial varieties prepared by White and Co., of Saffron-hill, and probably also by other manufacturers.

1st. My formula for making pyroxyline for the wet collodion process has been carefully elaborated after much experiment, and constitutes my standard, or point of departure, both for temperature, and for quantity of water when other varieties are required, the strength of the original acids remaining the same. The formula stands thus:—

Sulphuric acid, sp. gr. 1845	12 fluid ounces.
Nitric acid, sp. gr. 1450..................	4 ,,
Water	17 drachms.
Sea Island or long-fibred Egyptian cotton wool — bleached, carded, thoroughly washed, and dried	270 grains.
Temperature	150° Fah.
Immersion of the cotton	10 minutes.

2nd. My formula for the dry processes is the same, except that I add only twelve drachms of water and raise the temperature to 165°.

3rd. The formula for making pyroxyline for transfer collodion can scarcely be called a formula, as a wide margin in all directions (except that of temperature) is admissible. When I have made several batches of my *precious* pyroxyline for negative collodion by either of the first two formulæ, and squeezed out the greater part of the superfluous acids, I allow the latter to get cold, and then stuff into them, with glass rods, as much dry cotton wool as can be conveniently soaked therein. This is generally done in the evening. The pot is then covered up, and next morning the pyroxyline is thrown into the washing tub, after soaking in the acids for more than twelve hours.

The pyroxyline from the first formula, when thoroughly washed and dried, should show a gain of about twenty-five per cent. over the weight of the original cotton before immersion in the acids, and should be considerably disintegrated. It leaves some residue when dissolved in equal parts of strong ether and alcohol.

No. 2 should be much disintegrated—almost powdery—and should nearly correspond in weight with the original cotton, or perhaps a trifle less. It leaves considerable residue when made into collodion, and the solution takes from one to four weeks to clear up.

The third product from cold acids should be totally soluble in ether and alcohol and clear very rapidly.

No. 1 leaves nothing to be desired for the most sensitive form of wet plates. No. 2 gives an exceedingly porous and structureless collodion eminently adapted for the collodio-bromide and other dry processes, as soon as it has cleared. No. 3 is productive of a very skinny and imporous film; but if the collodion be kept for some months it begins to change its character, becoming less horny and tough, and better suited for the wet process. After still longer keeping it begins to assume the characteristics of collodion made from No. 2, and may then be used with good effect in any dry process.

I have not entered into details of manipulation, taking it for granted that your readers who wish to make their own pyroxyline are already furnished with the treatises describing these minutely, or with back numbers of your Journal, in which, from time to time, will be found information which will prevent any one from falling into mistakes.

In respect of a rough tabulation of strength of acids and temperature for useful varieties of pyroxyline for photographic purposes, I find, with the specific gravity of acids and the other concomitants which I have given in my formula No. 1, that it is necessary to diminish the quantity of water by about one fluid drachm for every three degrees of temperature over 150° up to 165°, beyond which latter degree no advantage seems to be gained, and to increase the water in equal proportions down to 130°. Beyond these limits of what may be called hot acids I have not fully investigated the strengths required for the production of a soluble and useful photographic pyroxyline. But there is a wide margin allowable in the strength of *cold* acids, both for quantity of cellulose immersed therein, and for time of soaking — all consistent with a perfectly soluble product, such as it is.

While on the subject of pyroxyline, I may observe how curious it is to note the tendency to decomposition exhibited by various samples. I have now in my laboratory the remains of some very soluble pyroxyline made, more than twelve years ago, from the purest bleached linen, at a temperature of 150°. It has been kept in a stoppered bottle—the worst way for preserving it—yet it has undergone no decomposition whatever, and still gives a limpid, structureless, and non-acid collodion. Again: about four months ago, two sheets of papyroxyline, which had been sent me from abroad, were torn into fragments, and stoppered up in a similar bottle, so, also, some of my transfer pyroxyline made in cold acids. They have both decomposed, and filled the bottle with red nitrous fumes, are brittle and tender like cobwebs, and, when dissolved in neutral solvents, as they do readily, yield a very acid collodion. Another sheet of the same papyroxyle kept in my desk, and a large stock of transfer pyroxyline stored in loose paper bags for the same time, have not shown the least symptoms of decomposition. A sample of pyroxyline received about two years ago from an extensive manufacturer in the provinces, and closely packed in a green stoppered bottle, has not changed, although the stopper has been only once removed, when I was testing the quality of the enclosed material, which was very good indeed. Another sample, sent me by a London firm, after being closed up in a stoppered bottle for nearly eighteen months turned into a pasty mass like putty, without emitting red nitrous fumes, and was, at the same time, intensely acid.

I might multiply examples of the vagaries—such, because we cannot explain them—of this indefinite substitution compound called pyroxyline, all of which have come under my own cognisance; but it is better to point out how to control them within certain limits.

It is very possible, and I am disposed to think it probable, that those specimens of pyroxyline which, in the dry state, show a tendency to decomposition, exhibit the same characteristic feature when dissolved in ether and alcohol. I have no other reason to induce this belief than the fact that collodion prepared from pyroxyline made in cold acids changes its character by being kept for some time, while collodion from a different class of material is very constant in its nature and changes very slowly; and, be it remembered, these are just the distinctions which apply to pyroxyline *per se*. The best plan to treat it is to put it into solution with all convenient speed after thorough drying; or, if stored for future use, to keep it loosely in a cotton bag or paper parcel, which excludes dust but not air.

George Dawson, M.A., Ph.D.

THE DIFFERENT SOURCES OF ARTIFICIAL LIGHT.*

The analysis of the solar spectrum made by Herren Kirchoff and Bunsen has shown that on the surface of this constellation burn immeasurable quantities of magnesium, potash, soda, chromium, &c. Whether it be that these metals are in a free state on its surface, or that they are there in a volatile combination—for instance, existing with chlorine, as I will presently show — the presence of acid and a very high temperature are sufficient to produce to our vision not only a dazzling light but also a light of great chemical effect. These conditions are now actually present in the sun; considerable masses of water and acid are there to be found in a free state, and the presence of the before-mentioned metals accounts for the immense quantity of chemical rays which are contained in the solar light.

I have made the discovery that almost all metals and also many mettaloids, if they burn with acid at a high temperature, give rise to the formation of a great multitude of chemical rays; and, while pursuing this investigation, I found that every time a metallic salt was heated to a very high temperature it became decomposed, an oxide being formed or remaining behind (that is, it became decomposed by oxidising), and these glowing masses let loose a vast number of chemical rays.

If, for instance, we burn magnesium, we generate a high temperature and form a metallic oxide, and we know also that this light is photogenic; but if we apply a jet of oxyhydrogen gas to chloride of magnesium, carbonate of magnesium, &c., we produce the same conditions as those resulting from magnesium burning in the air, namely, a high temperature and oxide of magnesium. I will make this experiment before you, and you will immediately see that the light produced in the latter case is not inferior to that of magnesium. You will, at the same time, have an opportunity of observing the chemical strength of this light.

If metallic oxides, such as magnesia or lime, be used, and they be heated to a high temperature, the light, as I now show you, is not very strong, but experiments prove that this light is considerably less photogenic than when these oxides are formed at the moment they send forth the light.

It has been known for many years that the magnesium light is a very good one for photography; but there exist other light-yielding sources, namely, chromium and titanium.

If oxyhydrogen gas be conducted through chloride of titanium or chloride of chromium, which is afterwards ignited, a blue flame is obtained of a very great chemical strength. If a jet of gas be introduced into the flame the light will become extraordinarily intense, because the formation of titanic acid or chromic acid takes place at a very high temperature. The light obtained in this way is of such great chemical strength that paper prepared with chloride of silver, when held at a distance of twenty centimetres from the flame, becomes considerably darkened in the space of thirty seconds. I have tried to construct a chloride of titanium or chloride of chromium lamp, but these bodies decompose under the influence of the humidity of the burning gas; the pipes become stopped, and a strong smoke is occasioned, which settles itself on the apparatus. In spite of this, I am yet inclined to hope that I shall be able to make this source of light available for photographic purposes.

I have already mentioned that the greater number of metalloids, and of metals also, when burning at a high temperature, produce a light which is suited to photographic uses. Among these bodies I will place magnesium, titanium, chromium, calcium, phosphorus, arsenic, cyanogen, zinc, and antimony; but the three first exercise the greatest influence on our photographic plates.

* Read by Dr. Monckhoven at a meeting of the Vienna Photographic Society, Oct. 5, 1869.

Other metals and metalloids have a certain small amount of strength, though they give either a yellow light like soda, a green light like calcium and barium, or a red light like strontium. You shall see the different kinds of light when I apply the jet to the chlorine combinations of these metals. You perceive the light is very luminous, but of a colour which the developers at present in use could not bring out on our photographic plates.

There are many methods of turning the metallic oxides of a high temperature to lighting purposes:—

1. Mix the relative metallic salts, nitre and carbon, and kindle this composition as Bengal fire. This can be very easily made, and I will presently give you some formulæ for the preparation of this mixture. Sulphuret of antimony and arsenic are employed for artificial fireworks, and have also been tried in photography; but these mixtures always generate flames of large circumference with thick smoke, consequently cannot be introduced into the apparatus for enlarging.

2. The wire-drawn metals can be burned. This has been done with magnesium, which is wound off by clockwork. The light thus obtained is very brilliant and very actinic, but also very costly. The principal objections we have against the employment of the magnesium light are the flickering of the flame, that it presents a large surface, and leaves a deposit on the lens of the apparatus which soon renders it unfit for use

3. Metallic salts—which are not fusible, which not only get red hot but, when red hot, change chemically, and when developing actinic light leave oxide behind—have the effect of explosive gas. This last-mentioned medium is that which, after repeated trials, I adopted as the most judicious.

(To be concluded in our next.)

THE EXHIBITION OF THE LONDON PHOTOGRAPHIC SOCIETY.

[SECOND ARTICLE.]

THIS exhibition has been so much appreciated by the public, and the attendance has been so great, that it affords us pleasure to state that efforts have been successfully made to keep it open till the end of the present week, instead of closing it on Tuesday last, as was originally intended. Every person who can make it convenient should visit this admirable exhibition. We resume our notice of the pictures.

Mr. E. Dunmore exhibits a number of what are called landscapes, but which, in most instances, are architectural subjects. Among these are two or three very beautiful pictures. *An Avenue* is a difficult subject ably treated, and a picture of *A Villa* we have never seen surpassed for harmony and detail.

Mr. Dallas's prints from surface-blocks, or Dallastypes, as he calls them, are examples of a very useful application of photography, namely, the production of phototypes or surface-blocks from pen-and-ink drawings.

M. Lemenager shows a series of pictures of *St. Alban's Abbey*, valuable to archæologists.

In Mr. Mitchell's collection *A Highland Cottage* is a pleasing pictorial "bit," although the original is very far from being attractive as a residence.

A frame of stereoscopic pictures, apparently instantaneously executed, from the perfection with which the cattle, &c., are delineated, indicate the taste and care which Mr. Frank Howard brings to bear upon his photographs.

Mr. A. Ford Smith, of Manchester, exhibits some *cartes* much above the average in respect of quality. This gentleman has also contributed some landscapes, which are equally good.

A fine collection of *cartes* is exhibited by Mr. Lothian, of Edinburgh. While these portraits are excellent as photographs, the collection is specially interesting owing to its including so many artists of note connected with the Royal Scottish Academy.

A number of pictures by Lieut. Anderson, R.E., cleverly illustrate various phases in the routine of military engineering; while several sent by Mr. Henry Dixon similarly illustrate the progress of the Holborn Viaduct.

Both Mr. MacAndrew and Mr. F. Downer are well represented.

Knowing Mr. Cocking to have a cultivated artistic taste, we naturally expect to find indications of it in his works; nor are we disappointed, for he shows some excellent portraits.

Toddington Hall, by Mr. F. C. Earl, commands attention both from its great size and its excellence; but it is not superior to some others of his pictures, of which he exhibits a goodly number.

No person can examine Mr. Henderson's enamels without being struck with the great perfection achieved in this interesting branch of photographic art by that gentleman. They are the best ever exhibited by that excellent artist, who is now generally acknowledged to be "without a rival" in this particular branch of our art-science.

There are some good enlargements executed by "Window's carbon process," with the nature of which process we are not acquainted.

Mr. Rejlander exhibits very largely; and when we say *that*, the imagination of the reader can easily adumbrate the rich pictorial treat afforded by a study of the works of this talented artist.

Mr. Stephen Thompson comes out with considerable force—his *Old Kentish Homestead* being amongst the most attractive of his many able pictures.

Mr. Gillo's specimens of transferred collodion films are fine examples of a department which might be cultivated with much more profit by photographers than it is. It is so easy to print either enlargements or ordinary-sized transparencies upon collodion, and then to transfer them to paper—the results, moreover, being so superior—it is a matter of surprise so few are found to practise this branch.

The pictures of Lieut.-Colonel Stuart Wortley attract much attention from their large size, their superior execution, and the novelty of their pictorial treatment. Many of them are night effects, or rather *moonlight* effects. There are three large heads on 15 × 13 plates, which attract much attention. There is a very pretty head of a girl dressed in the costume of the period of Henry VIII. Another represents a handsome girl robed in a Spanish mantilla. All who have the welfare of the art at heart will welcome Colonel Wortley's return to photography, on which, by his cultivated taste and dexterous manipulation, he has already shed a lustre, and we may add a hope that he may for a long period be enabled to devote his great talents to the advancement of our art. His photographs are pictures in the highest sense.

The weak point of the exhibition is the enlargements. Last year's exhibition was much stronger in this department than that of the present year. We have spoken of some by Mr. Window's carbon process, and have confessed our ignorance of the process named. The results are sufficient to render it desirable that more were known of it. This our readers will be made acquainted with in due course. Mr. Faulkener, Mr. Hooper, Mr. Warlich, Mr. Mayall, Messrs. Lock and Whitfield, Mr. F. Briggs, and others, exhibit enlargements, the majority of them being elaborately coloured. A portrait, painted in oil, of Mr. Reverdy Johnson, engaged in the contemplation of a bust—we presume of Washington—commands attention from its excellence as a speaking likeness of the late American Minister at the English Court. It is by Mr. Mayall, and is "painted for the Corporation of Brighton."

Mr. Blanchard contributes a large number of portraits. Upon a careful inspection of his works we see no reason to alter our opinion, as expressed in last week's "Answers to Correspondents," respecting their being, as a whole, the best examples of portraiture in the exhibition. His portraits are of two sizes, 10 by 8 and 15 by 12. They are of the class now known as "Salomonesque," especially those of the smaller size. Those of larger size may rather be regarded as studies of heads. Their pose is artistic, their tone a fine warm velvety-brown, and their lighting faultless. A portrait of that well-known artist connected with our comic serials, Mr. Proctor, is, perhaps, in its technical qualities, the finest of Mr. Blanchard's productions, although his large heads secure the greatest amount of public attention.

The productions (large heads) of Mr. Lafosse, of Manchester, are splendid studies of lighting and general effect. This artist bids fair to take a very high position in this department of photographic art.

Mr. Fry's contributions are not numerous, but they are executed in that skilful and tasteful manner which is characteristic of this artist. As prints they are very brilliant.

Mr. England has a large number of his inimitable Swiss views. This artist's works are ever fresh and charming,

Mr. F. Beasley this year appears to have been "taking a leaf out of the book" of Mr. England, for his contributions are culled from the more sensational subjects to be found in Switzerland. They are all of a very high order of excellence; and the same may be said of some pretty rustic scenes by Mr. Alfieri.

The coffee process is represented by Mr. S. A. Mowles. An intimation is affixed to his picture stating that the plates were kept four months before exposure. Judging by these specimens no better process need be desired.

We expected to see more photo-crayons than are exhibited; more especially did we expect to find some contributed by Messrs. Sarony and Co., who are, however, "conspicuous by their absence" from this exhibition. Messrs. Vandyke and Brown, Messrs. Bullock, Messrs.

Burgess and Grimwood, and Mr. A. F. Smith appear to be the only exponents of this process. Two large glass transparencies, by Messrs. Bullock, backed with plain white paper, are very fine. The eburneum pictures of Messrs. Burgess and Grimwood are fine, but wanting in that force which would enable them to show to advantage in the immediate vicinity of so many brilliant prints on paper.

Some excellent specimens by the tannin and gum process are exhibited by the Rev. A. Johnson; and Mr. Russell Sedgfield shows a perfectly charming series of cabinet views, among which a picture of *Windsor Castle* is entitled to special commendation.

A series of very large Daguerreotypes is exhibited by Mr. Mayall, illustrative of the state of the art in 1851. They represent views in the Great Exhibition building of that year, and from their superior detail, the straightness of the marginal lines, and their general excellence, they will disabuse the mind of any person who may have imagined that the works produced by the Daguerreotype process were of limited size, or that the lenses in those days were not calculated to produce straight lines.

The Autotype Company show us in their numerous works exhibited that they have made an immense stride since last year in developing the resources of permanent pigment printing. The specimens shown prove that their new process, patented by Mr. J. R. Johnson, is applicable to every branch of photography. Among the many reproductions of drawings and paintings—all excellent in their way—we were particularly struck by a *facsimile* of a fine crayon drawing by Cave Thomas, entitled, *Ecce Homo*, which might be mistaken for the drawing itself; and, also, by two frames of copies of rare engravings from the British Museum, after Sir Joshua Reynolds. It is, however, the pigment prints from negatives taken from nature which will most interest photographers, and in this department the works shown well deserve inspection.

Messrs. Sarony and Co., of Scarborough, who call themselves licensees of the Autotype Company, exhibit two frames of cabinet and *carte-de-visite* pictures, which far surpass anything previously seen in carbon printing. Those with enamel surface nearly equal Daguerreotypes in perfection of gradation and definition, while they rival silver prints on albumenised paper in brilliancy. Those with matt surface are soft, delicate, and perfect in half-tone and gradation; but they lack somewhat of the force and brilliancy of silver printing.

Mr. F. Good exhibits two large frames of his views in Egypt, printed for him by the Autotype Company in permanent pigments, which leave nothing to be desired in all qualities except the mere tint employed, which, we think, should have been warmer and more intense. This is, however, a question of detail which is under perfect control.

When we consider that all the works of the three exhibitors just referred to are absolutely permanent, we cannot but congratulate ourselves upon the great progress which the art has made, and is making, in this direction.

We shall resume our notice of the exhibition next week.

We may supplement our present article by giving an extract from a notice of the exhibition in *The Times* of Tuesday, the 16th inst.:—

"The general verdict seems to be that, both for diversity and degree of excellence, it is decidedly the best exhibition of the Society.

"It includes more than 400 examples. The subjects include landscape and architecture at home and abroad, foliage, skies, seas, portraits, human and animal; examples of natural history, of natural size or enlarged, are almost the only important application of photography not represented.

"Processes are as various as subjects. We have wet and dry-plate work, gum-gallic and coffee, eburneum and carbon processes; examples in small and solar camera enlargements; pictures on all manner of surfaces—matt paper and enamel and glass; transcripts from nature, and 'combinations' of sky and landscape, figures and background, in which direct rivalry with pictorial art is ventured upon.

"The exhibition has two sources of interest: one for the working photographer, the other for the public and critics, who judge results, not on photographic merits, but by the pleasure they give. We notice the exhibition less from the photographic than the artistic point of view.

"We see nothing here to induce us to change the opinion we have before expressed in notices of photography that its true function is in the record of facts as they are, not as arranged for pictorial effect. With full recognition of the beauties of Mr. Robinson's work, and of the good taste which has guided his 'combinations,' and with such clever examples of photographic picture-making as many of Mr. Rejlander's subjects and Mr. Hubbard's *Stolen Moments* here, fresh in memory, we still feel that photography has an altogether distinct function from fine art. If, indeed, the theory of some of our painters were true, that the painter's work is simply to represent what he sees before him, then the photographer might claim to be put in the same rank with the painter, and above him. For what painting could record the multitudinous detail of the figure friezes and ornaments of the Buddhist temples of Southern India like these admirable photographs of Capt. Lyon's? But if, as we hold, the distinctive function of the painter's art be not transcription, but new creation, the condition of which is the subordination of the objects represented to certain mental states and acts of the artist, it is evident that photography is excluded, for the sun *will* paint what he sees as exactly as he can. We may arrange the subjects for him to a certain extent, and choose the point of view for him; but we can do no more. But the more we arrange his subjects the more lifeless they will look—the more they will show that dreadful dead-aliveness which belongs to the *tableau vivant* as distinguished from the picture. And this for the simple reason that everything in a picture requires to be modified, as well as arranged, by the artist in the process of painting, whereas the photographer can only arrange and not modify, or only modify within the narrowest limits."

MR. M'LACHLAN'S LARGE COMPOSITION PICTURE.

The following amusing and genial article, which is somewhat personal, although by no means offensively so, appears in the last number of the *Free Lance*, a humorous journal published at Manchester. During the past week we have seen and examined with some care a print in carbon of this great work, and, in lieu of more elaborate criticism, we may say that it reflects the highest credit upon all connected with its production.

Lachlan McCross Street.

The gentleman whose name graces the head of this column resides in a glass house situate at the summit of the building in which Mr. Halderman Pellett sells hats. Lachlan McCross-street is a clever—one of *the* cleverest—photographers of the day. His local fame is such that, if you desire your physiognomy camera-ised, you must make an appointment long before, and likewise be punctual. In the metropolis too Lachlan is well known, and many of his works have been highly praised by people who know what they talk about. He is stark staring mad on the subject of photography, and declares to you that there is nothing like it under the sun. As to portraits, pure and simple, they are all very well, and they pay, but there is no room for the display of real art, you see. It is true you can get "half-tone" to perfection if you only know how to set about it—and what is more horrible than your beastly touched-up photograph!

Now a man who is thoroughly mad about his profession—be it what it may—is tolerably sure to succeed in it. Sir Joshua Reynolds was more than eccentric; Hogarth was as mad as a March hare; Gainsborough was "queer;" and Nasmyth was "odd." Lachlan McCross-street had so much to do in the way of portrait-taking that, notwithstanding the work pays so well, he got tired of the monotony. Ladies are so "fussy," and gentlemen are so "priggish," that the mind of a conscientious artist revolts at the daily routine of taking off the heads of the populace. The reflection of the enormous difficulty of procuring now-a-days veritable likenesses of the great men who have gone before—Shakspeare, Milton, Ben Jonson, and others—suggested to McCross-street the idea of securing the visages of living celebrities and of baking them in enamel—just as the patterns are burnt into dinner plates. He succeeded, and at a trifling cost it is easy to multiply these specimens for the benefit of posterity. Thus the likeness of Sir Thomas Turveydrop, Baronet, M.P., may be enshrined not only in the local cabinet of local worthies, but in the British Museum, and other public places for the admiration and solace of future ages.

Having succeeded in this, Lachlan was fired with an ambition to reproduce, in a picturesque group, the men who did honour to themselves, their country, and their hearts, by their devotion to the relief of the distressed cotton operatives of six years ago. Night and day, day and night, did McCross-street ponder and dream over his pet project. He is a naturally bashful man—all photographers are—and he sought the aid of Joseph the Town Clerk, who, with his usual good nature, set to work with a will, and broached the matter to the good Earl of Derby. The Earl, who never could say "no" to a reasonable request respectfully urged, at once chimed in with the idea, and freely gave his influence and his aid in carrying out the design. Lachlan McCross-street was now a happy man, and he at once commenced to realise his one absorbing idea. With difficulty he was enabled to perform the daily drudgery of photographing the faces of inane and pompous citzens. If his children had not required bread and butter, he would willingly have gone without both himself that he might waste no time. But such things are not to be done in a hurry, and full five years have elapsed since Lachlan first got fairly to work with his picture.

It is not difficult to comprehend something of his difficulties. Lord Derby *must* be in the chair, and the modest Mr. McClure *must* be at his right hand, but after that everybody desired the most conspicuous position. It is human nature, and it was not likely the magnates of the county were going to run the risk of being overlooked. Lachlan declares that he can never sufficiently repent the fibs that were necessary

to induce these good people to accept the positions assigned to them. But McCross-street is wise in his generation, and knowing that about the most difficult thing to do with human creatures is to arrange them in a picturesque position, so that the *tout ensemble* may be artistic and agreeable, he engaged the services of Mr. Shields, an artist of great repute. Mr. Shields has the reputation, well earned, of being one of the best draughtsmen in the kingdom, and his quickness of perception and correctness of taste were invaluable. The result of all this labour and cogitation, this pulling to pieces and rebuilding, these sleepless nights and laborious days, is now to be seen in the rooms of Messrs. Agnew, in Exchange-street. It is simply a triumph of art, and must be so regarded by every beholder, whether he can or cannot estimate the difficulties which have been surmounted. We have not space to enter into a detailed criticism of the various portraits, but it is impossible to pass over the most interesting of all, that of the late Lord Derby. Seated as chairman of the meeting about to commence business, his attention is attracted by some object upon his left hand, and thus an opportunity is given for an excellent, an easy, and a natural *pose*. His noble forehead, expressive eyes, and finely-chiselled features stand out with wonderful sharpness. Everybody has heard of "speaking" likenesses, and, as you look at this picture, you would really not be surprised if sound were to issue from the half-open lips, so thoroughly natural is the whole expression.

The painting, which is by a well-known artist, Mr. Hughes, is in monochrome, because Mr. Lachlan McCross-street intends to photograph from it numerous copies some twenty inches by ten in size. The picture itself is more than ten feet in length, and probably about five feet in width. It must be borne in mind that this creation has been really a labour of love to Lachlan, who can never hope to repay himself even the mere bawbees which it has cost him, to say nothing of professional pride and natural anxiety. Nevertheless such recompense as can be fairly made should be given, and this can be done in two ways. First by the purchase of a large number of copies—and there ought to be hundreds of county people who would be glad to possess so handsome a *souvenir* of a great national trouble grappled with and overcome—and, secondly, by the purchase of the original for the new Town Hall.

Manchester may well be proud of the energy with which the sad consequences of the cotton famine were fought and overcome in her own Town Hall, and that should be the destination of this picture, that posterity may see and reverence the features of the good men who gave their money, their attention, and their time to succour the poor and needy in the hour of their distress.

Contemporary Press.

THE ANTHROPHOTOSCOPE.

[Philadelphia Photographer.]

The "anthrophotoscope" is a contrivance familiar, doubtless, to some of our readers, but new to many more. It is a sort of a "peep-show." Photographic images are cut free from the background very neatly, and fastened upright on a wheel which revolves, with a background on a different plane (say at an angle of ten or twelve degrees) from the figure itself. The table is then placed in a box or case.

To obtain the proper effect, then, the pictures are viewed through a large magnifying glass of long focus, minute fractions of an inch being converted into apparent distances.

The figures may be variously grouped, and the backgrounds changed at will in the following manner:—

A variety of landscape views or other scenery is arranged around the marginal portion of a large flat wheel, say two feet in diameter, that part of the wheel being bevelled or sloped back, so as to form an angle of ten or twelve degrees with the general face of the wheel, this bevelled space being, say, four inches wide from the periphery towards the centre. This wheel is placed on a horizontal axle. Close in front of this bevelled wheel another thin wheel, say eight inches less diameter than the first, is placed, but revolving independently around the same axis, the periphery of the smaller wheel just reaching the bevelled portion of the larger. In front of this, again, other thin wheels, all parallel to the first, are placed, revolving independently of each other, but around the same common axis; each wheel in succession being so much smaller than the one behind it that a line touching their peripheries would make nearly the same angle with the vertical face of the wheel as the plane of the background on the larger wheel. In the edges or peripheries of these small thin wheels narrow grooves or slits are cut, vertical and parallel to the sides of the wheel, for slipping in and holding the vignette likeness. This being the mechanical arrangement, the full-length pictures are attached immediately to the inclined background on the large wheel (being held divergent to its plane by means of wedges), and the vignettes are held in their positions diverging from the background by slipping the lower edge into the vertical grooves formed in the edges of the smaller wheels, the relative position and angles of background and likeness being the same as for the stationary pictures. These wheels being suspended inside a box, a large magnifying lens of say four inches in diameter and twelve or fourteen inches focal distance or thereabouts, is placed in the front side of the box, opposite that point where the figures become upright in revolving. The light may be admitted through an opening in the top or sides of the box, and should be subdued by passing through a tinted glass. A movement of either wheel brings different figures in juxtaposition, and a movement of the large wheel backs the picture with a different landscape. To exhibit the most beautiful effects from this mode of arrangement, there should be several of the smaller wheels graduated down as we approach the front in the proportion before indicated.

Recently an improvement in mounting the figures has been patented by Mrs. Sarah F. Mills, San Francisco, California, which consists of little uprights with points to which the figures are pasted and then stuck in the board. It is another instance of the inventive faculty developed by great Photography.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 25th	Oldham	Hare & Hounds Inn, Yorkshire-st.
,, 25th	Bristol	Philosophical Institution, Park-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held in the City of London College, Leadenhall-street, on the 11th inst.,—the Rev. F. F. Statham, M.A., F.G.S., President, occupying the chair.

After the minutes of the previous meeting had been read, Mr. G. S. Stenning was elected a member of the Society.

The Chairman, having announced that the subject for discussion was on the fading of photographs and their restoration when faded, requested Mr. Valentine Blanchard to open the discussion.

Mr. Blanchard said that, some years ago, he tried a number of experiments upon photographs that had become yellow, and some of which were printed upon albumenised paper toned with gold; others being on plain paper and very old, made, indeed, previous to the introduction of gold toning. His experiments in restoring these albumenised prints had been made with bichloride of mercury, which certainly removed the yellowness and made the pictures somewhat respectable in appearance and passable. One of these prints he had met with a short time since, and it had not undergone any further change, but was just as it had left his hands eight years ago. When applied to plain paper prints, the same treatment caused them to vanish altogether. By treating those with ammonia they were redeveloped. More lately he had experimented with developed prints, with the same result. Those on plain paper and not toned with gold were obliterated by the mercury but restored by the ammonia.

The Chairman remarked that there were some persons who advertised that they restored faded photographs, and asked if any of the members knew the means adopted by such persons.

It was explained that these advertisements had reference to retouching the faded print and making other copies from it.

Mr. Blanchard thought that many of such advertisements referred specially to the restoration of Daguerreotypes. That was a class of picture which he had not known to fade, although a dark scum sometimes crept over them from the edges, which, however, could be very easily removed. He had seen some Daguerreotypes which had all the appearance of having been rubbed with a coarse towel. Of course, when in that state restoration was quite impossible.

The Chairman said that, with reference to the causes of fading, one great source was their being placed in a damp situation. The presence of impure gases was also prejudicial. Fading was further caused by the insufficient removal of the hyposulphite of soda by washing.

Mr. Henderson had received many glass positives to restore, the deposit of silver forming the image in some of which was very much oxidised. His usual procedure in such cases was to convert the image into the iodide, and then redevelope with silver and iron solutions.

Mr. Taylor observed that Mr. Tunny, of Edinburgh, some years ago, made a speciality of restoring faded paper photographs; and on one occasion the subject was brought before the Photographic Society of Scotland. Redeveloping with silver and pyrogallic acid, followed by toning, was, he believed, the method employed.

Mr. Simpson had tried various experiments in the restoration of old and faded prints, but he had not known the process of toning employed, whether gold or sulphur. He had tried the redevelopment of faded prints by gallic acid and silver, by chloride of gold, and by mercury. A strong and neutral solution of chloride of gold was best, although there was a tendency to a reduction of the half-tones. The method by bichloride of mercury had sometimes been attended with success, and at other times with non-success. Concerning gallic acid, he found it to injure the whites; and the result at which he arrived, from his experiments, was that there was no practicable means of restoring faded prints to their pristine vigour, although they might be much improved.

Mr. FITCH asked the opinion of the members respecting the propriety of glazing or enamelling the surface of the paper, and thus sealing up the picture. He had a picture of that kind which was covered with mildew; it had been kept in an unused drawing-room.

Mr. HENDERSON had lately looked over some photographs coated with plain collodion, and had found them yellow in the whites, while those protected by wax and collodion had not become discoloured nor faded in the least degree.

Mr. TAYLOR said that, in many cases, when prints faded it would be found that the paste used in mounting them had much to do with it. He cited as an instance a copy of Mr. Fox Talbot's *Pencil of Nature*, in his possession, the photographs in which had been printed (on plain paper) many years before gold toning had been thought of, and which, through the carelessness of the person who printed them, had been imperfectly washed, and yet they were as brilliant and good at the present time as they were twenty-five years ago when the book was issued. There was, however, an exception, that exception being a narrow margin round each print by which they were pasted to the mount. The margins were quite faded and yellow, and established beyond doubt the action of the paste in inducing the fading. The paste employed was that in use by bookbinders, and contained alum.

Mr. BLANCHARD had seen a picture by Hennah, sixteen years old, and quite as beautiful as it was originally. It was on plain paper. He was afraid that it must be said that no picture on albumenised paper would be permanent.

Mr. HOWARD, too, considered that albumen was the weak point in photographic printing. Glazing the print was a protection, inasmuch as it prevented the air from acting on the albumen. He found that when he applied hot water to remove a print from an old mount, a decomposition was set up which made the picture yellow.

Mr. BLANCHARD was watching with interest some prints by Mr. Simpson's process, and was inclined to think that it gave permanence. So far the prints had showed no symptoms of fading.

Mr. SIMPSON promised to bring to the next meeting some collodio-chloride prints which had been exposed to atmospheric action for a protracted period, side by side with prints on albumenised paper. The latter had changed considerably, but the former had not.

Mr. HENRY COOPER had some resinised prints which he had done in 1862 or 1863, and some of them had been lying about in damp places, while others had been hung up in a room. All the prints that had been washed in hot water remained perfectly pure in the whites, while those washed in cold water had become very slightly yellow, this change being in the resin. He had not noticed any case of fading among them, although some were hanging in a conservatory.

Mr. BLANCHARD thought that the time had then come when the London Photographic Society might advantageously appoint a fresh committee to inquire into the subject of fading.

Mr. HENDERSON, *apropos* of collodio-chloride, said that he had some time since taken a few prints by it on opal glass, which were very beautiful at the time. He took every precaution in their treatment, washing them with hot and cold water alternately, but they had entirely faded.

Mr. SIMPSON said that he would bring to the next meeting the first specimens which had been produced, and it would be found that they had not faded.

The CHAIRMAN inquired what was best to be done with a print which was only beginning to fade, so that the progress of decay should be arrested.

Mr. BLANCHARD advised that it should be washed in ammonia, and then toned.

Mr. W. H. PRICE said that most members would come to the conclusion that the basis of the picture was a rapidly-oxidisable body; if they could be assured that it was composed of gold, they would then have confidence in it. He considered the carbon process as a step in the right direction; the experience of ages had shown that carbon was indestructible.

Some conversation took place on the subject of keeping negatives in the same way as engraved copperplates are kept, after which the discussion terminated.

The CHAIRMAN inquired if any members had tried the sensitive paper distributed at the previous meeting by Mr. Henderson.

Mr. TAYLOR said he had tried it carefully, and it gave all the good results that had been claimed for it.

Mr. SIMPSON had also tried it, and found it quite successful.

Mr. HOWARD had likewise tried it with the same results.

It was decided upon having at the next meeting as many of the pictures then being exhibited at the exhibition in Conduit-street as could be obtained for that purpose, and that members would be expected to make such critical remarks as they felt justified in doing.

After the usual votes of thanks, the meeting was adjourned.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held at the Memorial Hall, on the evening of Thursday, the 11th instant,—the Rev. Canon Beechey, M.A., President, in the chair.

The minutes of the previous meeting were read and confirmed, and Messrs. B. W. Bentley and G. Hutchison were elected members of the Society.

The PRESIDENT alluded to Mr. Chadwick's notice of motion, and explained Rule 12, which clearly showed that such a motion could not be entertained except at the annual meeting, or at a special meeting convened at the request of ten members. The same remarks applied to the proposition of Mr. Wade, who withdrew his notice.

The following resolutions were then passed:—

1. That the members of the Manchester Photographic Society are sufficient to warrant it in taking both THE BRITISH JOURNAL OF PHOTOGRAPHY and the *Photographic News*.
2. That on receiving the assent of the Editors to this arrangement, each member be allowed to select the journal which he likes best, for one year at least.
3. That in case any member may choose to take both journals, he may be supplied with the two at the present rate.

Mr. Noton then exhibited an experiment in corroboration of that part of his paper read on the 9th September last, which relates especially to the sensitised albumen film. A slip of glass was immersed, for a few seconds, in an old and well-used solution of aceto-nitrate of silver; it was then withdrawn, drained a short time, and dipped into a bath of pure water, and held there. A precipitate fell from the surface of the glass slip, which was simply a liberation of iodide of silver by a large excess of water. Upon raising the slip a further fall of iodide took place, and when withdrawn from the bath the slip retained a very fine deposit of iodide of silver. He (Mr. Noton) was of opinion that the experiment showed that if a deposit could be obtained upon the surface of bare glass, and retained there, it was reasonable to expect a much denser deposit upon porous iodised films.

A brief discussion followed, and the subject dropped.

Mr. Wade exhibited a number of excellent photographs by Mr. Green, of Liverpool; and Mr. Coote showed specimens of printing on Durand's sensitive paper.

Mr. NOTON made a few observations on "diffraction gratings," and showed a slip of glass containing 500 and 1000 lines to the inch, ruled by Mr. Dancer twenty-five years since.

Mr. HEYWOOD wished to remind the members that the Society possessed a portrait book, in which he was much gratified to find a portrait of the late Mr. Petschler, and invited all the members to contribute their portraits to the book.

The meeting closed with the usual complimentary votes.

SOCIETY FOR THE ADVANCEMENT OF PHOTOGRAPHY, BERLIN.

A MEETING of this Society was held on the 22nd ult.,—Dr. H. Vogel in the chair.

After the reading of several letters, &c.,

Herr MEISSNER, of Bonn, communicated to the Society a process whereby negatives partially over-exposed could be strengthend to correspond, the over-exposed parts, such as white garments in portraits and skies in landscapes, being preserved from the strengthening. The process is substantially as follows:—After fixing with cyanide of potassium the negative is varnished. The whites are mostly so strong that they need no strengthening. All the parts that do not require strengthening are covered with gum arabic in solution, to which a little carmine or Berlin blue may be conveniently added. After this covering is dry the lac is removed by any suitable solvent. The covered part of the negative will not be affected thereby, for the gum prevents this. The negative is now washed and strengthened in the usual way, the whites being protected by the lac from being injured. It is finally varnished, when the negative is ready for use. In this way perfect harmony may be obtained in the negatives, and those white blurs with which clothing is frequently disfigured may be avoided. The process is simple, and there is no difficulty in its employment. It is peculiarly adapted to the obtaining of beautiful skies in landscapes. The gum solution should not be too strong, and must be put on as thin as possible. Neither should the alcohol for dissolving the lac be too strong, as absolute alcohol, owing to its strong withdrawal of the water, causes the gum layer to tear, and most probably the layer underneath would be injured thereby. Experiments on useless negatives would soon show the strength that could be used with safety.

Herr PETSCH remarked that the evil of over-exposure usually showed itself in bright clothing, and the hands when in dark positions, &c. In order to prevent this he employed a screen of about four or five feet, covered with dark cloth. On the upper part of this screen was a hinge, which enabled the operator to bend it as desired. It was placed on the light side of the figure, to be taken and moved nearer or further off according to circumstances. In this way this simple accessory throws a slight shadow on the lower part of the person, and sufficiently suppresses the too bright hands and white clothing.

The Chairman read a letter from Herr Kolben, of Gröningin, recommending, in order to prevent rain water from penetrating into studios, the employment of curved glasses, which, with the convex side below, are made to rest on iron bearers, which appeared from the diagram to

be of an anchor form, and to allow the water in the middle of the glass to run away underneath. The panes are placed like tiles two inches apart, one upon the other. The glazing is effected with putty incorporated with asphalte.

Herr Scamoni sent some heliographic prints as an illustration of what he had read at a former meeting in regard to the processes of helio-engraving.

Herr Kampf, a pupil of M. Adam-Salomon's, laid before the meeting proofs of large pictures, which were executed in the effective style of that renowned artist. The extraordinarily deep and beautiful tone of the backgrounds, as well as the consequently bright and strongly-lighted heads, elicited universal admiration, although all were not of the same opinion as to the manner in which this was accomplished.

A conversation which arose respecting these proofs digressed into the general principles of the art, and resulted in the conclusion that the deep toning of otherwise subordinate heads, hands, and other corresponding objects of a picture, had such an effect that through these strongly-contrasted values of tone the picture itself might be printed without harmony. It must, then, be left to the personal taste of the artist to decide upon the happy medium.

Herr KAMPF stated that M. Salomon employed a peculiar copying and toning process which enabled him to obtain brilliant prints from a very faulty negative, and he offered to communicate this process for the sum of 100 thalers.

Herr PRÜMM referred to the discovery of a new artificial light by Dr. Monckhoven, with reference to the production of enlargements.

The CHAIRMAN said that Dr. Monckhoven was coming to Berlin in the spring of next year, and would give the Society the benefit of his experiments.

Dr. ZENKER referred to the progress of heliochromy, and said that MM. Ducos du Hauron and Charles Cros proposed to reproduce coloured pictures according to nature by means of three negatives taken from the same object—the first through an orange, the second through a green, and the third through a violet-coloured glass. Three carbon proofs are printed from these three negatives by the usual process, in the corresponding complementary colours; that is, from the negative taken through the orange-coloured glass a print on blue-coloured gelatine (on which all the yellow of the object, as on the covered negative, remains white), from the negative taken through a green glass a red carbon print, and, lastly, from that taken through the violet glass a yellow print. The three prints are then fitted exactly on the same transfer paper, and make up together a coloured picture. Herr Zenker called attention to the great difficulties to be experienced in carrying out this idea. The principal hindrance lay, he said, in the chemical inefficacy of the red and yellow rays, which, in the world of colours, played so extensive a part. Then the yellow gave with difficulty a transparent substance, which the blue light completely absorbed. The yellow and red rays take effect on chloride of silver, but, unfortunately, this effect cannot be strengthened as in the usual negatives.

There arose a lively debate on this interesting subject, during which Dr. Zenker informed the meeting of his former experiments in coloured photography, and at the conclusion of which he presented to the Society his work on heliochromy.

After some further business of a private nature the meeting separated.

Correspondence.

Foreign.

Paris, November 15, 1869.

THE account of the last meeting of the French Photographic Society would not be complete without a notice of another communication made by M. Marion, on the method of obtaining pellicular carbon negatives from which positives may be printed off the "right" or the "wrong" way. Pellicular negatives are not at all new. I remember that Mr. Ernest Edwards exhibited a number at one of the meetings of the Society some months ago, so that any account of their uses and advantages would be superfluous. The *modus operandi* of M. Marion for obtaining such negatives is, therefore, the subject to which we must direct our attention. The carbon picture still undeveloped is transferred to a metallic plate, in the same way as it is proposed to attach it to a sheet of coagulated albumen paper. The operation is longer than that required for albumenised paper, and the metallic plate must be previously covered with a film of wax dissolved in turpentine, to facilitate the detachment of the picture after its development, and to prevent the oxidation of the metallic surface. Instead of an hour, as in the transfers on albumenised paper, the pictures on the plates are kept under pressure for six hours. The images are developed as usual, and when the plate is quite free from all soluble matter it is left to dry spontaneously in a cool place without any draughts of air. It requires generally from twelve to twenty hours to produce a perfect desiccation of the image. When all moisture has disappeared the plate is taken into the open air, and the image peels off itself in the form of a transparent film, with all the details of the original negative.

The metal of which the plate is composed appears to be of some importance. At first M. Marion thought that nothing could be better than a silvered plate, but this was erroneous. A flattened copper plate well polished should be preferred; and, strange to say, a rolled plate of the same metal has not the same aptitude of attraction. Zinc is said to be too easily oxidised. If a *negative* has been used to impress the carbon paper the pellicular picture will be a positive, which may be used in its turn to produce a negative, and *vice versâ*. If a transparent *positive* be used in the first place, a pellicular negative is obtained at once, which may be printed from from either side. This sort of negative, says M. Marion, "is the *desideratum* of carbon photography on albumenised paper, and the silver printing processes will also be able to draw advantages from it." These pellicular negatives are very thin, and should be kept between two films of collodion to protect them in the printing operations when a large number of pictures are required from them. To obtain pellicular negatives of greater thickness, the developed image, whilst still upon the metallic support, may be placed on a levelling stand, and a hot solution of gelatine poured over it. The edges of the plate in this case should be surrounded by walls of cardboard. The drying operation in this case is much longer, lasting, at least, three or four days.

To produce the same effect in an easier and quicker manner, the following plan may be adopted:—The paper is prepared with two films—the first the gelatine, bichromate, and colouring matter; and the second of colourless gelatine. The printing is performed as usual, only the exposure must be at least one-third longer than customary. The following is the action which takes place:—The light attacks the colourless film, crosses it, and attacks the coloured film underneath. The image is formed in the two films, but it exists really in the lower film, the upper only forming a sort of armour or protection to it, and giving it a strength. The development is as usual, but is accomplished with more ease than with the thin films. The drying is long, the detachment proceeds as usual. M. Marion accompanied this communication with numerous specimens illustrative of the process. I leave it in the hands of those interested in the matter to glean any notions they can from it. In a letter received from M. Marion today he begs me to inform your readers that there is no connection between his house (A. Marion, Paris) and the well-known house of Soho-square. It appears that confusion has arisen on this point, and the mistake has been made in the list of exhibitors at the annual exhibition of the London Photographic Society, and in an article in its journal, page 159. M. Marion trusts this confusion of names will not be kept up.

The President of the Pharmaceutical Society of Brussels has published a method of obtaining the photographs of plants, herbs, flowers, &c., which is not without interest to photographers, from its extreme simplicity, and from its indicating a method of printing just the reverse of that generally practised. The portions of the paper acted upon in this process become white, whilst those protected from luminous influence produce the shadows of the picture. A solution is made consisting of—

Solution of perchloride of iron, sp. gr. 1·260 ...	1 ounce.
Distilled water	3 ounces.
Sugar of milk..	80 grains.
Tartaric acid	80 ,,

A sheet of good photographic paper is prepared with this solution either by means of a brush or by floating. It is dried, and is ready for exposure under the plant or whatever is required to be copied in the pressure-frame. The exposure varies. In good sunlight ten to fifteen minutes are required, but the completion may be told from the exposed parts of the paper changing from yellow to white. It is best to give good measure of exposure, so that all the persalt of iron may be converted into a protosalt; for, unless this be done, a grey ground will be obtained instead of a white one. When the exposure is complete the sheet of paper is well washed, then floated on a solution of gallic acid, or spread, whilst moist, upon a sheet of glass, and the gallic acid solution poured over it. When the image is become sufficiently black it is again well washed, and dried. The picture is then in writing ink, and is as durable as any of our daily letters and manuscripts.

A few special hints about the photographing of plants, so as to reproduce all the delicate, nervous tissue, are given by M. A. T. de Meyer, the author of this process. He recommends that the plants be allowed to dry pretty completely before photographing them; "the cellular tissue then becomes more transparent, and the vascular tissue is reproduced at the same time." If images of flowers be required, it is necessary to paste outside the glass of the pressure-frame some thin transparent paper, just over the coloured petals, so as to diminish the intensity of the light in these places. Without this precaution the image of the flower will have disappeared before that of the leaves is finished, the tissue of the petals being more transparent. If the petals are yellow this precaution need not be followed. It seems to me that this process might be very useful in many cases in which a copy of a drawing, or a manuscript, &c., was required quickly and of unerring fidelity. I believe a process of a similar description, but in which the pictures were blue, was commercially announced and worked by a Mr. Willis some years ago. Whether it was a success or not I never knew.

The subject of the detection of impurities in bromide of potassium is attracting much attention, and many plans are proposed for this object. Besides those I have alluded to in recent letters, M. Duingt, of Geneva, observes that if to a solution of bromide of potassium, mixed with $\frac{1}{1000}$ of iodide and a little chloroform, benzine or pure sulphide of carbon be added, drop by drop, shaking all the time, some weak bromine water, the chloroform, &c., is seen first to become coloured violet, then is decolourised by a fresh addition, and, lastly, to become of a yellow tint from a fresh dose of bromine water. If at this moment the decanted liquid be treated with weak *sulphurous* acid, drop by drop, it becomes again violet on the addition of chloroform.

In a capital little publication, entitled *The History of a Sunbeam*, published in French, I find an interesting chapter upon the "Light of Rembrandt;" and, remembering that some American editor expressed his opinion that very few photographers knew either who Rembrandt was, whether he was still alive, or what his peculiar effect was, I transcribe to your well-read pages some of the information I find in this one-franc volume:—

"The effects of the lighting of Rembrandt van Ryn are admirable. In throwing the straight, narrow sunbeam into an *atelier*, a chamber of a philosopher, a laboratory of an alchemist, or a meeting of friends, he does not simply show the phenomenon of lighting up, but he unveils all the thoughts which might arise either in the mind of the spectator or in those of the personages under the influence of his lighting; and the influence of this ray of light is salutary and full of inspiration, or suggestive. At the same time he brings out with an infinite delicacy, both in his lights and in his shadows, the thousand shades resulting from the passage of the discreet luminous flood which he introduces into his compositions. All his pictures merit being studied close to, and for a long time, from the only point of view of their illumination—sometimes fresh and happy, then sombre and measured, then painful and complicated. Indeed, frequently he gives a phantasy of light to some subjects instead of their natural effects, and this wilfulness, which would be a fault in a vulgar painter, adds to the beauty of the whole in Rembrandt's hands. In a dash of light he knows how to comprise an infinity of things, and the characteristics of his personages come out from the way in which his magic brush has drawn that luminous dash or brilliant ray. The personages are very matter of fact, often even gross, but they are all lifted up by this light, which determines their expression, and communicates to them a peculiar charm. Rembrandt is the painter of hidden and imperceptible colours—those colours which remain in the eye when it is closed, after having enjoyed the light."

Next week I shall have to notice a unique volume, just printed for private circulation, by M. Blanquart-Evrard, of Lille, who has been good enough to forward an early number to your correspondent. It is entitled *Photography: its Origins, Progresses, and Transformations*. It is illustrated with a large number of photographs produced by the chief new processes of photo-engraving, &c., and is a very valuable contribution to photographic literature. R. J. Fowler.

Home.

A LENS QUERY.

To the Editors.

Gentlemen,—I have recently been informed from several quarters that our best English opticians are in the habit of making lenses of 'extra quality," of course charging an extra price. Now, it appears to me, if such be the case, that it is important this should be known generally by amateurs and the profession.

I believe it has been a general impression that, by paying the usual price charged, the best average productions of our great opticians would be secured; but if it be true that they reserve their *best* lenses for a still higher price, it will no doubt create a feeling of great uneasiness amongst those who fondly thought that, in the possession of a Ross's, a Dallmeyer's, or a Grubb's lens, that they need not fear a rival.

Supposing I pay an optician twelve pounds for a No. 2 *carte-de-visite* lens, can I, by paying eighteen pounds, obtain a still better one? Or, to reverse the question—If I do not choose to pay eighteen pounds, shall I only obtain a second-rate instrument (but still a thoroughly good lens) for twelve pounds? I am not complaining of this so much as the advantage thus given to a few, unless it be known generally. Photographers have paid good prices for their lenses so long, they deserve to be treated in a candid and open manner.

Let our opticians charge as much as they please, as they have a perfect right to do; but let us know exactly how we stand in this important matter.—I am, yours, &c., P. Grey.

29, *Newland, Northampton, Nov.* 16, 1869.

[We have published this letter *in extenso* because it treats of an alleged evil of which we have before heard. It is quite a misconception to suppose that opticians of eminence would thus play fast and loose with either their *clientele* or with their own reputations. They make only one quality of lens, and that the best of which they are capable of producing. It would be possible to make a special lens more expensive than others of the same kind by some variation in the mounting, or even by employing glass specially prepared for the object glasses of telescopes; but no benefit would be derived from this.—Eds.]

THE POSSIBILITIES OF PHOTOGRAPHY.

To the Editors.

Gentlemen,—Not being versed in that modern adjunct to photographic art known as "the art of putting things," will you kindly enlighten me as to one or two subjects?

There are in the exhibition in Conduit-street, now open, several photographs by Col. Stuart Wortley which purport to be moonlight scenes. Now, although this is a wonderful age in which many things are done at the bare idea of which our forefathers would have shrugged their shoulders in pitying scepticism—photography itself being one of them—still there is one thing which, if we may believe physicists, has not yet been done and that is to confer upon our satellite actinic powers of such an active nature as to permit of instantaneous photographs being taken by her mild rays. Col. Wortley's moonlight pictures are taken by sunlight, of course, but what I should like to know is, by what means does he obtain his skies? His clouds are marvellous, without doubt, but I question whether they could have been taken from nature. Might such effects not be obtained by taking the sea on one negative and the clouds on another, the latter being copied from a drawing or painting? I presume the pictures referred to were produced in this way.

Another thing I should like to know is, by what means Messrs. Robinson and Cherrill get some gulls in one of their pictures to sit, or rather *fly*, so steadily for their portraits as to permit their eyes in one or two instances to be in some degree staring with, doubtless, well-justified astonishment, although for all that I can see they might have been a quarter of a mile away from the camera. This is a glorious art of ours, seeing that even seagulls of distant climes adoringly bow their heads to its behests. I have said "distant climes," seeing that neither in size nor shape do they resemble those about these shores.

Verily! great is (photographic) humbug, and very numerous are its prophets.—I am, yours, &c., Naturalist.

London, November 17, 1869.

[We shall have something to say on these topics after the exhibition is closed.—Eds.]

EMIGRATION TO CANADA.

To the Editors.

Gentlemen,—Two letters have appeared in your columns on the above subject in reply to the first excellent one asking for information.

In contradiction to the discouraging remarks of the two last correspondents, I beg to enclose you a few extracts received from emigrants in Canada by Lady de Grey, who has taken a great interest in helping honest, good tradesmen to emigrate to that colony; but what I would like to see is some statements from "A Canadian Photographer" as to what chance of success one would have in some of the rising townships, or as assistants in Toronto or any of the other large towns of Canada.—I am, yours, &c., An Assistant.

Edinburgh, Nov. 16, 1869.

"The season for emigration to Canada is now nearly over. The East London Family Emigration Committee, to which I belong, have been enabled by the subscriptions received in consequence of the letters which you have been so good as to insert in your columns, and from other sources, to send out East-end workmen and their families to the number of 608.

"These men had all good characters, and were reduced to extreme poverty by scarcity of work. Many had lost children from fever brought on by want. To procure food they had parted with almost all their furniture and their clothing, and skilled workmen were earning the small pittance afforded by breaking stones in the labour yards. Letters are now received from them by us full of gratitude and happiness. All found work immediately on their arrival in Canada, and the following extracts speak for themselves as to their present condition:—

"C. S. M. writes from Kingston:—

"'There is no want in this country. I have not seen one mendicant during the week that I have been here. I wish that the same could be said concerning London. Servant girls are wanting in the township of Kingston. I feel certain that 300 girls now earning a scanty living in London could obtain good situations at Kingston and round about. Agricultural labourers are in great demand, but servant girls more so.'"

"C. S. writes from Toronto:—

"'We often think how you would like to see us now that we are very happy, and the children look so well, and we are able to live well.'"

"Another writes from Toronto:—

"'My husband got a situation at his own trade in a jeweller's shop in Toronto, and has been working since May 10 at $1\frac{1}{4}$ dols. a day, or 6s. sterling; far beyond our expectation. * * * Notwithstanding some things being dear others are as cheap, and, taking it altogether, we can live much cheaper than in London.'"

Washing Prints.—It is proposed, in America, to wash prints, when the supply of water is limited, by patting them with an India-rubber sponge. It is more elastic, the pores or cells are much finer, and the power of suction (and hence of cleansing from hypo.) infinitely greater. Prints so washed for a few minutes stood unaltered by a severe test.

EXCHANGE COLUMN.

I will exchange backgrounds by Bull for other backgrounds; also, I will exchange a pedestal for one of a different pattern.—Address, Harry Emmens, 108, Seel-street, Liverpool.

I will exchange a bicycle and a Ross's *carte-de-visite* lens, No. 2, for a Dallmeyer's No. 2B *carte* lens; also, an orthoscopic lens, by Voigtlander, with light, portable camera without a dark slide, for 12 × 10 plates, will be exchanged for scenic backgrounds or accessories, or any useful article—Address, F. K., Winchester Cottage, Jersey.

Wanted to exchange, a binocular stereoscopic camera with twin lenses by A. Ross, connecting bar for focussing back and folding tripod stand; also quarter-plate walnut camera, with bath, &c.; an aneroid on bronze stand; also, 100 coloured slides for the lantern, nearly all about six inches in diameter (subjects, Jerusalem and the Holy Land); a water-colour painting, by H. G. Hine; and an oil painting, by Beattie. A portion of the above, or the whole, will be exchanged for an equivalent in value.—Address, A. B., Dundas-street, Saltburn-by-the-Sea.

ANSWERS TO CORRESPONDENTS.

Photographs Registered During the Past Week.—

John G. Short, Lyndhurst—*Group taken at Beaulieu Abbey, comprising Prince and Princess Christian and others.*

Jonathan Shaw, Liverpool—*Photographs from Original Drawings (from memory) of the following Liverpool Cotton Brokers:—Henry Pearce, David Wrigley, Joseph Thorburn, James Lister, Samuel Gath, D. C. Buchanan, N. G. Bousfield, John Goldie, John Allan, T. H. Sleigh, H. J. Webster, F. F. Chinn, Miles Barton, Thomas Haigh, James G. Bateson, H. Waddington, T. Marshall Bulley, E. Fairclough, Thos. Garforth, Matthew Jee. F. Mawdesley, Henry Robson, Francis Hollins, E. M. Joseph, Wm. Griffith, John H. Davies, John Dickinson, J. Shaw, John Lord Howard, Michael Bousfield, Wm. Reynolds, James Cunningham, George Cooke, T. B. Blackburn, T. Bourne, Samuel Smith, Joseph Parton, J. Trepolin, C. Mertens, Jos. Palthorpe, J. Hodgkinson, John Taylor.*

☞ *Correspondents should never write on both sides of the paper.*

Lover of the Art.—Your plan is so excellent that we cannot suggest an improvement.

J. B.—The allegations are so utterly untrue as almost to be amusing. You will hear more of the matter soon.

Ignoramus.—It is easy to remove the albumen from a print by immersing it for a short time in a boiling solution of caustic potash. The strength of the solution must not exceed one part of the potash to ten parts of water.

F. L.—The alabastrine process will suit your purpose better than any other. We are in a position to say that pictures by this process are permanent if they have been properly washed, and otherwise treated with ordinary care.

"Wet Process."—A ten-grain solution of protosulphate of iron will be found to be sufficiently strong for your purpose. There should be a drachm of acetic acid and about a grain of gelatine to each ounce of solution. In cold weather the proportion of protosulphate of iron may be slightly increased. We have used the foregoing with much success.

A. W. S.—If you write to some of the photographic chemists you may be able to obtain it; but glycyrrhizine is not now used either in the collodion or the nitrate bath. If you intend adding it to your collodion, we advise you not to do so, because sufficient density and better pictures can be obtained without its aid than when it is employed even in very small proportion.

S. Bourne.—Our readers who remember Mr. Bourne's previous narratives of photographic travel in India, Kashmir, &c., will be glad to learn that we have received from that gentleman another graphic description of his experiences when "out with the camera" in the most unfrequented parts of India. Mr. Bourne, as a traveller, has always proved himself a keen "sportsman" in "bagging" photographic "game" among the grandest and wildest scenes in nature, where "what he greatly thought, he nobly dared."

W. H. Y.—Proceed as follows:—Take a picture first with the full aperture of the lens, then, without moving the camera or re-focussing, after having pushed close up to the front lens a cardboard diaphragm with an inch aperture, take a second picture. Now remove the diaphragm, and paste, in a temporary manner, upon the front lens a circular piece of cardboard or opaque paper, the size of the aperture in the diaphragm previously used—that is, one inch—and still, without re-focussing, take a third picture. Send us the three pictures, and we shall then be in a position to give you our opinion of the lens.

W. W. Stainthorpe.—1. The subject of the photograph has a dull, heavy look—in fact, he is anything but lively-looking; but, if there be any truth in phrenology, there is more in him than at first sight is apparent. The vertical lines in the background seriously interfere with the figure, which is otherwise, considering your limited experience, good.—2. We have not yet had time to try the collodion, but we gave some of it to a professional friend, who has with it produced a much better picture than that enclosed by you. We shall try it next week.

T. G. P. (Ireland).—1. The colour of the curtain is of no consequence; it might be green, red, or dark drab. Distemper will be better than oil.—2. Acetic acid is most preferred.—3. By making your want known through our advertising columns you would experience no difficulty in getting it supplied. We presume you mean a second-hand press. Many of these are to be procured at about half the original price.—4. We believe that the course of treatment indicated by you will correct your bath. From its not being old it is probable that there is but little organic matter in it. Let the solution be very weak, and add it until a slight milkiness is produced.

Enamel (Dundee).—The *carte* you enclosed (which has been returned) is produced by a very simple system of masking. In the first place, the vignetted portrait is printed in the usual way. An opaque oval mask is then placed upon the centre of the card, so as to cover the portrait. Another mask is then placed so as to protect the margin of the picture. Thus arranged, it is exposed to light until the exposed portion is printed of a deep black, and, when removed from the printing frame, the portrait will be in a white oval surrounded by black. The mask may easily be made upon glass, either by opaque varnish or by pasting tinfoil or even black paper upon it. An ordinary embossing press completes the operation. The effect, in our opinion, is not good.

Frederick M'Adam.—The rapidity of a portrait lens is determined by its angular aperture, or the relation of its aperture to its focal length. A well-made lens of large size and short focus will have none of that property which you describe as depth of focus. It will take a sharp picture of objects situated in one plane only. In proportion as you stop it down so will its depth of definition increase, until at last it may have indeed any desired amount of depth; but this is gained at the expense of rapidity of action. If you have three stops of the diameters respectively of two inches, one inch, and half-an-inch, you will find that the first-named of these will permit a picture to be obtained in one-fourth of the time that would be required with the one inch. If an exposure of sixteen seconds were required with the half-inch stop, four seconds would suffice with the inch, and one second with the half-inch stop.

Received.—A. E. Lesage; E. Leader Williams; A. L. Henderson; Robert Rump; G. W. Webster; Alexander Wilson. In our next.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at the Office, 2, York street, Covent Garden, London, W.C.

A Yellow Glass Chimney.—At the October meeting of the Philadelphia Society, Mr. Constant Guillou exhibited a "photographic dodge" in the shape of a yellow shade for a candle, when preparing plates for the dark room. It consists of a pint bottle, of yellow glass, such as is sometimes used for gin, &c., cut off at the top and bottom, and forming a cylindrical shade or chimney. By resting this upon a brass ring, usually attached to a coal-oil lamp, an effectual, cheap, and convenient shade can be obtained, not liable to fog plates, and giving sufficient light to work by.

Mechanical Printing Processes.—Dr. Vogel, in the *Philadelphia Photographer*, says:—"Albert's process is still the subject of much comment. It seems that the matter has entered into a new phase, and that the world is to be flooded with new printing processes. Obernetter, in Munich, publishes prints which seem to be produced by a process analogous to Albert's. Bruckman, of Munich, works in his printing establishment a new half-tone printing process, and, to make the list complete, an establishment has been opened in Berlin which will teach, to any one, for the sum of 200 thalers, a printing process similar to Albert's. The establishment belongs to Messrs. Ohm and Grossman. As inventor and practical printer, they employ a Mr. Gehrmser. The *modus operandi* itself is not known; the results, however, are so much like the Albertype that the processes must be nearly identical. During the last session of our society these gentlemen showed some samples of their work, which were received by the members with much attention; they showed more sharpness and depth than most similar prints. I hope soon to be able to send you specimens."

LONDON GAZETTE, *Tuesday, November* 16.

Bankrupt.

John Latham, late of Longton, photographic artist.—Dec. 4, Stoke-upon-Trent.

Notice of Sitting for Last Examination.

H. N. Harrop, Longsight, near Manchester, photographic artist.—Dec. 8.

METEOROLOGICAL REPORT,

For the Week ending November 17th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Nov. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
11	30.25	43	30	32	34	WNW	—	Fine
12	30.45	49	30	32	34	W	—	Foggy
13	30.22	—	30	46	49	WSW	—	Overcast
15	30 00	59	46	52	53	SW	0·13	Raining
16	30.03	59	46	50	51	SSW	—	Dull
17	30 32	—	39	41	41	WSW	—	Foggy

CONTENTS.

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"OCCLUDED" HYDROGEN AS A REDUCING AGENT FOR SILVER AND GOLD COMPOUNDS.

Some ingenious experimentalists have lately turned their attention to possible uses of electricity in the development of photographs, the proposition being to expose an ordinary plate, wash it free from soluble silver salts, and make the film the terminal of the wire connected with the zinc plate of a galvanic battery, the photographic plate being plunged into water slightly acidulated with acetic acid, and a plate of platinum of equal size immersed at the same time and connected with the copper plate of the battery. It was hoped that the hydrogen generated on the surface of the collodion film would rapidly develope the image before the unaltered iodide or bromide of silver had time to suffer reduction. We need scarcely point out the great improbability of such a limitation to the action of the hydrogen disengaged by electricity from the water; for it is much more likely that the hydrogen would attack at once the whole of the iodide or bromide of silver on the surface of the film, and rapidly effect a general reduction to the metallic state. In the first instance, no doubt the portions of the films which had been exposed in the camera would first suffer reduction, but these parts of the surface would not long remain distinct from the rest.

However weak our faith in the value of electricity for these purposes may be, it serves to direct attention to two points which are of some interest at the present time; we refer to the use of electricity as an agent in strengthening negatives, and to hydrogen gas as a reducing agent for silver compounds.

Touching the first matter we may say that a negative which presents a sufficiently continuous surface of silver reduced by the iron developer can be strengthened by the careful deposition upon the reduced particle of a fine specular layer of silver. When a sufficiently feeble current is employed, and the plate immersed in a weak silver solution, the deposit of metal is slowly formed, and attaches itself firmly to the surface of the metal constituting the image. The satisfactory arrangement of this process is a matter requiring some little delicacy of manipulation, and we hope soon to return to the subject and give such details of the mode of operating as our experience will enable us to do.

It is to the second point we now desire specially to draw attention, viz., the employment of hydrogen as a reducing agent. During the last year and a-half we have been engaged occasionally in repeating the remarkable experiments of the late Professor Graham, the Master of the Mint, on the occlusion of hydrogen by certain metals, and, more especially, in examining the reducing action of the occluded hydrogen. A few words in explanation of the term "occluded hydrogen" may be necessary, since some of our readers may not be familiar with it.

Professor Graham found that certain metals—palladium and platinum more particularly—possess the extraordinary power of absorbing large volumes of hydrogen gas, and retaining it in some kind of combination. In order to determine this it is only necessary to take a plate of palladium foil, and, having connected it by a wire with the zinc end of a galvanic cell, to immerse the plate in acidulated water, the copper end of the battery being connected with a plate of platinum likewise immersed in the liquid. Hydrogen is immediately set free at the palladium surface, and oxygen at the platinum end. The latter gas is given off in bubbles from the platinum, whereas the hydrogen is absorbed by the palladium. This absorption of hydrogen is termed by Professor Graham "occlusion." The palladium is capable of absorbing about nine hundred times its volume of hydrogen, and this enormous absorption or condensation of hydrogen within the pores of the metal takes place without any material alteration in the colour of the palladium, the latter retaining its metallic appearance. This, amongst other circumstances, induced Professor Graham to regard the charged palladium as being a true *alloy* of palladium with the metal *hydrogenium*, the ordinary gas hydrogen being regarded as the vapour of a highly volatile metal.

It is found that this palladium foil charged with hydrogen possesses most powerful reducing properties—that the hydrogen within it is just as capable of reducing silver salts as a metallic layer of zinc would be. As illustrating this point we may cite an experiment. A plate of palladium foil was charged with hydrogen, as above described, and then immersed in a solution of corrosive sublimate; almost immediately a white precipitate of calomel made its appearance, and when the action proceeded a little further metallic mercury was reduced. On repeating this experiment with a slightly alkaline solution of nitrate of silver, the metal was quickly thrown down on the palladium plate, and when an alkaline solution of gold was used the metal was likewise precipitated. These precipitates were obtained under circumstances in which the ordinary hydrogen gas or palladium foil alone would have been quite incapable of effecting reduction.

In order to utilise this remarkable property photographically, we devised the following experiment:—Take a piece of palladium—stout foil is sufficient for the purpose—and coat the metallic plate with bichromated gelatine, taking care that the proportion of bichromate of potash shall not exceed three grains to the ounce. When the film has set and dried, coat the back of the plate with shellac varnish, to which a little castor oil has been added to give it elasticity. Now expose the gelatine surface under a negative for a sufficient time; remove from the frame and wash in tepid water to remove those parts of the gelatine film unacted upon by light, and connect the plate with the galvanic battery, and charge with hydrogen. Allow the whole to dry slightly, and then plunge the plate into an alkaline gold solution; the ordinary bicarbonate of soda toning bath answers well. The hydrogen which has been absorbed by the exposed surfaces of the palladium reduces the gold, the latter attaching itself in thin layers upon the metallic surface. On removal of the residual gelatine a photograph in gold is obtained on the surface of the palladium.

The above operations are troublesome, but the result is interesting as showing that the late Professor Graham's important discovery can be utilised even to a small extent in photography. Probably the bitumen of Judea process long ago employed in photographic etching would yield sharper results than that above stated, but this plan we have not tried.

We hope next week to describe an experiment by means of which we have succeeded in demonstrating the absorption of hydrogen by palladium to a large audience.

WHO DISCOVERED THE COLLODION PROCESS?

A STATEMENT in Mr. Tunny's interesting article, *Early Reminiscences of Photography*, which we printed a fortnight ago (see page 545), appears to have created some sensation among photographers throughout the empire, and we have received many communications on the subject. The statement is one which strikes a blow at the preconceived opinions of the great body of photographers, by whom the late Mr. Frederick Scott Archer is held to be the first discoverer of the collodion process. Mr. Tunny's assertion, it will be remembered, was that the honour of this great discovery belonged to M. Le Gray, of Paris.

Now, it happens that we have for many years enjoyed the pleasure of personal acquaintance with Mr. Tunny, and know something about his first efforts in connection with photography, especially with the collodion process. Seeing that a natural dislike is being felt at such a strongly-alleged historical fact as the connection of the name of Archer with the introduction of the collodion process being thus rudely flung to the winds, we think it due to all concerned to supplement what Mr. Tunny said so briefly by appending a few observations on the subject. In doing so we must, in a matter of this kind, allow others to speak first; hence we commence by quoting Mr. Archer, who, in the preface to the first edition of his *Manual of the Collodion Process*, written on March 14, 1852, says:—

"It is difficult to say who first attempted to use collodion in photography, and it will hardly be a matter of much importance to pursue this inquiry; but the first publication in which it was alluded to was that of M. G. Le Gray, of Paris, and then only incidentally as a substance which might possibly be made available. There is no doubt that many tried it previously to this; but, as their experiments produced no results and led to no practical end, their claims to the first use of collodion cannot be considered of much value."

Mr. Archer further says:—

"My first attempts with collodion were directed to the improvement of the surface of paper by spreading over one side a thick solution of collodion.

"These essays were not successful; for, after the necessary washings, &c., in the process, the collodion film did not adhere to the paper sufficiently to be of any use.

"However, previous to and during the progress of these experiments, I was trying various other substances as media for holding the chemical agent—zyloidin, other modifications of starch, extremely fine paper pulp, tanno-gelatine solutions, and several combinations of albumen. Each had its turn, and it was only after repeated experiments that I decided on collodion as being the best and, at the same time, the most available substitute for paper."

The collodion process was published in the *Chemist* of March, 1851. Previous to that time M. Niepce de St. Victor had published his albumen process on glass, in which the iodide was dissolved and mixed with the albumen.

In Bingham's *Photogenic Manipulation*, eighth edition (1851), after a description of negative processes on glass by means of films of albumen and isinglass, or gelatine, we read as follows (page 73):—

"We may, in place of the gelatine, employ a number of other substances to form an adherent film upon the glass. The following are a few of those we have experimented with and found to answer moderately well:—Vegetable gluten dissolved in acetic acid forms a very tenacious coating and difficult to remove. Collodion (gun cotton dissolved in æther); the spirit of wine varnishes; a mixture of albumen and gelatine in equal proportions, applied as directed for albumen in the first process, and then immersed in an infusion of oak bark; several of the gums, starch, casein from milk, vegetable albumen, &c. The method of applying the solutions may be varied in a number of ways, and opens a wide field for experiment. * * * There are several other methods of obtaining very sensitive glass plates. By using pyrogallic acid, as proposed by Mr. Archer, we obtain a surface very sensitive to luminous influence. He has not published his method of applying it to glass."

We now go a little farther back, and find that, in June, 1850, M. Le Gray published a work in which is contained the following passage:—

"I am now making use of the following process on *glass*:—Fluoride of potassium or sodium is dissolved in alcohol or mixed with sulphuric ether, and then saturated with collodion. I act on this with aceto-nitrate of silver, and I obtain a picture in twenty seconds in the shade. I develope the image by a solution of protosulphate of iron, and fix with hyposulphite of soda. By the use of ammonia and bromide of potassium I get great variety of sensitiveness."

A translation of the above work was published in London by T. and R. Willats a few weeks after it appeared.

Mr. Charles Heisch, F.C.S., lecturer on chemistry at the Middlesex Hospital, in one of Willats' manuals, published, *we think*, in 1854, (for it bears no date), says, respecting not the mere suggestion of collodion, but as to the first who published any account of the method of using it, that "it was undoubtedly Le Gray," in the work from which we have quoted. Mr. Heisch says of the directions there given that they—

"Are quite enough to establish Le Gray's right to be considered the first who published the collodion process, as they contain all the essential points, viz., the addition to collodion of an alcoholic solution of some salt capable of giving, with nitrate of silver, a precipitate sensitive to light; the reduction of the solution to a proper consistence by ether, and the spreading of the liquid, thus obtained, on glass plates. The substitution by Mr. Archer of iodide of potassium (a substance in constant use in photography) for the fluoride or bromide of Le Gray, can only be regarded as an improvement on a process already before the public."

Now, from the few remarks which remain for us to make, there will, we imagine, be no difficulty in arriving at a definite conclusion, and a settlement of the disputed question—"Who discovered the collodion process?"

Mr. Tunny was, so far as we can ascertain, engaged in the practice of the collodion process some months before Archer published his process in the *Chemist*. He (Mr. Tunny) obtained a knowledge of the process by reading a translation (not a very good one) of Le Gray's treatise on *Photography on Paper and Glass*, which, of course, was published at a date anterior to Archer's first publication. He made such modifications on Le Gray's process as appeared to him to be improvements, and he thus obtained a process which differs in no material degree from the collodion process as it is now universally practised. Instead of fluorides, Mr. Tunny preferred the iodides; and he developed with protosulphate of iron. This we can vouch for. This was the process employed by Tunny when Archer first published. In no material respect did Archer's process differ from that employed by Tunny, except in that he (Archer) developed with pyrogallic acid. Which process of the two, let us ask, is most in use at the present day? This is a query which every photographer can answer.

Mr. Tunny has always said that he believed Mr. Archer to be an independent discoverer of the collodion process. We believe so too, and we think that every person who knew anything of that gentleman, and who reads the extracts given above, will necessarily arrive at the same conclusion. We quite believe that Archer never saw Le Gray's description of his process, and that he really and honestly worked it out without any more aid from Le Gray or others than the mere suggestion that collodion could be employed in photography; but, at the same time, the above facts, taken in connection with the dates given, compel us to conclude that while Archer was *a* discoverer of the collodion process, he was not the first who discovered it. But if, in spite of what now stands on record, it can be shown that M. Le Gray's publication is not that of a complete process, but merely a few suggestions, then Mr. Tunny still claims priority in his public practice over Mr. Archer's first publication.

HOW TO PRESERVE COLLODIO-BROMIDE OF SILVER.

WHEN one prepares an emulsion of collodio-bromide of silver he may not always have occasion to use the whole of it at one time. The consequence is that it generally, although not always, becomes useless after being kept for a few days longer. But supposing the emulsion to have been at first properly prepared, it may be preserved in perfect order for future work, by a plan which suggested itself to me some months ago.

About the middle of last June we had occasion at King's College to make up about forty ounces of collodio-bromide of silver for the preparation of a stock of dry plates for the summer vacation. Within three days the whole was used, except about twelve ounces; and, as there appeared little chance of any more being required for at least four months, an experiment was tried with the remainder.

The emulsion was divided into two parts (Nos. 1 and 2). To the first I added two fluid ounces of collodion containing a definite amount of soluble bromide, and left No. 2 intact. These bottles were stowed away in a dark box, which was not disturbed nor opened till about a fortnight ago. In No. 2 the bromide of silver had partially subsided, but, after considerable shaking, returned into suspension. This latter collodion in its present condition, although giving a fine-looking and promising film, was photographically worthless, the plate fogging all over soon after the alkaline developer was poured on. I made one attempt, which proved to be futile, and intend making some more, to restore its originally good properties. If I succeed progress will be reported.

In No. 1 the silver bromide had nearly all subsided into a hard cake, and could not be disturbed by violent shaking. Into this bottle I put about half-a-teaspoonful of washed and dried sea sand, which, after some shaking, broke up the crust of silver bromide into fine particles in suspension. Then I gradually added—of course with plenty of bottle-shaking—twenty-two grains of powdered nitrate of silver, to make up the necessary equivalent for the soluble bromides in the collodion which had been poured in about four months previously.

After filtration this emulsion worked excellently, perhaps better than it did originally.

I was told the other day by a gentlemen to whom I mentioned my plan, and who had been communicating with Mr. Mawdsley, that the latter adopts a similar system for the prevention of waste. At all events, the method which I now recommend is not generally known, and may prove useful to many of the readers of The British Journal of Photography. George Dawson, M.A., Ph.D.

"RESIDUES AND WASTE."

While this subject is on the *tapis*, and at present occupying the attention of careful managers, the advice of an old chemist and photographer will, perhaps, still further aid the efforts of those who intelligently endeavour to recover all they can from the large amount of the precious metals used in our art, the quantity really present in the finished pictures bearing so very small a proportion to that made use of in the many baths and solutions required in the practice of photography.

If the processes of saving and collection are systematically carried out there is very little trouble, and the result amply repays a little outlay at the beginning. Get into the way of collecting every bit of paper with silver on it; wipe up your splashes; let not a drop of solution escape till you have extracted all its virtue. Do this systematically and persistently, and he must be a careless one who does not get at least £8 10s. from every £10 worth of gold and silver used in his daily operations. The proportion of gold and silver in a finished print is surprisingly small—not *more* than six per cent. of the total amount used in its production; and it requires no special knowledge to set about the work of recovery.

I will give a slight sketch of my own plans, which any one can adopt or modify as he sees fit. I do not think there is an establishment in the country which recovers a larger proportion than I do; and my arrangements cost little and involve less trouble than most I have seen.

To begin with paper waste. In one corner of my operating room I keep a box, into which are thrown old filters, bits of paper from dark slide corners, and bits used for wiping backs of plates. Whenever there is a splash or a slop it is at once dabbed up with a piece of blotting-paper (always ready for the purpose) and in it goes into the box. A rejected negative, not fixed, contains much silver; I wipe the film off with paper, and throw it amongst the rest. I have a separate room for sensitising, for printing, and for toning (*i.e.*, washing, toning, and fixing), and each has its box for waste paper, spoiled prints, wiped-up solutions, &c. In my cellar is a large bag, into which these various boxes are emptied of their valuable contents as fast as they get filled, and it is really surprising how rapidly they do fill; at times I almost wonder where all the waste comes from.

From solutions I collect three separate sets of precipitates—metallic silver, chloride, and sulphide. The collecting vessels are assorted accordingly. Through the whole operations I rigidly keep the precipitates separate.

Metallic silver is collected from the developer only. My developing sink is made with a slightly-hollowed bottom, so that the fluid all collects in the centre, and is conveyed from thence by an India-rubber tube, which, hanging underneath, dips into a glass pottle bottle, where the developer and its precipitated contents gradually collect. As soon as this is full the tube is put into a companion bottle, and the solutions allowed to run in till it also is full. By the time the second bottle is full (or in a day or two) the whole of the silver (with no further addition) will of itself be precipitated in the form of a grey powder, and the supernatant fluid can be poured off. This filling, precipitating, and emptying can be continued till a sufficient quantity has collected at the bottom, when it can be taken out, washed, dried, and put on one side as "metallic silver." (It will be slightly contaminated with iron.) This is the smallest item, and gathers but slowly. The dark-room residues are finished by mentioning that the hypo. fixing solution, when tolerably used up, is emptied into the hypo. fixing out of the toning room.

Here, in the toning room, is collected the bulk of the precipitates—chlorides and sulphides—and here are my largest collecting vessels, which, before proceeding further, I will describe.

I have tried every shape and material, nearly. I started with square wood tanks; these took too much time to clean the precipitate out. Then for some years I used the well-known large, glazed cream mugs. I got to dislike them; they took too much time to syphon off the top liquid. I then got a set made purposely for me at the potteries, same shape, but with holes in the side to run off the fluid by a tap. These leaked through innumerable, invisible cracks, keeping my floor always damp. Finally, I got a cooper to make me the set I now use, and they answer their purpose perfectly and admirably. They are in shape a modification of an old laboratory vessel—similar in shape, but made of wood instead of glass—the narrow-mouthed precipitating beaker.

For the benefit of those unacquainted with this useful utensil, I will describe one of those I use. It is cone-shaped, the bottom wider than the top; and thus the face of the sloping sides points *down*, so that the precipitate falls entirely to the bottom, and none is left on the sides. Anyone using a vessel with any other shaped sides will at once see what a great advantage this is, as, ordinarily, the time consumed in getting the precipitate off the sides is very great and the process very troublesome; with my form this is all saved. The vat is two feet high, twenty inches wide at the bottom and fourteen at the top, made like a beer barrel—oak staves and iron hoops. It has two handles, and is painted all over outside to keep the hoops from rusting. The cooper had special orders to make it extra smooth inside, and the bottom slightly bowl shape and carefully fitted, so that, at its junction with the sides, no little groove should be left to get filled with precipitate, not easily to be removed. It has a common wooden tap let in about seven inches from the bottom.

To proceed with the collecting. I have four of these vats—two for chloride and two for sulphide—so that the precipitate in one is subsiding while the other is being gradually filled.

In the chloride vat are put the washings from the prints before toning, old baths (if there are any), and waste nitrate of silver solutions generally. The precipitant in establishments of any pretensions to size should *invariably* be hydrochloric acid (muriatic acid or spirit of salt of the shops). Common salt (chloride of sodium) is disadvantageous in many respects; it dissolves a noteworthy quantity of chloride of silver when in excess (and printers will be careless). The precipitate takes much longer time to subside, and printers will not give the time and attention to keep testing to see if the salt be much in excess or not. With acid the precipitate at once subsides, and an excess does no harm. If the acid be bought by the Winchester quart at a time the cost will not exceed 3d. or 4d. per pound.

As soon as one vat is emptied (to the level of the tap) I put in one ounce of acid ready, thus saving the time and trouble of stirring well. As soon as the companion vat is filled the washings are directed into this one till it is full. The companion vat is then ready to be emptied. Turn the tap; collect the first half-pint that comes out, for there will be a little precipitate in the tap which will be carried forward in the first rush of fluid; then let it run away till it will run no more; turn the tap in again, pour in an ounce of acid again, and so on till you think you have enough ready for reducing or sending to the refiners.

In the sulphide vat is run only the hypo. fixing solutions (from the glass pictures as well as paper). I never use cyanide; but, if anyone do, let him keep it quite separate, but treat it otherwise in the same way as the other fixing solutions; the reason of this being that cyanide dissolves easily sulphide of gold (to be spoken of hereafter).

Here I am sorry to differ from your esteemed contributor, Mr. Dawson, whom I respect greatly, and from whose various papers I have often derived both pleasure and profit. My experience leads me most emphatically to advise photographers to save *all* their fixing solutions; if they do not they will turn into their sink very nearly as much value of metal as is saved *in all their print washings.* The value of metal to be extracted from the fixings always comes up to within a fraction of the value of that from the print washings. I have tried it over and over again, reduced the metal in my own laboratory, and sent it to the refiners. In each case alike have I found the above-named proportion carried out. To set any doubt on the matter quite at rest, I will detail an experiment I have made since reading the various statements on this matter.

I took a number of prints of various sizes, mostly *cartes*. They amounted to just 3½ sheets of paper. Carefully collecting the washing, and precipitating with *pure* acid, I found 35·73 grains of chloride of silver (which for the purpose we may consider as pure). After toning and washing I fixed, and precipitated the fixing, obtaining

22·89 grains of sulphide of silver (with a little sulphide of gold) which also we will consider pure. Then 35·73 grains of chloride contains 26·89 grains of metallic silver; 22·89 grains of sulphide contains 19·13 grains of metallic silver. But the refiner always allows me five or six per cent. more value for the silver from paper fixing precipitates than from chloride. For comparison of value we must, therefore, increase the 19·13 to that extent, thus giving the proportion of value of metal recovered from print *washings* to that recovered from the print *fixings* as about 27 to 20½.

To return to the precipitation of the hypo. For this purpose I use sulphide of potassium (liver of sulphur of the shops). My toning room is below the ground level and consequently not very well ventilated, yet I never find any unpleasant effect from the sulphide. The smell is not perceived after the first few minutes after mixing. A little more care is required with this precipitate than with the chloride, as it does not subside so soon, and an excess of precipitant dissolves the sulphide of gold, the quantity of which in the solution is most considerable—sufficient to increase the value of the metal produced close upon threepence per ounce.

The process of precipitation requiring a little more care than that of the chloride, will be apt to frighten printers from attempting it; but the liquid accumulates so very much more slowly than the print washings that the process has only to be performed occasionally.

When the vat is full I add what I consider a sufficient quantity of sulphide of potassium, stir well, and in an hour or two (or next day) dip a measure in to get a little clear solution for testing, and drop into it a drop or two of solution of sulphide, a supply of which I always keep ready dissolved in an ounce phial. I always make my fixing of one strength, viz., half-a-pound of hypo. to one quart of water, and use it in the proportion of two and a-half ounces of hypo. to one sheet of paper—as near as may be. Then, to every ten gallons of waste fixing, an ounce and a-half of sulphide will be about the right quantity to use. This proportion of sulphide of potassium to paper may be considered safe; and a manager using his hypo. differently can easily calculate his quantities afresh, and leave the whole process in his printer's hands, simply telling him to put so much sulphide to the vatful of liquor.

I have now disposed of all the solutions but the waste toning. This I allow to accumulate for a month or two, and then precipitate by adding to it a little *strong* solution of sulphate of iron. There will already be a deposit of gold and chloride of silver; this, being mixed with the new precipitate from the iron, will be very impure. I pour off the supernatant fluid, and fill up (shaking meanwhile) with water; stir well, and decant off again after a day's rest, leaving as little fluid as possible. The precipitate then has some aqua regia poured on it, and is gently warmed. After the solution is considered to be complete, the silver is separated by filtration, the filtered gold solution well diluted with distilled water, and the gold from it reprecipitated by iron, not forgetting to save the filter paper containing the silver and to throw it into the waste paper box.

Nothing further remains to be explained about my method; but I think I can end with a statement of experience which will explain the apparent inconsistency of the refiner's experience (quoted by Mr. Dawson) with my own.

It is quite certain that a few years ago very few photographers ever thought there was any good to be got out of hypo. waste. An ingenious friend of mine, who prints very largely, came to the conclusion that if the fixing dissolved anything out it must be silver. Brimful of the idea, he went to his hydrochloric acid, got an ounce, and nearly spoiled a batch of prints in his impatience to get some waste fixing, all the previous quantities having found their way into the sink. He poured in his acid, and was delighted to see a dense precipitate take place, followed by a very nasty smell. The precipitate and the stink together convinced him, and on my next visit to London he showed me with great satisfaction quite a little mountain of waste. He had not decomposed nearly the whole of the hypo. in the solution, and the consequence was, his precipitate, instead of being silver, as he fondly imagined, was a tolerably pure sample of sulphur, adulterated with silver very slightly—a long way from even ten per cent. On my explaining the matter, and showing him the very little value of his precipitate, he was very much chagrined, the more so as he had projected a visit to the continent with a part of the proceeds. However, he soon set to work on a proper basis, and this year he has had a fortnight in Paris, and brought a good round sum back with him—all from a year's hypo. residues.

I will say "good bye" to the reader in advising him to send off all his precipitates to the refiner's. It will be more economical than reducing them himself, and save a great deal of time—the charge made never, in my own case, having exceeded six per cent. on the value, and a time or two having been four per cent. Keep the various kinds separate, wrap up and label them, and send them on in a bag with your paper. If you live 200 miles away from London the carriage of a cwt. will not be above 2s.—the time, trouble, and loss in burning your own to ashes being worth a great deal more than that. One word more: don't let any hypo. get into your chloride vat; if you *do*, pour off the liquid at once into your sulphide vat.

G. Watmough Webster, F.C.S.

Since the above was written I have received a letter on the subject from one of the largest refining and assaying firms in the kingdom (if not *the* largest) and from it I give the following extract:—"We can bear you out in asserting that hypo. residues, if properly collected, *very handsomely repay the trouble and expense.*"—G. W. W.

ADJUSTABLE CAMERAS WITHOUT SWING BACKS.

Although "swing backs" as at present constructed are by no means unsightly adjuncts to the camera, only a few years have elapsed since they were so. The inventive skill and admirable workmanship of our best modern camera makers have succeeded in so reducing the bulk of appliance as nearly to render it at first sight unobserved.

For the best class of portraiture a camera with a swing back is almost a necessity, and for large direct portraits absolutely so. To say that there are many large and, in every other respect, first-class cameras which are devoid of the property of adjustment in the back is to utter an obvious platitude; and we believe it will be considered a platitude still more stale if we say that there is no photographer having such a camera who does not occasionally wish that it possessed those powers of adjustment. The cost of such an addition to a camera already finished is considerable, for it involves much labour of a highly-skilled nature—so much, indeed, that few would care to incur the necessary expense, especially if the instrument were one which had seen much service.

These observations will serve to introduce a letter which we have received, and which will form the text for a short and practical homily:—

To the Editors.

Gentlemen,—When on a visit a short time since to a professional photographer in Manchester, I was surprised to find him using a camera without that very useful but cumbrous institution, a swing back. To my inquiries he replied:—"I have swung the lens instead of the focussing screen for years. It saves weight in the camera, and is far more useful, to a professional man especially, than the old method. I can make my lens look down a coal pit if I like!"

This was to me quite a new light; but on examining numerous negatives of machinery, stonework, statuary with inscriptions at the base, corners of streets, &c., there was, so far as I could see, no distortion. I was on the point of getting a camera fitted with this, to me, novel arrangement, when a very learned and scientific friend assured me that the thing was contrary to reason, and that the most ordinary knowledge of optics would show the folly of it.

Not possessing even this amount of knowledge I shall be glad of your opinion on the subject; and if any of your readers are in the habit of swinging their lenses instead of their focussing screens, perhaps they will, through your columns, give me the benefit of their experience.—I am, yours, &c., A Leicestershire Rector.

Now we are aware that several excellent mechanical contrivances in connection with photography have emanated from our Manchester friends, but we confess to being quite at a loss to know the nature of the substitute for the swing back to which our esteemed correspondent has made reference in his letter. If it differ from that which we are now about to describe, we ask, on behalf of our readers, that he will give us a description of it; because, as will have been inferred from our preceding remarks, we believe it is calculated to be of much use to both portrait and landscape photographers—especially so to those who take large portraits with large lenses.

The question to be answered is—What are the best means for mounting a lens on a camera so that it shall turn by an easy motion from the axis of the camera (if such a term may be allowed) to any angle within moderate limits, and when in any position be rendered quite rigid?

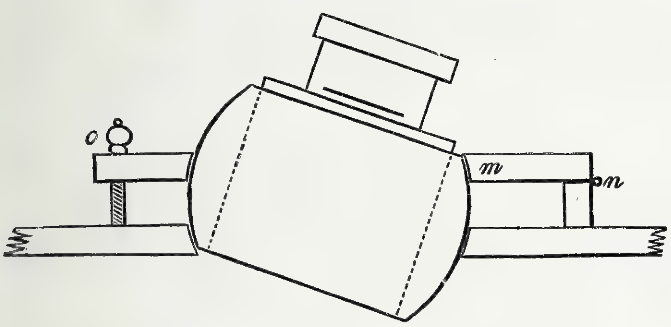
Some years since we had a camera made which fulfilled the condition of universality of motion; but it was eventually superseded by an arrangement which we considered better. The first arrangement was of the mechanical kind known as gimbals, such as that by which mariners' compasses are suspended. A large hole was cut in the front of the camera, inside of which was loosely fitted a strong brass ring, kept in its place by a pivot at each side round which it could revolve. The flange of the lens was in turn fitted loosely inside of this ring, and was pivotted into it, the pivots being placed at

right angles to those in the outer ring, which were supported by the camera front. When the lens was screwed in its place it had a universal motion; for the one pair of pivots permitted it to turn vertically, the other pair horizontally, and both conjointly in an oblique direction. A loose cover of flexible India-rubber sheet connecting the flange with the camera front effectually prevented the passage of light through the adjusting system; and suitable pinching screws served to retain the lens in a rigid manner when any particular adjustment had been made.

We discontinued the gimbal system and adopted one which our predecessor, Mr. Shadbolt, introduced shortly afterwards, and which, although published by him at the time, does not appear to be so well known as it deserves to be. It possesses the advantages inherent in a swing back, and its mechanical principles are so simple that any carpenter of ordinary abilites can make and adapt it. Every requisite adjustment can be made with the greatest ease, and the utmost rigidity may be obtained by turning a single screw.

The principle is that of the ball and socket, and it is carried into effect in the following way:—The flange of the lens is screwed on to a large sphere made of wood, the front of which has been cut away or flattened sufficiently to permit of this being done. A hole is cut through the wooden sphere sufficiently large to let the lens tube pass through it. A hole is now made in the front of the camera of such a width as to be rather smaller than the diameter of the ball or globe, which consequently cannot pass through it. A smaller piece of wood is made with a hole through it of the same size as that in the camera, and this is placed outside of the sphere, which is thus kept in its place, and works between these two planes as a ball would do in a socket.

The following diagram shows the construction of the ball and socket we have just described:—



From the above it will be observed that the wooden globe has segments cut from its opposite sides. The outer piece of wood *m* is attached to the camera front by means of another piece, to which the former is in turn attached by the hinge *n*. The lens may be rotated in any direction, and such a degree of pressure applied by means of the screw *o* as to prevent it slipping when once adjusted. The edges of the respective holes in which the ball works—or, in other words, the *socket*—ought to be lined with black velvet. This both ensures evenness of motion and prevents the admission of light.

We shall now speak of the uses of the adjustable camera which has just been described.

There is not much need for us to speak of the advantages of having a swing back; still, among the thousands of professional or amateur photographers, there may be many who, from what they believe to be innate principles of rectitude, would scorn to use anything in photography which savoured of a "dodge." In their desire to have the truth, the whole truth, and nothing but the truth, they close their ears to the voice of any charmer, no matter how wisely he may charm. If they be called upon to photograph a landscape under circumstances which demand the use of a lens with a wide stop, they will rather have the foreground a blurred, hazy, ill-defined mass—as they must necessarily have under such optical conditions—than resort to what they would designate the trickery of using the swing back, which, by permitting the top of the plate (on which the foreground is impressed) to be moved a little farther from the lens than the middle or bottom of the plate, would undoubtedly make the foreground as sharp as the distance.

The power to move the plate on its horizontal axis, in even a very small degree, is a great boon to the landscape photographer. When desirous of taking a picture with a lens having a rather long focus and a wide stop, it is next to impossible to get a foreground which is at all presentable, on account of its conjugate focus being, from its proximity to the lens, situated at some distance behind the plane on which the distance of the view is in sharp focus. In such a case let the ground glass be inclined backwards, and at once the foreground is made sharp without the definition of the centre of the picture being impaired in the least degree. By stopping down the lens excessively the same result could be secured, but it would be obtained at a great expenditure of light and, consequently, of time. This is one use of a swing back to a camera. A precisely similar effect can be secured by the ball-and-socket adjustment which we have just described.

Whenever it is sought to get the adjustment by the lens instead of by the back, it is imperative that the camera should have a sliding front.

We have just described a case in connection with a landscape in which, but for the swinging back, a sharp foreground could not have been obtained with a lens of a wide aperture. Suppose that we have a similar view to take with a camera which has *not* a swinging back, but the lens of which is attached by means of the ball and socket, how are we to proceed? Having the lens and camera in their normal relationship to each other—that is, the axis of the lens at a right angle to the ground glass (in which position the distance of the picture which falls upon the centre of the plate will be sharp and the foreground out of focus), bend down the lens towards the foreground—by which means it will become relatively sharper—and at the same time push down the sliding front which carries the lens with its ball-and-socket arrangement until the axis of the lens, or an imaginary line drawn straight through it, points as nearly to the centre of the plate as possible. The downward pointing of the lens, coupled with the pushing down of the sliding front, must be considered as an exact equivalent to the bending or swinging backwards of a ground glass, &c., which has been placed in a swing-back camera. The converse of this, of course, holds good under the opposite circumstances.

In out-of-door work, the case which most frequently demands the aid of the swinging back is when a tall building—a steeple, or similar object—has to be photographed. To get it all in the camera is tilted, or pointed upwards. Now, as every experienced photographer is aware, an architectural subject delineated under such conditions is distorted, inasmuch as all the marginal lines, which should be perfectly vertical, converge to the top. A perfectly square building would thus in the photograph be represented as leaning towards the centre—the top would be much smaller than the base. With the swing-back camera, all that is requisite to rectify this error of projection is, when the camera is pointed upwards, to swing the ground glass so as to be in a vertical position; by doing so the converging perpendiculars at once disappear, and truthful delineation supplies their place. It is imperative that the building and the ground glass should be on the same plane.

To apply the camera with the adjustable front to such a case as that last mentioned, all that is necessary is, in the first place, to plant the camera fairly level, and then to slide up the front, at the same time making the lens point slightly upwards until a satisfactory picture is obtained upon the ground glass.

Leaving landscapes and architecture, we now glance for a moment at the application of both the swing back and the adjusting front to portraiture. If a large portrait of a sitting figure be required—the portrait, for the sake of distinction, to include the knees—the proper position for the camera, or point of sight, is opposite the face. But if the lens be worked with a large aperture, when the face is focussed sharply the lower part of the body—the knees for example—will be entirely out of focus. To rectify this, the same course of proceeding must be adopted as that which we have just described in reference to the foreground of a landscape.

In a similar manner, when it is applied to architecture. the camera must be placed quite level and the sliding front moved upwards, the lens at the same time being pointed upwards. In this way may be secured a picture quite free from distortion. But when this principle is applied to a lofty building it will be necessary to reduce the aperture; because, although with a stop of a given size the picture may be quite sharp when the lens and camera are in their usual relation to each other, when the lens is tilted and its axis at an oblique angle to that of the camera, a very small stop will be requisite to bring the top of the building to a degree of sharpness equal to that of its base, the proper focus of the top being nearer to the lens than the plane of the ground glass, and hence out of focus when viewed upon the focussing screen, requiring a very small stop to give it the requisite sharpness.

From what we have said it will be seen that the movable front, or ball-and-socket adjustment for the lens, is strictly analogous to the swing back; that it can, without much trouble or expense, be applied to cameras which have no swing backs; and, finally, that nothing can be done by the one arrangement which cannot be done equally well by the other.

THE EMPLOYMENT OF ARTIFICIAL LIGHT.*

The artificial light that should be used in the apparatus for enlarging is one with a small surface and very strong glare. In other respects the Bengal flame would answer very well. It must also be free from smoke and perfectly steady.

The electric light has already been tried with this apparatus, produced by a galvanic column or steam engine, the turning cross of which, armed with large magnets, created a strong electric stream; but, contrary to expectation, the brilliant electric light has very little chemical power, which is shown by its defective burning. It appears that this light is attributable to particles of carbon which become heated up to a very high temperature.

The Drummond light, in which a cylinder of lime is exposed to a jet of hydro-oxygen blown gas, is not particularly good for our purpose. The light obtained in this way is very beautiful and steady, but the lime emits actinic rays only so long as it is mingled with carbonic acid, and while it continues to present a new surface to the jet. On this account, in carefully-constructed apparatus, the lime cylinder is allowed to turn on its own axis.

The lime cylinder of M. Tessie du Motay is put through a magnesia, and afterwards a zirconia, cylinder. The light is then very beautiful, but not chemically strong.

Instead of compressed magnesia, Professor Carlevaris uses small parallel pipes of hard carbon, which are wetted with chloride of magnesium; thus a light is obtained less beautiful than that of Tessie du Motay, but with more chemical radiance, only, unfortunately, the chloride of magnesium occasions the same smoke as metallic magnesium, and hence this method is not practical.

Of all the processes I prefer the Drummond light, in which the lime cylinder is made up of titanic oxide, magnesia, and carbonate of magnesia. I form the mixture in parallel pipes of three centimetres wide and nine centimetres high. They last three hours, and cost only thirty centimes a piece. Instead of pure hydrogen I use common coal gas. I have also tried the spirit lamp, but this I found was attended with danger.

As for the oxygen, its preparation is one of the simplest and safest, if M. Deville's method be only correctly followed. Obtain from a manufacturing chemist the ordinary calcined peroxide of manganese, which, through this treatment, from the dark colour which it formerly had, passes to a brown colour. This well-powdered brown oxide must be mixed with twice its weight of chlorate of potash, likewise in a pulverised state. It is first mixed with the hand, and then poured through a sieve into an iron retort, furnished with a lead pipe which discharges into an India-rubber bag capable of containing 350 litres.

The mixture is heated over common gas, and in four hours or less the whole of the oxygen contained in the salt is extracted. If instead of the brown oxide of manganese the uncalcined hyperoxide be employed, a much higher temperature is required. The apparatus is omitted, becanse the mixture increases in volume and the operation becomes dangerous, But I contend that with the brown oxide the operation is of undoubted simplicity.

When the oxygen is liberated and is caught in the India-rubber bag, the mixture is washed with some litres of water (which dissolves the chloride of potassium formed by the decomposition of the chlorate of potash), and the whole is poured into a filter. In this manner we obtain the manganese, which, when it has been dried, can again be turned to account.

Every kilogramme of chlorate of potash yields 270 litres of oxygen gas. This quantity supplies the lamp that is made use of for two hours; the cost price of one lighting, inclusive of gas and the cylinder of titanic oxide, is two francs per hour. If this be compared with that of magnesium we at once perceive the immense advantage of the new light.

The oxygen gas is contained in an India-rubber bag, which, like a cylinder bellows, is inserted between two round boards. The top board can be raised and lowered three feet, and must be loaded during the burning with a weight equal to about 100 kilogrammes to execute each print. The oxygen may be preserved for a whole month, and the generating of this gas is, besides, so safe and easy that in less than a quarter of an hour the bag can be refilled with fresh oxygen.

The burner I employ is constructed precisely like that of M. Dubosq.

The hydrogen gases, as well as the oxygen, are mixed first when streaming out at the jet, whereby all danger is avoided. The jet can be moved nearer to or further from the cylinder. The cock of the hydrogen gas is first opened, and the stream of gas is lighted. Then the cock of the oxygen gas is opened, and the farthest end of the jet is brought into immediate contact with the cylinder of titanium. The burning of the cylinder always begins at the top. The fire excavates it at first, and then the light attains its strength. It is perceived how the particles of magnesium and titanium sparkle, lose their strength, and are restored again the one by the other.

On the bag containing the oxygen a weight of 100 kilogrammes is placed, and the two small cocks of the jet are regulated in a suitable manner according to need. Through the complete opening of the oxygen cock the maximum of light is obtained, and the hydrogen gas light is regulated thereby. When near leaving off very little of the oxygen should be used, and, consequently, the opening of the cock should be small, and that of the hydrogen gas should be regulated afresh. This requires a certain amount of practice, but it is very simple. D. Van Monckhoven.

[We have received a letter from our friend, Dr. Monckhoven, in which he points out one or two important errors in our translation of the first portion of his valuable paper *On the Different Sources of Artificial Light* (page 555). At line 40 of his article, for " chloride of chromium " *read* " chloro-chromic acid." The latter is bichromate of potash fused with chloride of sodium and then distilled with sulphuric acid. It is a brown liquid and not solid as the ordinary chloride of sodium, which gives *no* light. In the same paragraph another mistake occurs. It is not, as there stated, a mixture of oxygen and hydrogen (oxyhydrogen) which passes through the chloride of titanium or chloro-chromic acid, but only the hydrogen, which is then burnt in oxygen by a convenient arrangement.—Eds.]

* Concluded from page 556.

TRANSPARENCIES FOR THE MAGIC LANTERN.

There are many persons in the possession of ordinary photographic apparatus who would like to be able to take transparencies for the magic lantern, if they could do so without a copying camera, without a dry process, without toning, and without intensification. Some of these conditions are easily obtained together, but I have practically worked a process, and taken many pictures by it, wherein all these desirable points are attained at the same time. As it is nothing more than the ordinary wet process, with a slight alteration in the collodion and developer ordinarily used, it will very probably be found to be of commercial value to some of the readers of these lines.

The fact on which the process is based may be stated in a very few words. A developer consisting of pyrogallic and citric acids is known to favour the production of bluish-black deposits in the wet process; but I have chanced to notice that the salts in the collodion also influence the colour of the deposit. When the collodion contains an unusually large proportion of bromide of cadmium the colour of the deposit produced by the above developer is much improved, and is in every way suitable for transparencies, without any toning whatever. Where the deposit is thick it is of a pure black colour, and where it is thin it is of a blue-black colour—in fact just the right tone to look well when the pictures are thrown on a screen by the magic lantern. Snch pictures are admirably suited for colouring, because there is no brown or red tone present to interfere with the purity of the colours laid on by the brush of the painter. My experience in this matter extends only to cadmium collodions, which are now very plentiful in the market. I do not know whether other bases would give the same tones.

The great difficulty of getting the right tone and depth by the first application of the developer having been overcome in this very simple manner, all that remains to be done is to show how to work the process with the greatest economy of time and materials. Now that I am " up " in the process I much prefer the work of printing a few dozen transparencies upon glass, rather than copying the negatives upon paper, and the pictures are of considerably more value and beauty.

A bottle of good commercial bromo-iodised cadmium portrait collodion having been purchased, it may be tried at once with the above developer, to see whether the tone is such as pleases the purchaser, cyanide of potassium being used for fixing. By reflected light the colour is always bad, but that does not matter for the magic lantern. To improve the tone, about three grains of bromide of cadmium crystals should be added to each ounce of collodion, but then a stronger bath will be required than before.

The collodion, treated as just mentioned, should have a few drops of strong solution of iodine in absolute alcohol added, till it becomes of a straw-yellow colour, in order to facilitate the production of transparencies absolutely free from fog. The bath should be of very pure nitrate of silver — strength say forty-five grains to the ounce—and be slightly acidified with nitric acid. A second bath is necessary, made by diluting down some of the first bath solution till its

strength is only twenty grains to the ounce. The plate is sensitised in the first bath, in which it should remain at least six minutes when the collodion contains so much bromide, and then it should be dipped for a minute in the weaker bath. Supposing the strong bath were used alone, the transparencies would become much too intense on the application of the developer. The second bath is an advantage in point of economy, because the drippings from the wet plate are less rich in silver than would otherwise be the case.

The picture is taken by direct printing by artificial light, the negative being kept from absolute contact with the wet plate by a few folds of blotting-paper between two of the opposite edges of the plates. The artificial light should be small and bright, a paraffine flame from a very large-sized wick and burner being much the best. The flame should not be more than half or three-quarters of an inch high, its thin and not its broad surface being turned towards the negative. By thus reducing the flame as viewed from the negative to a small, thin, intensely-brilliant line of light, blurring by parallax is avoided. The printing may be done at a distance of eighteen or twenty-four inches from the flame; and the negative must be quite motionless during the exposure or blurring will result, because of the separation between the two plates. Then the picture has to be developed and fixed.

In this way it is easy to print a few pictures by holding the plates steadily with the fingers during the exposure, which may vary from one to three minutes according to circumstances. But when doing the work on a commercial scale this loss of time during the exposure cannot be tolerated, as the operator might be preparing other plates were his hands free; therefore a frame for holding the plates during exposure has to be devised. The printing-frame I use is shown in

FIG. 1.

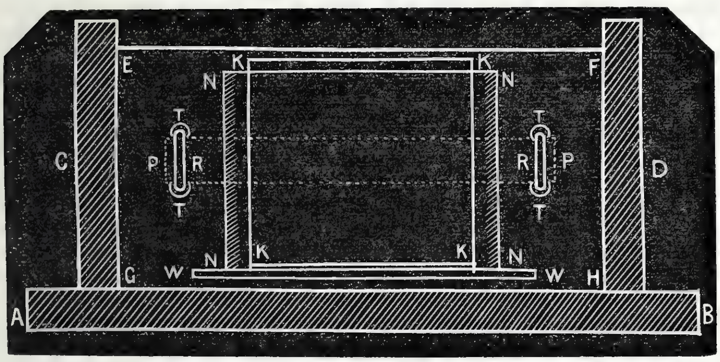


fig. 1, where A B is the base board, carrying two upright wooden pillars C D. These pillars are grooved, to allow the thin, flat, rectangular piece of wood E F G H to drop easily into its place. This piece of wood has a square, or nearly square, opening K K K K a little smaller than the negative. The negative and the sensitive plate are represented by N N N N, the shaded portion at the edges showing the position of the thin folds of blotting-paper which keep them from touching. The dotted lines P P represent a piece of common firewood, which presses against the plate and the negative because of the tension of the elastic loops R R. There are four holes T T T T in the piece of wood E F G H, and the ends of the elastic bands, after passing through the holes, are kept there by large knots on the other side. W W is a projecting ledge of wood on which the plates rest. This printing-frame will be cheaply made by any carpenter or cabinet maker, and I have found it very efficient in use. *Fig.* 1 is, of course, a back view of the frame, the light being on the other side when it is in use.

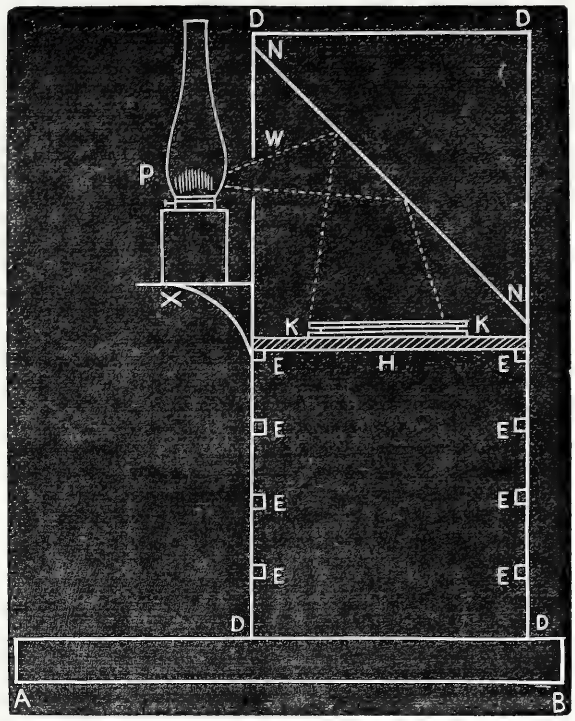
Every photographer who tries to print a large number of paper pictures with an insufficient supply of printing-frames knows the false economy of the step, and the great waste of time which results. It is the same in printing transparencies by wet-plate superposition. A printing-frame of some sort must be substituted for the fingers if many pictures are wanted in a short time. By the process just described, good transparencies may be turned out by dozens in a single evening by one person.

The intensity of the picture may be varied at will by altering the strength of the second silver bath, and by varying the time of development; a second or two more or less development makes a vast difference in the intensity of the resulting transparency.

Before trying the process, I expected to spoil several negatives by drops of nitrate of silver getting upon them from the wet plate. But, with care, there proved to be very little danger from this source, the chief point being to well drain the surplus liquid from the wet plate, by standing it upon dry blotting-paper after taking it out of the second bath. Obviously, if the wet plate were placed horizontally, with the negative and the light above it during the printing operations, there would be less danger of the nitrate of silver touching the negative. This raises the idea of another printing-frame, which I have not tried, but which would abolish the use of elastic strings, and perhaps answer better than the frame just described.

In *fig.* 2, let A B be the base board, and D D a box open on the side next the operator, as shown in the cut. This box is blackened in

FIG. 2.



side, and has ledges marked by E's, whereby the board H may be placed at any desired distance from the source of light. The negative and wet plate K K are placed upon this board. N N is a looking-glass to throw downwards the light from the paraffine lamp P, the rays from which, after passing through the hole W, are reflected as shown by the dotted lines. The ledge X supports the lamp. With a printing-frame like this the work might go on with great ease and rapidity.

When well washed, transparencies taken by this process should make very durable pictures, no bichloride of mercury having been used to tone them or hyposulphite of soda to fix them. Traces of either of these salts left in a collodion film predispose greatly to perishability. I find the process so easy that for a very long time past, whenever I wanted to copy negatives, I have taken transparencies, rather than go to the trouble of printing upon paper. The pictures when taken have had a second sheet of glass cemented over them with Canada balsam, prepared in such a way that it is not liable to crack or become brittle with age; so the photographs are very imperishable. Portraits I often copy thus upon opal glass, and cement a piece of "extra-white patent plate" over the film. The pictures are then sent to a glass grinder, who grinds and polishes the edges till they are flat and even. However, as the plates are liable to be separated by heat, I now think that a better plan is to gum strips of paper over the rough edges, and put the picture in a solid little "Oxford" metal frame, say of silver, and preserve them in that way.

One of the most remarkable facts in wet-plate printing by superposition is the great space which may be left between the negative and the wet plate, without any perceptible blurring resulting. When printing at eighteen inches' distance from the paraffine flame already described, the plates may be so far apart that a shilling may be dropped between them. William H. Harrison.

Recovery of Gold from Used Solutions.—Usually, iron is added to used gold solutions, and the precipitate collected and dissolved, entailing time and cost, and, in most hands, loss. Instead of this, evaporate your used gold solution to a small quantity, add muriatic acid sufficient to dissolve the oxide of gold suspended and deposited in the solution; filter out the insoluble chloride of silver (which save), and evaporate the solution to dryness, not using too great heat. Product: chloride of gold and sodium, ready for use.—William Bell, in *Phil. Phot.*

A PHOTOGRAPHIC JOURNEY THROUGH THE HIGHER HIMALAYAS.

By S. Bourne.

The readers of The British Journal of Photography get so much pure scientific pabulum stuffed into them every week that it has often occurred to me it would be a relief to some amongst us occasionally to descend from the lofty region of pure science, to which our learned Editors would for ever exalt us, and revel, by way of relaxation, in a little lighter gossip about the practical results of all this teaching—about what has been and is being done by our brethren in the art in various parts of the world—where they go with their cameras—what incidents, amusing or instructive, they meet with in their pictorial wanderings—what difficulties they have encountered—what process they worked—what was its value when put to the real and repeated test of trial in the field on a lengthened tour, the size of their pictures, and a host of other interesting matters of a similar character. Such papers have appeared—but how rarely! If they were more frequently incorporated among our scientific lessons they would add another attraction to the Journal, and be hailed with pleasure by many a reader, while a fund of practical information would thus be collected which would enable us to compare notes and mark progress. But I am aware that this entirely rests with photographers themselves, and is no fault of the Editors, and certainly not of the Proprietor, who is most persevering in his efforts to render the Journal popular and interesting. Come, then, ye talented photographers (every photographer is talented), from the five "quarters" of the globe, and let us hear what you are doing and where you have been wandering. Tell us into what known and unknown places the camera has penetrated.

By way of a start, and that India should claim her place in the march of photographic enterprise, I propose to give some account of a photographic tour through the higher Himalayas; but, before doing so, one or two words of explanation are necessary. In the first place, I make no pretensions to *scientific* travels—my object was purely pictorial; and though much that was interesting to the botanist and geologist came under my observation, I shall do no more than sometimes refer to the fact, without going into any description pertaining to the domains of these sciences, with which I am very imperfectly acquainted. And then I feel that some apology will be due to the reader for so much talk about myself, such frequent allusion to personal wants and trifles, to the exclusion, perhaps, of matters of more general or photographic interest. But one cannot always be writing pure photography, and the traveller cannot always be looking at sights. As the author of *Eöthen* remarks, he has his moments of "humble enthusiasm" about such commonplace matters as "fire and food, shade and drink, and if he gave to these feelings anything like the prominence which really belonged to them at the time," they would occupy a considerable share of attention in the narrative. Therefore, my narrative will be found to be made up of much egotism and allusion to self; while from all "geographical, geological, and botanical research, from all sound learning and religious knowledge, from all historical and scientific illustrations, from all useful statistics, from all political disquisitions, and from all good moral reflections," it will be found to be eminently free.

Although more than two years have elapsed since I made the journey in question, my jottings may not be without interest, from the fact that no photographer ever made the journey before, and it is very improbable that any photographer will ever travel the same route again.

My starting point was Simla, from which place I last addressed the readers of The British Journal of Photography, in some *Notes of a Photographic Trip to Kashmir and Adjacent Districts*. I now proposed to explore the rich valley of the Beas River through Kulu, penetrate into the wild and desolate regions of Spiti as far as the borders of Thibet, thence, *viâ* Chīnī and the Buspa Valley, to the source of the Ganges. The only guide I had to accompany me on my journey was a small pocket route map published by Captain Montgomery, of the Great Trigonometrical Survey; but this I found most useful and accurate.

Hearing of my proposed journey, a gentleman with whom I was slightly acquainted asked if he might accompany me, and on my informing him that I should only be too glad of his company, he decided on doing so. I don't think I shall be committing any breach of confidence in divulging my friend's name, and, as it may add an additional interest to my narrative from the fact that he may not be altogether unknown to some of my Scotch readers, I will state that my genial travelling companion, who contributed so much to the pleasure of the journey so far as he accompanied me, and whose botanical and geological knowledge added so much to its interest, was Dr. G. R. Playfair, of Agra, brother of the celebrated Dr. Lyon Playfair, of Edinburgh, M.P.

Having laid in a good stock of provisions and hermetically-sealed stores, and arranged them with cameras, chemicals, glass, tents, bedding, portmanteaus, and cooking utensils on the backs of sixty strong coolies (hardy mountaineers from Ladâk, who agreed to accompany us the whole journey), we left Simla on the 3rd of July. The south-west monsoon had already set in, but we were prepared for any amount of rain, as we knew too surely we should get it. Four easy stages along the capital Thibet road brought us to the village of Narkunda, where the picturesque travellers' bungalow formed my first picture.

Narkunda is well known to many visitors of Simla, and is celebrated for the magnificent view it affords of the snowy ranges of Spiti, Chīnī, and Gangootri, and also for a splendid pine forest through which the new road is carried. Viewed from the verandah of the bungalow, the range of snowy peaks forms an unbroken line for about 90° of the horizon, and in fine, clear weather is a grand sight. But, alas! the sight was not for us. During our stay of two days a dense mist hid all its glories from our anxious gaze, or, if it cleared off for an instant, it only revealed a bank of clouds piled up as a second and higher range of peaks on the top of, and concealing, the real one. But we had one or two momentary peeps through occasional breaks, when, though distant, the snows looked so close as to be within a few hours' distance.

I may here remark that it is only in a break in the rains that we can get a clear and distinct view of the far-stretching ranges of the Himalayas. At other times a light blue haze, fatal to the rendering of long distances by photography, fills up the deep valleys which separate one range from another, until the more distant ones blend in an undistinguishable line with the sky. But, after days and weeks of rain, in one of those charming "breaks" which we sometimes get, this haze is swept away, and summit after summit, to the farthest stretch of vision, stands out in bold and crisp outline, with every landslip and mark on their scoriated sides distinctly visible. It is on such days that I like to photograph.

Have any of my readers ever remarked how much better a dry process will render distance that is more or less shrouded by haze than the wet? I first noticed this in Kashmir. I and another photographer were taking a view at the same time, consisting of a lake bounded on the opposite side by a range of hills which were rather hazy. He was using the tannin and honey process, and I the ordinary wet process. In my picture the hills ran into one another without any distinction, and were simply indicated by their outline without any variation of surface. On my friend developing his picture in the evening the hills came out comparatively crisp and sharp—every tree and ravine distinctly visible; and while in my plate they looked many miles away, in his they looked more like what they really were in reality, not more than two or three. How or why is this? Can any one offer an explanation? But to return from this digression.

At Narkunda we had to leave the high level road which we had travelled for forty miles from Simla, and descend by a rugged path to the Sutlej, about 3,000 feet below. The heat in this valley was intense, and I shall not soon forget the broiling I got in taking a picture of the deodar bridge by which we crossed the river. After breakfasting on its bank we had a steady ascent to make of seven miles before reaching our camp. The day, fortunately, was cloudy; but notwithstanding the kindly screen which thus shielded us from the sun's direct rays, we were quite overcome with the terrible heat. Imagine our delight, therefore, when, after climbing some three miles, we espied a hole under a bush on a little stream that trickled down the ravine up which we were proceeding. We at once plunged in, and the sensations we experienced were such as only those who have travelled in hot countries can realise.

Thus refreshed we resumed our journey, and as we toiled up that weary ascent many a glance did we cast at the little dip in the summit through which our path led, wishing we were there, and feeling a strong misgiving that we should be too much done up to reach it that day. Three weeks later we should have made light of such an ascent, but our muscles and sinews were not yet in climbing order, and we were doomed to many a struggle through heat and rain before we could look upon these mighty mountains and feel that we were equal to them, and did not fear their rough and rugged sides. There was nothing in the scenery to give any interest to the march; scarcely a tree was to be seen, and all the view we had was a look back across the Sutlej to the opposite mountain which we had just descended. At last we managed to crawl into camp, where we fell asleep, and were only awoke by the kitmutgar (cook) informing us that dinner was ready.

(To be continued in our next.)

THE EXHIBITION OF THE LONDON PHOTOGRAPHIC SOCIETY.

[THIRD ARTICLE.]

THE exhibition closes tomorrow (Saturday), the time of its remaining open having been extended owing to the great number of visitors. While it is a great boon to photographers and the public to have an opportunity of inspecting such a collection of pictures without payment, we think that a small charge for admission would not have diminished much, if at all, the number of visitors, while it would not only prevent the pecuniary loss which must inevitably attend a free exhibition, but would place an amount in the hands of the treasurer of the Society that might be usefully employed in furthering the aims of the Society. And here we may remark, in passing, that the granting of medals for the "best pictures" would *not* be the best means of promoting the interests of the art. It will, however, be time enough to discuss that subject if such a proposal be made.

Resuming our hasty notice of the pictures in the two previous numbers, we commence by expressing our pleasure at seeing Mr. W. W. Rouch once more in the artistic arena—for there can be no doubt that in a certain sense an exhibition may justly be so designated. Mr. Rouch is a skilful artist, and we have known him to secure pictures of the greatest excellence under circumstances in which others had been comparatively unsuccessful. His contribution to the exhibition consists of a few views taken while on the continent.

Mr. Belton exhibits a number of pictures illustrative of the special advantages of his new "matt paper." While they are not inferior to albumenised prints in brilliancy and delicacy, they are quite devoid of gloss. There are so many circumstances arising in the practice of a photographer in which a matt surface is preferable to a glazed one, we welcome every effort to improve the former.

Concerning a number of portraits by M. Wane, a series of views in Norway by Mr. Buxton, a variety of views in the neighbourhood of the Trossachs, by Mr. Vernon Heath, some portraits by Mr. Slingsby, and a similar contribution by Mr. Ashdown, we have only to reiterate the expression which we have applied to so many of the pictures exhibited—"they are excellent." An admirable picture by the last-named artist, entitled *Get Up, You Lazy Boy*, represents a stubborn "lord of the creation" of some four or five summers ensconced in an easy chair, from which a juvenile sister is trying to induce him to rise by the admonitory words of the text.

If there were a school of photography we would be inclined to speak of the Manchester school. We overheard an artist of taste pay the compliment to a picture by one of the school referred to, Mr. Wardley, by saying that it was the most natural-looking picture in the room. This exhibitor's views are characterised by uniformity and clearness, and there is a certain style about them in virtue of which, when one picture has been studied, all the others by the same artist will be recognised without the necessity of referring to the catalogue.

Among those who may be considered as belonging to the same school we may mention Mr. W. D. Clark, who exhibits three admirable pictures of Edinburgh Castle. There are some good pictures of the same school by Mr. W. Sanderson.

There are several fine and large views in Scotland by Messrs. A. and G. Taylor. Mr. N. Briggs quite sustains his reputation by a number of 12 × 10 portraits. There are also a few with natural foregrounds, which are very effective.

Some pictures by Mr. Alfieri, taken by the camera campestra—an instrument which has been described in these pages—are worthy of observation as well from their intrinsic merit as from the camera by which the negatives were taken.

Messrs. Robinson and Cherrill exhibit several pictures, including portraits, landscapes, and composition prints. One of the latter, in which a flock of sea gulls is introduced, is effective, and attracts notice from the novelty of the conception. The portraits exhibited by these artists are of a very high order, but this is only what was to be expected from an artist of Mr. Robinson's well-known abilities.

Some panoramic views of *Mount Sinai* and *Jebel Serbal*, exhibited from the Ordnance Survey Office, appear at first sight as though our friend Mr. J. R. Johnson had contributed them as a foil to the productions of his ingenious pantascopic camera. The pictures referred to are composed of two or three views joined together so as to form a panorama; and really the junctions are performed in such a manner as to provoke hostile criticism, especially now when there is an instrument by which a panoramic view can be taken at one operation and on a single plate of glass.

It may fairly be questioned whether, among all the portraits in the rooms, there is one in which there is so much character as is displayed in the face of a girl by Mr. Rejlander. The picture to which we here refer is an enlargement entitled *Kept In*. The sentiment is so admirably displayed in the face of the little school girl that we doubt if there is any which surpasses it among all the works of this inimitable artist.

Mr. R. Manners Gordon's landscapes are pictures in the highest sense. It must be gratifying to him, as a true, unselfish photographer, to find that many are treading so close upon his heels as to render it a hard matter for him to easily maintain his high reputation. A rustic bridge over which a little girl is passing is a veritable gem.

A portrait burnt in on porcelain, by Mr. D. C. Dallas, is quite sensational from its colour; but it is not so good as we hope to see Mr. Dallas accomplish after he has had more practice in this direction. Among those who exhibit coloured work we are glad to find Mr. Warlich, who makes a speciality of enlargements.

Four views near Penzance, by Mr. W. Brooks, command attention from their excellence, although they have been hung so low as to cause their examination to be attended with difficulty.

Mr. Hubbard has two pictures this year—one being a sick child, the evident reality of which conveys a feeling of pain, although a fine picture, nevertheless; the other is a "composition" entitled *Stolen Moments*, generally acknowledged, and justly so, to be the finest picture of the class in the exhibition.

We conclude the present notice by again reminding our readers that the exhibition closes to-morrow (Saturday).

BOURNE'S INDIAN VIEWS.—An Indian paper, the *Neilgherry Excelsior*, in speaking of a recent exhibition, says:—"One of the most attractive rooms in the late exhibition was that devoted to photographs, and when we state that one-half of it was occupied by the fine photographs of Mr. Bourne (of Messrs. Bourne and Shepherd, Simla and Calcutta) we have said sufficient to account for the great interest evinced by visitors in this department. The idea generally associated with a landscape photograph is that of a dirty-looking picture, more or less true to nature, in spite, apparently, of the efforts of the artist to make it otherwise—with large masses of unbroken black for shades, and large masses of equally unbroken white for lights—a piece of crude white paper representing the sky, with sundry comets, meteors, and shooting stars sweeping across it, while the other parts of the picture are adorned with innumerable specks, scratches, and stains of various descriptions. With the majority of people the ultimate end and object of a photograph apparently is to be pasted with all manner of creases and finger marks into a common dirty scrap-book along with scraps from newspapers, manuscript verses of original poets, dirty engravings from the *Illustrated News*, ferns, mosses, leaves, and other heterogeneous materials to be occasionally scanned over and again consigned to their ignoble but fitting obscurity. But those who saw the beautiful productions of Mr. Bourne must have been made aware that in the hands of an artist the camera is not inferior to the brush in its capacity for producing pictures which are worthy of the rank and designation of works of art. Photographers at home have long been fighting to obtain this distinction for their productions; but when we consider the total absence of all art-knowledge—the violation, in fact, of every rule of art—the want of harmony and softness, of delicate detail combined with breadth of effect—the absence, in short, of all the elements of a properly-composed and artistic picture which have hitherto characterised the productions of all but a very few, we cannot wonder that they have found it a hard struggle to get their claims recognised. But when we are brought face to face with such photographs as those Mr. Bourne displayed at the exhibition, we feel that such claim cannot much longer be denied. These are pictures not to be doubled up in a coarse scrap-book, but framed for the adornment of the drawing-room. Here is artistic selection of subject, proper arrangement and balance of lines, appropriate foregrounds, delicate middle tints, and soft aërial distances, blending harmoniously with a real natural sky, while a due proportion of light and shade alternates through the pictures, securing *chiaroscuro* and breadth amidst all the fine detail which is their peculiar charm. What more is necessary to constitute a 'picture?' Every one of Mr. Bourne's photographs, too, is without a speck or flaw of any kind; there are no stains from dirty chemicals, dirty hands, or careless manipulation, and the most delicate skies and distances show not a trace of those blemishes which so commonly disfigure even good photographs. It is a rare treat to come upon photographs of this description, and we cannot but rejoice that Mr. Bourne, after depicting the grand scenery of the Himalayas and Cashmere, and the most noted architectural objects of Upper India, has found his way to our less grand, but, according to him, not less beautiful mountain plateau. The views he has taken of Ootacamund and the Neilgherries will, by their extensive publication by Messrs. Bourne and Shepherd in India and England, go far to correct the unjust reports that have been spread about our southern sanitarium, and show the residents of Upper India that its beauties are not inferior to those of their own summer resorts. * * * In concluding our notice of this beautiful series of photographs we should add that they obtained a special prize, which will add another to the numerous medals and cups (over twenty) obtained by Mr. Bourne at various exhibitions in India, the Bengal Photographic Society in Calcutta, at Dublin, and at the Paris Exhibition of 1867."

Correspondence.

Foreign.

Paris, November 22, 1869.

As stated in my last, I have in this to notice the valuable work by M. Blanquart-Evrard, entitled *Photography: its Origins, Progresses, and Transformations.* Few persons are more capable than the author of this book of executing the task he proposed to himself, which is described by the title. An ardent admirer of our art, an early and enthusiastic practical worker, who devoted himself to its popularisation when its productions were more objects of scientific curiosity than of general utility, who has carefully followed its various transformations since actively engaged in its propagation, M. Blanquart-Evrard now devotes his time and means to the production of this work, upon which neither expense nor trouble have been spared. It is a labour of love, for it is published for private circulation and not for sale, and the author has been able to give good specimens of a large number of the new processes; for no fewer than eleven fine prints, produced by the processes of Poitevin, Garnier, Baldus, E. Edwards, Braun, and Woodbury are found in its pages, besides specimens of the old developed pictures, so much brought into notice by the author, the ordinary silver prints on albumenised paper, and a photo-wood engraving, executed by an obscure Paris artist at least fifteen years ago. The mere enumeration of these pictures does not give an adequate idea of their value.

There are several specimens of the photo-engraving of M. Garnier of different classes of subjects, including the stereoscopic view of the 1851 Exhibition, which gained him the gold medal in the Exhibition of 1867. The carbon picture by Mr. Edwards is a finely-toned portrait. M. Braun contributes one of his reproductions of the drawings of the old masters, and Mr. Woodbury's picture comes from the same hands as the silver print, viz., MM. Goupil and Co., and it is very difficult to say which is the better production for fineness and tone.

I have before me the chapter on pre-journalistic photography, which I find in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1866; and as I find no mention in it of some curious and important contributions to our art, which are noticed in the volume of M. Blanquart-Evrard, I am tempted to call the attention of your readers to them. A quaint quotation from the pen of Francis Wey on the history of photography, which was published in 1853, is still very *apropos*, I think, to the "discoveries" in photography of the present day. He says that "the ideas or principles of discoveries are present at certain epochs in the atmosphere, just like the elements of epidemics; an innovation arrives at its full term, borne by several minds, and when it begins to germinate here and there it is often seen to flower upon several branches simultaneously."

Thus, in 1777, Scheele noticed the action of light upon chloride of silver, and in 1780 Professor Charles used to exhibit at his lectures in Paris, as a sort of recreation, the shadows of his pupils on a sheet of paper covered with chloride of silver, and impressing them thereon. He also obtained images in the camera, but he did not know how to keep them from fading. Then, a little later, came Wedgwood; and then M. Blanquart-Evrard reveals to us a mysterious personage of the name of Gonord, whose productions figured in an industrial exhibition in the Louvre in 1819. M. Gonord exhibited specimens of a method of obtaining enlarged or diminished pictures of the same subject, and he was rewarded with a medal. In 1821 this artist was found in the greatest poverty, gaining his living by transferring copies of engravings on to objects of porcelain which the porcelain manufacturers brought to him. He charged very little for his work, and only required two or three hours to make and transfer a copy of an engraving, either of the same size as the original, or larger or smaller, as required. When asked by the writer who visited him to allow him to pay for the three pictures which he gave him, it was impossible to make this ingenious but "*bizarre*" man accept anything. He died soon after, and with him his secret. How did Gonord obtain his pictures? At the time it was thought that he did it somehow with gelatine; but there is no practical manner of accomplishing the fact this way, and M. Evrard considers that these enlargements, &c., must have been done by means of a camera and photography.

Another mysterious personage figures in the history of French photography. A young man, with all the outward signs of poverty, entered the shop of the celebrated M. Charles Chevalier some time before the year 1839, and told him he was able to produce pictures of the images formed by the camera obscura. "Ah!" said M. Chevalier, "I have known for years plenty of persons who have lost at that game." But the young man drew out an envelope from his pocket, and showed the optician a true photograph upon paper of a collection of chimney pots and objects of a similar description that would be seen from the window of a garret situated at an elevation. "I operate with this liquid," said the young man, who pulled out a bottle of brown fluid, which he placed on the counter. He shortly afterwards left the shop, taking his picture with him but forgetting his bottle. This man was never heard of again. Some time after M. Chevalier gave this bottle to Daguerre, who kept it for two months. When his friend asked him if he had made anything out of it, Daguerre replied:—"I have made a great loss of time with it; for all the experiments I have made with this liquid have entirely failed. The secret of your man, if he had one, was not in his bottle."

The branch upon which this germ settled and budded died without producing fruit. M. Bayard, however, appeared on the scene, in 1839, six months before the publication of the process of Mr. Fox Talbot, and before the publication of the results of Daguerre, and showed pictures obtained in the camera; and on June 24, of the same year, he exhibited thirty at a public exhibition for raising funds for the relief of the victims of an earthquake in Martinique. If any one will compare what I have just written with the dates given in the ALMANAC of 1866, to which I have referred, he will find some discrepancies, and I must leave them to the compiler of that article to account for them. M. Blanquart-Evrard states that M. Bayard showed his pictures to some scientific friends in 1839, and six months before the publication of Mr. Fox Talbot's process. I find from the ALMANAC that this process was published on Jan. 30, 1839; hence, if this date be correct, M. Bayard would have shown his pictures in 1838. M. Evrard cannot refer to the date of the publication of Mr. Talbot's process in France. The date given in the ALMANAC of the communication to the French Academy of Sciences (Jan. 7, 1839) of Daguerre's process cannot be correct, for he says:—"A few days after June 24, 1839, Daguerre appeared, divulging his discovery and method." Hence, Daguerre cannot have made his communication till June, 1839—not January, 1839. So great was the emotion produced by the announcement of Daguerre, that M. Bayard and his works were overlooked. The great merit of Daguerre's process—and this is proof of his clever wisdom—was that he gave a substantially *perfect* process to the world, in a state *quite workable.* If it had been "nearly workable, difficult, and incomplete, it would not have appeared with such *eclat.*" This is very true, being as applicable now to many inventions as it was then, and is the reason why many who may not be real discoverers obtain all the glory. Take, for example, Mr. Scott Archer and the collodion process. The process adopted by M. Bayard had been communicated to M. Evrard, in 1839. M. Bayard only half did his work; he showed his pictures, but did not describe how he did them—he was waiting, probably, to perfect the process. The prints he obtained in the camera were positives on paper, and these are his formulæ:—

1. Dip a sheet of paper for five minutes in solution of chloride of ammonium, of five per cent. Dry.
2. Float on a bath of nitrate of silver, ten per cent., for five minutes, and dry in the dark.
3. Expose the nitrated side to the light, till black, taking care that it be not bronzed. Well wash in several lots of water, dry, and keep in a portfolio for use.
4. Dip a sheet of this prepared paper for two minutes in a bath of iodide of potassium of four per cent. Apply the white side of the sheet against a perfectly flat piece of slate (or glass), and expose, wet, in the camera. The light *whitens* the parts it acts upon.
5. Wash the picture well in water, and then in a bath composed of equal parts of water and ammonia. Wash again, and dry. The progress of the picture can be judged of by watching it in the camera. These pictures can be strengthened by pyrogallic acid, and then fixed in hyposulphite of soda.

I must resume the notice of this book in my next.

R. J. FOWLER.

Copenhagen, November 5, 1869.

THE art of multiplying photographs through printing-ink and the press, in Albert's manner, in Munich, makes good progress. A photographer here in Copenhagen, Mr. V. Schröder, has, after a course of three months' studying and contriving, now invented the very same process. His pictures are at least equal to those I have seen from Albert. But our Danish contriver (Mr. Schröder)—who also once showed me how photographs were to be burned-in in a fine style on enamel and china—is not much disposed to take any further advantage of his contrivances. After his last invention he was requested to associate himself as an assistant with Mr. F. Petersen, His Royal Majesty's photographer in this city, for an annuity of 1,000 dollars Danish (£120). Mr. Petersen had just been in Munich, and, not knowing what Schröder was about, paid Albert 10,000 francs for his process, including, I believe, the right to teach it to others in the kingdom of Denmark. He now found it advisable to engage Schröder as an assistant, because this opponent might have proved a dangerous rival to his further progress. It is not to be thought that either Albert or Petersen has obtained, or can obtain, a patent for their process in this country.

I recently visited Mr. Petersen, in order to get some specimens of the products of his printing-press. As he was still not far advanced with his establishment, he could only furnish me with the two pictures herewith enclosed. He had no portraits at hand; but I had a few days before seen some of Schröder's own productions, which looked very fine, showing, however, the same Indian-inkish colour and a want of strength in the deep shadows, which is also to be seen in the specimens enclosed. However, there is not at all any doubt that the process, after being cultivated and improved sufficiently, will produce portraits as fine and

brilliant as the best from stone, copper, or steel. We may, therefore, anticipate a new, glorious, and rich period for our art.

A Mr. Max Gemoser, in Berlin, has also lately invented the printing process, and offers publicly to teach photographers his art, when about 500 of them agree for a lesson in Berlin, paying 200 thalers (£30) *in propria personâ*. With some knowledge and assiduity in experimenting, it seems to be not a very difficult task to find out how the photographic printing is to be managed, as it is evident the process is practicable.

A friend of mine saw, one evening, a prepared printing-block by Mr. Schröder. It consisted of a thick glass plate, furnished with the transferred image for pressing. But the plate seemed quite clean and clear, without any trace of picture-marking; however, after Schröder had moved his black-tinted roller over the plate, the picture appeared suddenly, and was ready for printing. PETER CHR. KOCH.

Home.

CRYSTALS ON COLLODIO-BROMIDE FILMS AND THEIR PREVENTION.

To the EDITORS.

GENTLEMEN,—In an article published in your columns, a few weeks ago, I attempted to answer some very pertinent queries which you had received from an Indian correspondent. But his fourth question—"What are the crystals noticed on collodio-bromide plates, and how may they be obviated?"—I could not reply to satisfactorily, because I had never met with such crystals in my own practice, although I had heard of other photographers who experienced similar annoyances.

Since my article appeared, three amateurs who practise the collodio-bromide process have written to me, saying they are sometimes annoyed with crystals which do not appear till the plate is dry. One correspondent thinks they must consist of bromo-nitrate of silver; another, that they look like small flakes of bromide of cadmium lying on the surface. For obvious reasons neither of these suppositions can possibly be correct, unless unusually great blunders have been committed in compounding the collodio-bromide or in washing the plates. My third correspondent, Mr. Wainright, offers no opinion, but brings me a collodio-bromide film, beautifully (for my purpose) studded with crystals, and describes to me his mode of operating, which seemed to be according to the correct rule. Nevertheless, there the photographically-ugly crystals were in great abundance.

After cutting this plate into convenient slips and examining various forms of the crystals by the microscope, I could not see one which indicated any form of structure—simple or compound—peculiar to the metallic salts used in that kind of collodion.

After some farther investigation by a chemical process I found these crystals to consist entirely of tannic acid, which, by the application of a proper solvent, or even with the point of a camel's-hair brush, could be removed, leaving an evenly translucent film of collodio-bromide underneath. I have little doubt the crystals referred to by my different correspondents, and which they have met with in their practice of collodio-bromide with tannin, are all of the same class.

Several circumstances might favour the formation of such crystals, such as the mode of drying the films, the variety of tannin or the strength of solution, the presence of nuclei on the collodion surface, &c.; but when anyone is troubled with these unwelcome visitors, the remedy lies in washing off the superfluous tannin before the plates are set aside to dry. No loss of sensitiveness or diminution of any other good quality will thereby be incurred. After the tannin solution has been freely applied to, and allowed to soak into, the film, its functions—whatever they may be—are practically ended; and all the excess may, sometimes with advantage and never with loss, be entirely removed immediately afterwards.—I am, yours, &c.,

GEORGE DAWSON, M.A., Ph.D.

King's College, November 22, 1869.

PRINTING WITH A NEGATIVE BATH.

To the EDITORS.

GENTLEMEN,—Could you assist an amateur, through your valuable Journal, by telling me if I could make an old negative bath into a printing bath, or if it would do to use it as it is? A reply would oblige,—Yours, &c., T. R.

Sunderland, Nov. 24, 1869.

[Assuming that the bath was brought up to the proper strength, either by evaporating the water or adding more silver, the iodide of silver necessarily present in all old negative baths tends to prevent satisfactory prints from being obtained. Precipitate the silver by placing a clean piece of copper in the solution, and wash the metallic silver thus obtained, using a weak solution of cyanide of potassium as one of the courses of washing. A little nitric acid will soon convert the fine metallic powder into nitrate of silver. With the details of the preparation of the nitrate you can easily make yourself acquainted by looking through back numbers of this Journal.—EDS.]

HUMBUG AND ITS PROPHETS.

To the EDITORS.

GENTLEMEN,—"Naturalist" is wrong. There is no "humbug" in exhibiting such pictures as Col. Stuart-Wortley's. He does not say they were taken by moonlight, but merely that they show moonlight effects. All that is required to produce such pictures is a fitting subject, the skill to discern when the sun and clouds are in the best condition to be taken, plenty of patience to wait for the arrival of that time, and the skill to photograph it in a proper manner.

The "gull" picture, by Mr. Robinson, I examined some months ago in the window of Spooner, of the Strand, and I admired it much; but there is no "humbug" in producing or exhibiting such a picture. No photographer would for a moment be deceived into the belief that it was produced from a single negative taken of the scene as there represented, and the public do not care how many negatives are employed in the production of a picture, nor whether the gulls are painted on the negative or printed in any other way, so long as a pleasing picture is produced.

The "art of putting things" is undoubtedy a great art. I further admit, with "Naturalist," that Humbug is great and his prophets numerous; but, while admitting that full effect has been given to the former by the artists mentioned, I still must demur to the idea that there is any "humbug," as I understand the word, in either of their works.—I am, yours, &c., ZETA.

13, *South-square, Holborn, November* 24, 1869.

Miscellanea.

A NEW STUDIO ACCESSORY.—Maternal photographs are so fashionable in Paris that the more enterprising photographers there keep a baby as part of their scenery—so at least says the *Court Journal.*

A NOVEL HEAD REST.—A Connecticut inventor has patented a head rest attachment for church pews, intended to support the head of the worshipper when so inclined. The contrivanee can be detached at pleasure. We hope it will not succeed. The spectacle of shelf after shelf going up and sleepy head after head going down, in the middle of choice passages in the discourse, might well appal the stoutest heart and freeze the most eloquent tongue.—*New York Times.*

A WRINKLE.—Procure a wide-mouthed jar, holding, say, a pint, and fit it with a cork with a hole in the centre, through which fit the neck of a rubber funnel. Put a cork in the upper end of the funnel neck also. Then cut the bottom out of a three-ounce bottle, and about one-half of the neck off. This suspend (by means of a copper-wire frame) from the under side of the cork, by means of wire hooks, so that it can be detached for cleaning. To use it, proceed as follows:—When clean, put some cotton in the neck of the bottle, put it into the wire frame and hook it to the cork; then force the cork down tight, and pour collodion in through the centre tube until the small bottle is full; then cork it, and let it filter. This can be done until the collodion reaches the neck of the small bottle. It works well, and is easy to clean. A wide-mouthed bottle will do instead of the jar.—A. E. TURNBULL, in *Phil. Phot.*

RETOUCHING NEGATIVES.—A correspondent of our Philadelphia contemporary writes:—"The following mixture will be found capital:—Make two solutions—

1.—Nitrate of silver	240	grains.
Water	20	,,
2.—Pyrogallic acid	20	,,
Water	30	,,

Mix them together, and allow them to rest, say two hours. Collect the reduced silver on a filter; wash and dry. Now mix it to a paste with good, thick, negative varnish, and dry again. To use it, take of—

Alcohol	½	ounce.
Oil of lavender	¼	,,

Mix them together. Dip the brush in the last mixture and moisten the dried pigment and apply to the negative. This mixture having a solvent action, care must be had not to dissolve the varnish with it."

PRINTING VIGNETTES IN THE SOLAR CAMERA.—Another long way of accomplishing an object has been patented recently by Mr. J. E. Richard, Columbia, South Carolina, which is a device for printing vignettes in the solar camera. It consists in the provision of such means, the same being the attachment of a curtain, by adjustable levers, to clockwork, in such a manner that precisely the proper motion may be automatically imparted to the curtain, including the moving of the curtain both lateraly and vertically at the same time, or only vertically, or more or less laterally, as may be required, the aperture in the curtain being also provided with wings of various shapes for the purpose of giving such form to the shading as may be desired, and the whole apparatus being placed within a box having tubes running through the sides for the passage of the light, said box being also provided with means for setting it at a greater or less altitude at pleasure from the stand, in order to accommodate it to the height of the camera that may be used. From the drawings it would seem that the contrivance would answer well, though complicated.—*Phil. Phot.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely *offered for sale*, that being done at the small cost of one shilling in our advertising pages. This column is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a *nom de plume* be thought desirable), otherwise the notice will not appear.

Mr. H. MORRIS, New Wandsworth Station, S.W., will exchange a gold three-quarter plate Geneva watch for a whole-plate lens.

A 15 × 12 Ross's doublet wanted in exchange for a large lantern, 8 inch condenser, 5-inch object glass, with blow through and mixed gas burners. Also a series of twenty nine beautifully painted, historical slides, to use with the above; the whole packed in two boxes (cost upwards of thirty pounds). —Address, R. F., 8, Maddox-street, Regent-street.

A quarter-plate French lens and camera, half-plate lens by Horne, Thornthwaite, and Wood, and a single achromatic lens for views up to 15 × 12, by Maugey, will be exchanged for a Burr's 2B *carte-de-visite* lens and camera, or pair of stereo. doublets and camera by Burr, or gold chain.—Address, MANAGER, Mr. Fisher, Photographer, Malton, Yorkshire.

An excellent quarter-plate portrait and landscape lens, by Horne and Thornthwaite, London, will be exchanged for 100 feet of fourth quality glass for a photographic studio windows; also a quick-acting *carte-de-visite* lens, of 7-inch focus, 2¼-inch diameter, by C. Burr, of London, will be exchanged for a Kinnear's make. or some other equally as portable camera, for plates about 10 × 12 inches.—Address, E. LOCKYER, photographer, &c., Ringwood, Hants.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

W. V. FLEMING (Manchester).—We shall place your letter in the hands of an experienced lithographer who has some knowledge of what you inquire about, and reply in our next.

EXCELSIOR (Ringwood).—The exact strength of the solution of sulphuret of potassium is not a matter of much consequence. One or two trials will determine the strength that will best suit your purpose.

ERRATUM.—Referring to the first resolution in the report of the meeting of the Manchester Photographic Society in our last number, we received two alterations, at the last moment, from two gentlemen officially connected with the Society. For "sufficient to warrant it in taking both," &c., *read* "sufficient to warrant a division of its business between," &c. The latter was the version sent by the gentleman who prepared the report.

PYRO.—1. We should undoubtedly prefer the lens of two and a-quarter inches diameter to that of two inches. It will work much more rapidly. For stereoscopic work a pair of these may be got quite close enough together, if you cut away a piece from the sides of the flanges. These will work much more rapidly than the stereoscopic lenses described.—2. A little alcohol is used in the printing bath by some, to aid in the coagulation of the albumen.

M. D. (Reigate).—1. If the name be written on the negative with any kind of opaque ink it will be white in the print.—2. Without doubt an income can be acquired in the manner described, and we know several persons who realise considerable sums in that way.—3. The easiest apparatus to manage of the lime light series is the oxycalcium, or that in which a spirit lamp is employed; you are thus independent of either hydrogen or carburetted hydrogen.—4. About six or seven pounds.—5. At the next meeting of the South London Photographic Society. The exhibition will, however, be of a somewhat private nature. Any public exhibition will be duly notified to our readers.—6. A triple lens, an instantaneous doublet, or a rapid rectilinear. Any one of these will suit your purpose.

G. has fallen in love with Mabel Gray, or, to speak more definitely, with the colouring of her *carte*. This famous member of the *demi-monde* could scarcely pass a picture-seller's window in which her photograph is not to be found, generally coloured in a brilliant and effective manner. Our correspondent says:—"I should esteem it a great favour if you could inform me how they are executed, and where the colours might be procured for tinting photographs in like manner. The features appear to be tinted with a different material to the drapery, as the colouring is quite *flat* (in the trade acceptation of the word), whilst the general colouring of them appears to be done in the ordinary way. I have no doubt you can give me all the information I require as you have lifted me out of the mire before, for which pray accept my best thanks." Can any reader supply the information desired?

P. LE NEVE FOSTER.—Thanks for directing our attention to Mr. Sutton's latest optical effusion and attack upon Goddard's lens. In making his remarks on this lens he knew as well as we that his statements were devoid of credence, and would be accepted as such by those who were conversant with the subject. The drawing of the lens we engraved was a copy from one of numerous other similar lenses in Goddard's own work-book; and, indeed, as this statement was so plainly made at the time, and was supplemented by verbatim extracts from his writings, no person possessing the most moderate freedom from obliquity of moral vision could have failed to observe it. Goddard's reputation rests on too solid a foundation to be affected by such puny attempts at detraction; while it affords us unmitigated amusement to watch the attempts of our versatile friend to acquire a modicum of the notoriety for which he so much thirsts that he does not consider it too dearly purchased even at the expense of his reputation. Common gratitude to a person to whom he appears to have been so much indebted for his information concerning lenses ought to have made him chary of attacking any of Goddard's productions—at least until he had become qualified by making himself thoroughly acquainted with their principle.

J. P. (Ireland).—1. The white precipitate indicates that the salt is impure.—2. The business is still carried on. The address is, Great Queen-street, W.C.

A LANDSCAPE PAINTER.—We cannot perceive anything in the letter referred to that will warrant your assertion that the writer is "stabbed to the heart by the success of others," or that he denies "the existence of a personal devil." Your defence of Mr. Robinson's clever picture is more creditable to your heart than your head; we fear, however, that if your letter were published the artist would think he had just cause to say—"Save me from my friends!"

M. C. (Stourbridge).—You did not proceed properly when making your nitrate of ammonia. Try it again as follows:—Dilute some nitric acid with three or four times its weight of water, and saturate it with sesquicarbonate of ammonia (the ordinary carbonate of ammonia of commerce), evaporate by a gentle heat, and crystallise. If it be not wanted in the crystalline form, evaporate to dryness at a temperature of 212° Fahr., and raise the heat to 250°; then pour out the fused salt upon a slab of stone or metal, and when cold, break up in pieces. and keep them in a bottle. This salt is much used for making "laughing gas" or nitrous oxide, this being rapidly given off when it is put into a retort, and subjected to a moderate degree of heat.

THOMAS WISEMAN.—Since our interview we have ascertained what we hinted to you we thought was the case, viz., that the one point in your camera which you thought would prove to be novel is not in reality so. It is one of Mr. Sutton's numerous inventions, and was patented by him, although, as usual with that gentleman's displays of ingenuity, no person would or could see any advantage in it; we refer to the placing of a mirror inside of the camera at an angle of forty-five degrees, so as to throw the image on a ground glass placed on one side of the camera, in the same manner, indeed, as all toy and small drawing cameras were made many years previous to the introduction of photography. We have no objections to accept your contributions, but we cannot do so unless there is some point of novelty contained in them. With respect to the article under consideration, although it must be somewhat disheartening to you to find that so many things in it have long been well known to others, this is only what every one who enters the field of photo-mechanics must be prepared for, until he acquire a knowledge of what has been previously achieved. A perusal of our previous volumes would enable you to acquire this knowledge, and a complete set, since 1854, is kept for reference at our publishing office, and is at the service of any person who wishes to examine our past volumes. We should have written to you, but do not know your address. You had better put your article to the use you originally contemplated, as its novelty, or want of it, will not probably be there questioned.

⁂ Several communications are unavoidably left over till next week.

☞ **Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at th Office, 2, York-street, Covent Garden, London, W.C.**

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Nov. 30th	Liverpool Amateur	Free Public Library, W. Brown-st.
Dec. 1st	North London	Myddleton Hall, Islington.
,, 1st	Edinburgh	5, St. Andrew Square.
,, 2nd	Glasgow	Andersonian University, George-s

LONDON GAZETTE, *Tuesday, November* 23.

BANKRUPT.

R. STUBBS, late of King's-road, Chelsea, photographic artist.—December 8, at the Bankrupts' Court, London.

METEOROLOGICAL REPORT,

For the Week ending November 24th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
18	30.50	59	32	33	35	SW	—	Foggy
19	30.38	56	33	45	48	SW	—	Fine
20	30.32	—	37	38	40	NW	—	Fine
22	29 35	48	30	47	48	SW	0·43	Raining
23	29.27	43	39	42	43	W	—	Dull
24	29.64	—	37	38	40	NNE	—	Overcast

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 501. Vol. XVI.—DECEMBER 10, 1869.

ACTION OF LIGHT ON URANIUM COMPOUNDS.

We should have thought that the question of the action of light on uranium compounds had been thoroughly worked out in consequence of the elaborate and valuable researches of Mr. Burnett on this subject, and the numerous experiments made by others during the time the Wothlytype process of photographic printing occupied the attention of photographers. It would appear, from a paper by Mr. Bolton, published in the last number of the *American Journal of Science*, that this is not so, for that gentleman has brought into notice two additional facts relative to uranium compounds, which we will now briefly advert to.

Mr. Bolton states, as the result of his numerous experiments on various salts of uranium, that the compound which is most sensitive to the action of sunlight is the *citrate of uranium and ammonia*, and not the nitrate of uranium, as generally supposed. In order to prepare this salt he makes first an "oxide of uranium," or, more truly, uranate of ammonia, by precipitating nitrate of uranium solution with excess of caustic ammonia; a yellow precipitate is thus obtained, which is washed with two or three changes of water and then drained. Any desired quantity of citric acid—say half-an-ounce—is dissolved in water, and the solution divided into two equal parts. One of these parts is neutralised with ammonia, and to the second portion of citric acid solution the yellow uranium precipitate is added until the acid ceases to dissolve any more. The two solutions are then mixed, and the liquid may now be considered as containing citrate of uranium and ammonia. When the solution is evaporated to dryness a gummy, uncrystalline mass is obtained. This is the compound which is stated by Mr. Bolton to be more sensitive to light than any of the other uranium compounds.

The second point observed by Mr. Bolton was that the uranium salts, when exposed to light in contact with glycerine, were much more rapidly affected than when glycerine was absent; in order to test this matter directly, paper was coated with the oxyfluoride of uranium, and exposed to light at the same time as a paper sensitised with the same salt to which some glycerine had been added. The result was that in one-tenth of the time required to impress the former the uranium and glycerine paper was fully printed. We then have the two statements made—first, that the ammonia-citrate is the most sensitive of uranium salts to the action of light; and, secondly, that the addition of glycerine exalts the sensibility of all uranium compounds.

On the last point we may remark that the function of the glycerine in this process, as in many others in which it is employed, appears to consist chiefly in its power of retaining the film or surface in a moist condition. It is well known that uranium salts and most others which are affected by light are much more speedily acted upon in the moist than in the dry condition. As illustrating the difference in sensitiveness between moist and dry silver salts, we may cite the result of some old experiments which appeared to us, at the time, to point out this difference in a striking manner.

We took a good iodised collodion containing very little bromide, coated some plates with it, and, after sensitising in the usual bath, we washed the plates thoroughly in water, so as to remove, as far as possible, all traces of nitrate of silver from the film. We now took two of these plates—one of these we coated with a weak solution of yellow prussiate of potash, and then allowed to dry before exposing in the camera. The second we coated with the same solution of the yellow prussiate, but exposed wet. When placed in the camera, under precisely similar circumstances, we found that the wet plate was extremely sensitive, and a good negative could be obtained after a few seconds' exposure, while the dry plate required three minutes before any appreciable result could be obtained. As contrasted with tannin under similar conditions, the wet plate was *more* sensitive than one coated with tannin, and the dry plate greatly less sensitive than the corresponding dry tannin film.

These experiments seem to show that not only does the nature of the re-sensitising substance—if we may use such a term now—materially affect the result, but the condition as regards moisture has likewise a material influence. Ferrocyanide of potassium or yellow prussiate of potash is a crystalline salt the solution of which easily dries up to a residue incapable of retaining water, whereas tannin solution yields on evaporation a gummy varnish, which only gives up the last traces of moisture when exposed to a considerable heat. The value of a preservative may, therefore, as often be determined by the power which the film possesses of retaining much water as by its specific power of acting as a reducing agent for silver compounds which have been exposed to the action of light.

ACCELERATION OF EXPOSURES.

Second Notice.

I now propose to take up this matter where I left it in my last article, and to explain how it is possible to some extent to take advantage of *reflected*, as contra-distinguished from *diffused*, light within the dark slide. But, before entering upon this, I may be allowed to express my satisfaction that the views and suggestions stated in my former paper appear to be strongly supported by the practical observations of some who have used diffused light in various ways with advantageous results. Such testimony goes far to show that the theory has a foundation of truth to rest on, although I have not yet had the opportunity of attesting it very strongly myself by camera work. Should the way and manner in which diffused light operates on a sensitive plate be more fully understood by this discussion, there cannot be a doubt that it will be found usefully available for more purposes than can well be anticipated at present. Here is one little advantage I have experienced to begin with. I have now made my *dark room* more comfortable to work in than hitherto by the admission of more light; and I have taken all the dark wrappings from my glass bath, so that I can see the plate in the act of being sensitised. The superstitious horror of seeing things distinctly within the dark *sanctum* has thus, I hope, given place to a more *enlightened* belief and better practice. Of course when I get chemicals that will not stand the faintest trace of light without befogging, the former darkness may have to be restored, or the chemicals rejected as too quick for ordinary practice.

I observe that it has been proposed to line the inside of the camera with yellow glass, but I doubt the propriety of having anything with a *glancing* surface in front of the plate under exposure. I would prefer a dead white surface as more safe. Nothing, I think, can be better than plain white paper, such as I understand was used

by Mr. Eastham, of Manchester, and which is the material that I have myself to some extent tried.

Now, as respects the dark slide, let us see if anything can be done here to assist the general illumination.

My impression is that what are called rich creamy films are considered, as a rule, more sensitive than films of a thin and semi-transparent character. There may be exceptional cases—that is, some collodions which yield a film of a thin transparent character may be more sensitive than others which give a more opaque film; but the chemicals being otherwise equal or similar in their nature, I fancy the general testimony is that the more opaque film (within, perhaps, certain bounds) will be found the more sensitive. In my present remarks I assume this to be a fact borne out by general experience. What, then, is the reason of this? One rather evident reason seems to be that the opaque film interrupts and absorbs more light than the transparent one. What penetrates the film and sinks into the dark ground behind goes all to waste. It is only the light that is caught and stopped by the chemicals within the film that disturbs their molecular quiescence. A perfectly transparent film might naturally be expected to be very insensitive.

These ideas are further borne out by another circumstance. Wet sensitised films are generally found more sensitive than dried ones, whatever be the preservative used; and this accords with the fact that sensitive films become more transparent on drying. There is thus a loss in the power of light brought to bear on a dry film as compared with a wet one. Of course I am aware that the dry state of the film may in other respects be hostile to sensitiveness, but I am at present only referring to that phase of the question which envolves the waste or loss of light.

In the dry processes, however, and sometimes in the wet, we have often to work with very transparent films; and the question is, how can the light in such cases be best economised.

I have now been a good deal accustomed—chiefly by means of one or other of the dry processes—to take reversed negatives in the camera for the purpose of printing with certain of the carbon processes for which this sort of negative is required. There is no difficulty in taking such negatives, and if what is called "colourless glass" be used there is scarcely any loss of light by transmission through the glass. If there be any loss, this, I think, must be more than compensated for by backing the plate in the slide with a sheet of clean white paper. It should be padded so as to be kept close to the film. Indeed, I see nothing to hinder the use of a mirror or polished surface instead of white paper in this case; only the common glass mirror would not answer well, as the reflecting side would not be sufficiently close to the film, and, if it were not quite close, might produce optical halation.

It will at once be evident how the white paper or reflecting substance at the back of the film operates. Whatever light penetrates through the film is immediately reflected and transmitted a second time through the film, or absorbed within it from behind. The sensitive film has thus nearly the same advantage as if it absorbed all the light on its first passage, or at least was struck by it, and reflected what it did not absorb. By the re-transmission of the light which has passed through to the back, the exposure must in a considerable degree be accelerated.

To this plan, however, I am prepared to hear an objection started. It may be said that it is only the more powerful lights that will penetrate the film and be reflected, and that these would be better shaded or otherwise modified, as witness the efforts that have been made to shut out light in certain cases by means of sky and cloud stops, &c. There may be some truth in this, and the arrangement that I have mentioned may not answer for universal adoption. I merely state the method for what it may be worth, and for use only where it may be thought an advantage. But I think it will be found that not only the high lights, but a large proportion of the half-shades, will be promoted by the above arrangement. I have not yet tried landscapes, but I have tried some portraits by this plan, and found that a peculiar softness of shade was produced, considerably different in appearance from ordinary photographs. Besides, in regard to landscapes, it has generally been considered desirable to have sunlight when taking these. In dull weather, however, the white padding may be found an advantage in heightening the contrasts. This arrangement in connection with the white lining in front may perhaps produce as much illumination within the camera as will be found desirable in ordinary circumstances.

But, farther: the white backing may be varied to suit particular cases, and to produce special results. For example: it has often been made matter of complaint against photographs that there is usually a want of illumination in the foreground of views. Might not this be obviated, to some extent, by a graduated sheet of paper behind—dark opposite the sky, and graduating into white towards the lower part of the picture? Or suppose that a lens has a tendency to give too much illumination in the centre (some would say get a better lens), the back paper in that case could be darkened in the centre, and graduated into white towards the edges where more light is required.

It now only remains to be inquired how far the arrangement I have been attempting to explain can be applied to wet or dry plates exposed with the film in front of the glass, and on the side next the lens in the usual way.

The only thing that occurs to me in regard to this is, that the film would require to be spread upon a *white ground*. Opal glass might be used—best, of course, having only one side opalescent—so white as to promote rapidity of exposure, and so transparent as not greatly to retard printing. For some pictures rapidity of exposure is the all-in-all. A little delay in the printing is a matter of very subordinate importance. Even with ordinary glass to be used for this purpose, where the collodion does not yield dense films but is otherwise good, I see nothing to prevent that side of the plate which is to support the films receiving a previous coating of albumen, or gelatine, or suitable varnish, mixed with some semi-transparent neutral or neutralised white pigment, which, while it would be more transparent than paper for printing through, would be sufficiently white and opalescent to compensate for any over-transparency in the collodion, and give the negative during exposure the benefit of reflected light in the camera. In this case, also, there could be no sensible halation. And, by the way, would not this be as good a plan for preventing halation as the method so frequently resorted to of smearing the back of the glass with yellow and black paint?

It will be seen that the above suggestions for the use of *reflected* light may be available in the case of semi-transparent films, but can be of little service when the films are sufficiently dense to interrupt the whole or greater part of the light thrown upon them. It should be remembered, however, that if the rest of the camera be lined with white, then it is important, in order to generate diffused light within the camera, that the surface under exposure to the lens should possess a rather high tone of whiteness in whatever way produced; for it is chiefly by the light reflected from this surface that the front part of the camera can be filled with a subdued radiance to react upon the plate, and this might be further assisted by the frame which holds the plate being whitened.

It would not be difficult to construct the dark slide so as to throw weak or reflected light on the back of the plate during exposure, if that should be thought of any benefit. In this case the back door of the slide could be made of yellow glass, which might be uncovered in whole or in part during exposure; or a white surface could be given to the back lid inside, to reflect such light as might pass through the plate. In this case the back lid would require to be at some little distance from the plate, perhaps a couple of inches or so, to allow the reflected light to spread well. But, while I make these suggestions, I believe it will be found most effective that the diffused or reflected light, in whatever way produced or admitted into the camera, should be brought to bear on the face and not on the back of the plate, so that the faintest impressions from the lens may have the full benefit thereof.

But I need not weary my readers with suggestions of a purely mechanical description. If we are now to hold it as a well-established fact that either diffused or reflected light is an accelerator of impressions in the camera upon sensitive plates, then we may be sure that practical men will soon find out the best way of using it. I shall merely say here that I suppose it will be judicious, if not absolutely necessary, always to subordinate it to the principal exposure; but this may vary, and be regulated somewhat by the nature of the developer intended to be used. The exposure to diffused light may sometimes be carried so far as slightly to veil the negative without material harm. Indeed it may often be necessary to go this length in order to make sure that we have got the full benefit of it for bringing up the fainter details. These details, from their additional exposure to the influence of the light, should in developing keep in advance of those parts which have only received the diffused light and nothing more; and so soon as the details are fairly up the development can be stopped. Farther development could do no good, but harm. Fixing and further intensification, however, would still be available.

Bridgend, Perth, November, 1869. WM. BLAIR.

ON THE MIXED NITRATE PRINTING BATH.

IN photography, as in theology, there are frequently conflicting opinions entertained. The nature of the action of light upon the sensitive plate is a subject upon which there is more than one theory;

and, descending into the more practical details of our art-science, there is scarcely a subject on which perfect unanimity prevails. Take the tannin process, which is, or at any rate was, *the* dry process recently taught in King's College. If the opinions of practical photographers be ascertained respecting its merits, it will be found that while some try it and are successful, others try it only to abandon it in favour of some other of the numerous dry processes now before the world.

The addition of the nitrates of soda or ammonia to the printing bath is one of those matters on which there are *two* opinions. Many photographers possessing skill and experience use this mixed bath because they find qualities in it not to be found in a simple bath of nitrate of silver; others, equally skilful, try it without finding any advantage. It is to be presumed that the conditions under which each class works are different. A tries it and succeeds; but because B is not equally successful he ought, previous to a proclamation of its failure in his hands, to ascertain from A the conditions of success. The articles which follow represent conflicting phases of opinion, and we print them in the order in which they have reached us.

Mr. Henderson's rejoinder to Mr. Dawson's last article on the subject was received within a day or two after the appearance of the latter communication; but as he referred to the experience of a skilful and well-known professional printer, Mr. Bovey, we sent a note to the latter gentleman, asking him to state whether he still used the mixed bath. His reply was courteous and prompt, and will be found following Mr. Dawson's article below.

Meanwhile a communication has been received from Mr. Dawson, in which he gives the replies to questions put by him to several professional photographers. Mr. Henderson, it will be observed, has kindly offered to give Mr. Dawson a practical demonstration of the advantages to be obtained by the addition of nitrate of soda—an offer of which Mr. Dawson will, no doubt, avail himself, and thus ascertain the conditions under which he has failed to succeed. Of one thing we have long been aware—very brilliant pictures have been obtained by the weak mixed bath, and medals have been awarded at some of the exhibitions to pictures which we know to have been thus printed.

"It never rains but it pours." We have, since writing the above, also received a letter on the same subject from Mr. George Price, which will be found among the correspondence; and to Mr. Price's letter, as well as to the contributions of our other three friends here appended, we direct the attention of our readers. The subject has now been discussed so thoroughly that we cannot devote more space to its consideration.

We now introduce the three communications referred to:—

I was much surprised, on reading Mr. Dawson's article in the Journal of the 12th inst., to find that he was still prejudiced against the use of other nitrates than that of silver in the printing bath.

The theory of the subject has been so fully treated by Mr. George Price in your pages I thought there could be no more cavilling about the matter. It would appear—so I am informed—that Mr. Dawson makes no secret of his not having read, and of his having no intention of reading, Mr. Price's articles. If such be the case, the loss is his own.

I put aside the theoretical consideration of the subject, for your readers are more interested in the practice of the mixed nitrate printing baths.

I should like Mr. Dawson to say what weight *his* "extensive" practice and experience can have compared with those of Mr. Bovey, my own, and thousands of other practical and professional photographers. My own experience alone amounts to having printed upwards of a hundred reams of paper on this mixed bath.

As the first introducer of this bath it would be expected that I should state its capabilities. To do so it would only be reiterating what has been written over and over again. But if Mr. Dawson is really open to conviction I will, after he has read what has been written on the subject, have much pleasure in devoting an hour or two to giving him a practical demonstration of its virtues, any time, by appointment, at my printing works at New Cross.

November 15, 1869. A. L. Henderson.

Since the subject of the utility of nitrates other than that of silver in the sensitising solution for albumenised paper has been again brought forward—I hope for final discussion—I think it would be better, should we be already possessed of sufficient information, to get the matter settled with all convenient speed.

I knew I was running a tilt against the opinion—well or ill-grounded—of some of the readers of, and writers in, this Journal when, recently I combated some of the ideas contained in Mr. Nicol's paper read before the Edinburgh Photographic Society, and when in the same article I expressed a conviction—founded on most careful, extensive, and, to me and many others, conclusive experiments—that nothing was gained by adulterating the nitrate of silver printing bath with other nitrates. In this position I should have allowed the matter to rest, basing the truth, so far as I could ascertain it, on purely experimental evidence; but it would appear that everybody is not disposed to "rest and be thankful" or to chime in with my ideas.

From the append to my article it is not apparent whether the writer has himself investigated the subject, and, if he has done so, it is clear he has omitted, probably from oversight, to supply those most important items for experimental verification, namely, the quantities and proportions of materials.

It is no convincing evidence in favour of any alleged physical or chemical fact to quote the experience of an unnamed photographer and an unnamed albumeniser in favour of the nitrates.* I have heard several vague tales of great results brought about by similar means; but, in every instance wherein I had an opportunity of probing this same nitrate quicksand to the bottom, I have found the whole affair to be a haphazard sort of work, going on and carried out without the operator's knowing the definite quantities of the various nitrates used in the sensitising bath, and, worst of all, without having any knowledge of the equivalent of salt used in his albumenised or plain paper. Opinions founded on information derived from such loose information, although they are worthy of full investigation, amount to nothing less than photographic fancies, and should have no place in the chemical or physical demonstrations of our science.

But, not content with resting my conviction on past experience, I have gone still farther. Since my article appeared (some weeks since), I have taken the trouble of repeating and extending a great many experiments in the same direction, the conditions being—paper prepared with albumen, undiluted, one ounce, and chloride of sodium ten grains; the sensitisers from ten to fifty grains plain nitrate of silver to each ounce of water, and similar solutions containing amounts of nitrates of ammonia, soda, or potash varying in strength up to nearly the point of saturation. When the weights of the alkaline nitrates in proportion to the silver stood very high—say fifty to seventy or more of the former to fifteen or less of the latter—there was appreciably less tendency to dissolve off the albumen than was shown by a solution of plain nitrate of silver, but, at the same time, the process of sensitising went on more slowly. This latter fact could be accounted for by the greater mobility of the rarer liquid, whereby the particles of silver could be more rapidly brought into chemical contact with the matter with which it had to combine; and the other fact may be explained by an extension of the same physical principle to dense fluids, which, other things being equal, act more rapidly as solvents exactly in proportion to their greater mobility.

My later experiments have shown that the *nitrates* which have been specially recommended are not the only bodies which might be used. *Sulphates*, or other substances which give greater density to the bath without decomposing the nitrate of silver, act in the same capacity; and their only action, when used in quantity, seems to consist in retarding the solvent action of water on dried albumen. They do nothing whatever, so far as I can see, towards making the paper more sensitive, or the actinic impressions more vigorous. On the other hand, when the silver solution is weak—fifteen grains or under—and a large quantity of other nitrates are added, they retard sensitising of the paper to the extent of nearly one-third of time.

While making the above experiments within the last few weeks I was afraid some persons might accuse me of carrying them out in a one-sided spirit. To dissipate such an idea, I wrote to several of the *dii majores* of photography and photographic printing, namely Messrs. Bedford, Bolton, Eliot, England, Ross and Pringle, Sedgfield, Wilson, and two others. Without any explanation whatever as to my object in asking for information, I simply put to these gentlemen the compound question—whether, in their practice, they purposely added any other nitrate except that of silver to their sensitising solution for albumenised positive paper; and, if they did so, what advantage was thereby obtained.

From all those to whom I addressed my queries I have had prompt replies, and I dare say if I had put twenty others equally precise they would have been as explicit. This fact shows how willing our great photographers in this country are to communicate their practical information. But as these replies were not asked for the purpose of publication, I do not attach the names of the authors to their respective answers. Each writer, if he read this article, will recognise his own handiwork.

* And yet this is precisely the nature of the evidence given by Mr. Dawson himself in this article. Several names of photographers are mentioned; but, notwithstanding this, the evidence partakes of the anonymous character. We have stated that the "unnamed albumeniser" was *one of our largest manufacturers of albumenised paper*. There is not a *very* large number to whom the remark could refer.—Eds.

No. 1 is very cautious and precise, and does not go beyond the scope of the question. He says:—"Respecting the use of nitrate of soda, &c., in printing, allow me to say I have had no experience, never having used them, nor am I acquainted with anyone that has."

No. 2 says:—"Since we went into the matter together some years ago, at King's College, I have not myself tried the effects of other nitrates, considering our experiments conclusive. I may mention that Mr. —— [his head printer] tried the effects of nitrate of potash but without any beneficial result, and soon returned to our usual *modus operandi*, chiefly on account of the comparative difficulty of estimating the strength of the solution."

No. 3:—"I never add nitrate to my bath in the shape of soda, &c., but I will try them to see if they are of any use or not, and will report to you.* I never use my bath stronger than thirty-five to forty grains in winter, and twenty-five to thirty in summer. With these strengths I have always got sufficiently good tones in my prints without adding any other nitrates to the bath; and, although I may be wrong, I have always considered that these nitrates are favourites only with those who have been in the habit of using 60, 80, or 100 grains per ounce in their sensitising solution."

No. 4 reply is very characteristic of a genial gentleman whom some know, and of a first-class photographer with whom everybody is acquainted by reputation:—

"*I* never use nitrate of soda or anything of that sort in the printing bath. When it was proposed, *our* eminent (you know) firm tried the plan hard. Mr. —— looked after that department, and I took his word for it that it was all *fiddlededee*. Mr. —— also tried it hard, and thought it *fiddlededum*.

"But at that time, as far as I remember, the nitrates were proposed simply as silver savers, and it was probably in this character they were examined. They are rather more recommended as assisting the albumen to stick in its place; and in this light I have never examined them, not having been particularly bothered by the albumen dissolving off. Also I am getting old, conservative, fat, and lazy, and don't experiment now so much as I did at one time.

"I use a little alcohol in my bath. I have tried weak baths, of course; these are from twenty-five to thirty grains, but prefer to *wobble* between forty and sixty grains. Generally, I suppose, my bath would register about fifty grains to the ounce of water—using the ordinary paper found in the market, chiefly ——'s, which, he says, is prepared with albumen one ounce, and chloride of ammonium six to seven grains.

"Please don't *print me*. A professor may confess that his knowledge is limited, but I cannot afford to do so to my customers, and must give them a decided answer, off-hand, on any subject under the sun."

Nos. 5 and 6 replies to my queries are equally explicit. One says in reply:—"I did try nitrate of soda in my printing bath some years ago to save silver, when the wholesale dealers were running us close in prices; but it's all humbug—you lose more in bad prints than you can save in silver."

The other very curtly says:—"I suppose that sort of thing is very likely to be recommended by some persons; but I can do very well without these people and their recommendation too. I use nothing but nitrate of silver."

No. 7 remarks:—"Our printing bath is just fifty grains to the ounce of water, and we add no other substance to it whatever. We have two toning baths, viz., lime for the over-printed, and acetate of soda for the better-timed, prints. As for the papers, we use all and sundry that we can find good."

No. 8, who, of any man I know, has had the most extensive experience in first-class printing, observes:—

"In the face of so much that has been said and written in praise of various additions to the silver bath for sensitising paper, whereby the hope of greater excellence at less cost of production has been so lavishly promised, I could not possibly reject the various adjuncts recommended without practically putting each new nostrum to the test. Consequently, I have, at various times, used the nitrates of soda, potash, and ammonia. I have also used gelatine, sugar, gum, dextrine, &c., and I have persevered in them for months together, but my customers have in each and every case decided the matter for me, by complaining of the work done as not being up to my usual standard of excellence.

"I therefore now, after a series of trials extending over more than two years, have come to the conclusion that there is no substitute (even in part) for good nitrate of silver that will cheapen the cost of the sensitising bath for paper printing, without a corresponding reduction in the quality of the work done."

No. 9 says in reply to my inquiry:—

"I have long ago abandoned the addition of nitrate of soda to the printing bath, as I believe it to be a penny-wise and pound-foolish plan. I never obtained the percentage of silver from my residues when I used it, and although you may get as brilliant prints with a weaker silver bath, yet the printing is much slower and the prints take two or three times as long to tone. My albumenised paper, I am told, contains six grains of chloride to the ounce of albumen. My silver bath is never over fifty grains to the ounce, and I let it go down to forty grains without any harm being done. A little methylated spirit in moist weather is an advantage, as it prevents the paper getting damp and printing a bad colour; but in summer, in very hot weather, it is better without alcohol. In fact, a little glycerine to prevent the paper getting too dry is more the thing wanted. I believe the hygrometric state of the albumeno-chloride has a great deal to do with printing a good rich tone."

* I received a letter the other day from this gentleman, enclosing some specimens of prints. He has tried weak silver baths (twenty-five grains) with and without nitrate of ammonia, and says—"You are right; there is no advantage in ammonia. Judge for yourself from the marked prints."—G. D.

Such is a compendium of printing practice evoked by the editorial append to my late article on "nitrates, &c." Many of your readers will, no doubt, be pleased that circumstances have all conspired to render this information particularly valuable and of the highest significance, and to thank your editors for giving me an opportunity of laying such weighty and authoritative opinions before them. But without the evidence of the eminent practical men whose experience I have quoted above, I should still have clung to my present conviction of the inutility of these nitrates in the printing bath, until some one had favoured me with a formula, or even some shadow of an exact formula, upon which I could experiment with success; but, after protracted trial, I must confess my inability to comprehend the possibility of obtaining any gain in sensitiveness, richness of tone, or economy by adding anything which is not organic in its character to the silver printing bath; but if the paper already contains a sufficiency of the organic compounds along with the chlorides, there is little or no use in adding anything organic to, and less necessity for mixing with, the sensitiser any inorganic salt which does not affect its chemical properties.

And now with this—I fear tediously-long article—I hope to have done for ever with the Will-o'-the-wisp extravaganza of useless nitrates in the printing bath. Years ago I fought against this same nitrate fallacy in the midst of a wild outburst of reasonless opposition, after proving by careful experiment the inefficiency, or rather *deficiency*, of such additions to the sensitising solution. But, by the kindly co-operation of some of the most eminent photographers and printers of the present day, whose evidence is reported above, I trust the lingering shades of the "nitrate ghost" are at last banished to their proper regions of eternal oblivion.—*Requiescant in pace.*

George Dawson, M.A. Ph.D.

Although I have experimented with other nitrates besides that of soda, my chief experience has been with the soda, as I found that no advantage was gained by substituting other nitrate salts for my favourite nitrate of soda.

I commenced using this last-named salt as an adjunct to the sensitising bath in the year 1863, and have continued its use up to the present time with much satisfaction and pecuniary profit to others as well as to myself. With the nitrate of soda and silver bath I have sensitised many dozens of reams of paper, and have printed many thousands of prints of all sizes. All the copies of *Sleep* (Mr. Robinson's picture) hitherto published are examples of the capabilities of the mixed bath. Also the *Mountain Dew Girl*, *Going to Market*, and several other of Mr. Robinson's productions afford further proofs of the virtues of the printing bath I use. I might name many other works of renown, but I have introduced sufficient to answer present purposes.

One of the chief advantages I find in the use of nitrate of soda is an entire absence of that discolouration which always accompanies the use of nitrate of silver without any adjunct. For a long time I was impressed with an idea that the nitrate of soda rendered a passive, not an active, kind of help. I have, however, changed that opinion, and now believe that the manner in which it assists in keeping the albumen intact, also the readiness with which any deposit of discoloured albumen is filtered clear of the mixed solution, offer proofs that the nitrate of soda aids chemically; but in what manner I am as yet unable to decide, and all my attempts to clear this matter up satisfactorily remain of no avail.

Many persons have heard of the nitrate of soda bath dissolving away all the albumen from the surface of the paper. Too much nitrate of soda and too little nitrate of silver, I fancy, must be the cause; as, in all my experience with the papers of every known make, I have never seen the surface removed by the nitrate of soda bath. It is not impossible that papers spuriously prepared might be found to lose their surface in the soda bath, but I have never met with such.

Those who have tried the nitrate of soda, and have condemned its use, have done so simply because they have tried it in an impure state. Sometimes the amount of carbonate of soda mixed up with

the nitrate of soda is so great that nearly, if not quite, the whole of the silver has been precipitated; and, even when a pure sample of nitrate of soda has been used, the experimentalists have stuck so close to the minimum quantity of nitrate of silver admissible that they have found their prints poor and flat, and their solutions speedily attaining the colour and consistency of treacle.

My own experience all points to one great principle—no matter what adjunct is used, *be not too sparing of silver.* I never allow my bath to fall below thirty grains; at that strength good prints can be obtained.

I have introduced this method into many establishments, notably into that of Messrs. Maull & Co., where it has been in use for several months; and my friend Mr. Smartt is so pleased with the certainty of my method of producing prints throughout, that he has made up his mind to seek no further change; "for," said he, "if I change, it must prove for the worse, as to better it, either for ease, simplicity, or certainty, would be a thing impossible." W. T. Bovey.

November 26, 1869.

THE LATE NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

After an existence of upwards of twelve years the North London Photographic Association has at length executed its own "happy dispatch," and has breathed its last. For a considerable period the defunct Society has been in a state of desuetude, but at length, of its "own motion," it made up its mind to put an end to its career.

The North London Association was founded in March, 1857, by a few gentlemen, among whom we find the names of Mr. Barnett (who has been for so many years the energetic Honorary Secretary), Mr. George Shadbolt, Mr. Hill, Mr. Barber, Mr. Hislop, and others.

Mr. Shadbolt for several years presided at the meetings, supplying the place of the President, Mr. Charles Woodward, F.R.S., who had, it appears, only been nominated to that office in recognition of his services to science as displayed in his investigations into the phenomena of polarisation of light. As a practical photographer, or even as one who had investigated the conditions under which photographs were taken, Mr. Woodward seems to have been quite unknown. As he is said to have attended only one meeting of the society over which he was supposed to preside during the whole period of its existence, it cannot be said that the late President had *ceased* to take an interest in the Society's welfare.

For seven years after its formation Mr. Shadbolt usually occupied the chair, and under such an able Vice-President the Society enjoyed uninterrupted prosperity. Not only was Mr. Shadbolt thoroughly conversant with the subjects introduced for discussion, but he possessed the tact of "drawing out" the opinions of the numerous members who during that period were wont to attend the meetings. To become a good chairman tact is even more requisite than knowledge, and our friend Shadbolt possessed both; hence we can account for the palmy days which existed during the time he held sway.

From various circumstances—one of which may be said to be the spread of the volunteer movement, by which the rifle proved such a powerful rival to the camera—the members of the Society had been for some time taking less and less interest in its proceedings, until at the last few meetings preceding its demise only from one to four or five members were present during its proceedings, and this in *a Society which had to its last day nearly a hundred paying members on its list*, and considerable funds in hand.

It seems almost impossible to mentally realise such a fate under such circumstances. In a sense—though in one sense only—the Society "died in harness." Never was there a similar body—except, perhaps, the still flourishing Edinburgh Photographic Society—which had to contend with fewer difficulties. A hundred paying—or, rather, paid-up—members, and a fair balance in hand! Let us inquire into the cause of the Society's demise.

At the helm of its affairs were able business men, who not only so managed its commercial transactions as to steer it clear of debt, but contrived to return to the members a large proportion of their half-guinea subscription in the form of presentation prints. Eventually the bonus in the shape of prints became so large that, in addition to enjoying all the privileges of membership, each of its members had sometimes, of late years, received prints of the retail value of thirty shillings! This soon attracted to the Society large numbers of persons who were not photographers, and probably cared nothing for photography, but who were alive to the advantage of obtaining pictures on the exceedingly advantageous terms just mentioned.

Some time since there was a trial of strength (or something akin to it) between the two classes of members composing the Society—the executants, or practical men, and those who were merely nominal members, having a keen eye to the presentation prints. Many of the former desired to unite with the South London Photographic Society; but, on the votes being taken, the majority were recorded in favour of a continuance as an independent body. Since that time the attendance at the meetings had gradually become smaller, until at length it was found necessary to issue a final "winding-up order."

Allusion has already been made in this Journal to the fact that many active members of the South London Photographic Society—whose meetings are held in the City of London College, *north* of the Thames—either reside or have their places of business in the northern portion of the metropolis.

It may here be worth while inquiring if the time has not come when the latter society might advantageously change both its name and its place of meeting without making any further alteration in its constitution. Its name does not convey a proper idea of its *ctientèlle*, and the place of its meeting (Leadenhall-street) is neither central nor well chosen for those who reside either in the northern or southern suburbs—for few, if any, photographers reside in the city.

But to return to the body which has just "paid the debt of nature." The North London Photographic Association has done good service in its day to our art-science. It has had an active Secretary, whose situation was purely an honorary one, although the members marked their sense of Mr. Barnett's able services by presenting him, in 1866, with a handsome clock. The number of members at the close of its first year was fifty-seven—a number which afterwards, at one time, rose as high as 117, while at its demise the number of enrolled members was ninety-nine. Perhaps the lamented deceased may be said to have died of plethora, for with a restricted treasury and a more energetic body of members its collapse might, probably, have been prevented. Let those societies who imagine that they are placed in circumstances of adversity take comfort when they read of the fate of a body that, financially speaking, was always in smooth water.

A POOR MAN'S PHOTOGRAPHY AT THE GREAT PYRAMID, COMPARED WITH THAT OF THE ORDNANCE SURVEY ESTABLISHMENT, UNDER THE ORDERS OF COL. SIR HENRY JAMES, R.E., AT THE SAME PLACE FOUR YEARS AFTERWARDS.

COPIOUSLY ILLUSTRATED WITH TRANSPARENT PHOTOGRAPHS ON GLASS.*

Alas! how seldom does it happen that a scientific man can set to work at his most favourite and even important subject of research with all the instruments of observation and apparatus of record that his intellect imagines or his heart desires!

At all events, in original inquiries, in the pure walks of science for its own sake alone, the usual question with each ordinary private scientist is *not* "What is the most powerful machine that can be brought to bear on some difficulty in knowledge or obstinate mystery in nature?" but, "What is the cheapest possible method by which any sufficient result may haply be obtained?" And if this be the prevailing form of the apparatus question at present in the general branches of practical science, much more must it rule in the particular branch of *photography* which, according to its scale, eats off its head in silver baths; and much more entirely must it dominate there when that photography is being exercised during travel in foreign parts. Yet every traveller in strange lands ought to photograph, and the vital problem, therefore, is, "How shall such traveller, if a poor man, accomplish it?"

Now pray do not fancy that because the man is poor his work must, therefore, be necessarily bad, and his experiences uninteresting; for some of these same poor men are precisely the most ambitious souls after excellence in all society. Urged, too, by their very poverty, they often strike out useful inventions; and though, if measured by a mere material foot rule, their instrumental apparatus may too often appear pitiably small, by exactly so much has it more promise of entering into, and passing through, the eye of the needle of nature than the ponderous coaches of the rich.

Many other poor men before me have already described to this Society, and many others after me will also, I trust, continue to describe, how they have accomplished one difficulty or another in photography, despite slender means and forbidding circumstances; and I therefore only appear now as one of a large and acknowledged band of workers, neither the first nor by any means the most worthy, but simply as one under a very peculiar pressure—as one compelled

* Read at a meeting of the Edinburgh Photographic Society, December 1, 1869.

by a sudden combination of rich, hasty, and unscrupulous opponents either to speak out on the instant before the world, or to let his favourite subject of study, during several earnestly-spent years, disappear at once and for ever beneath the heap of erroneous assertions, disparaging treatment, and *bad* photography which those opponents have freely cast upon it.

What, then, can a poor man, and one who believes in the truth of his subject and goodness of his cause, choose to do in such a case, than make a stand and speak out?

But will the Society care to hear much of what he has to say? That will doubtless depend in part on the intensity of the difficulties struggled with, and the degree of success with which they have been overcome. These points, therefore, I will first discuss, and treat them in and for themselves alone; and then, if you still approve, we will apply the final test, or that of comparison with the works of the opposite party.

How the Poor Man Photographed in Egypt.

When I went to Egypt just five years ago, I went—though accompanied, encouraged, and assisted by my constant helper, the partner of all my joys and sorrows—still I may say generally that I went a private individual and a poor man. I alone in this country—save, perhaps, one other person—then saw the exceeding importance of modern scientific examination being applied without further delay to that most ancient architectural monument of all the earth, the Great Pyramid. I alone would run any risks with regard to it; and, therefore, except the helping hand which one acute reasoner and far-seeing as well as generous-minded man voluntarily and spontaneously held out, I was left by both Government and all other authorities to find my own way to the Pyramid, and pay all expenses there out of my very slender salary, not calculated to bear any such burden.

The strictest economy, therefore, had to be the order of the day; and as several other subjects of scientific observation, of a very engrossing character too, required prior attention, there was sadly little left for photography.

But photography must be taken; for what monumental research of the present age can be effectively treated without its marvellous aid. It *must* be taken, but the apparatus could only be *very* small.

Method for Single Negatives.

So far as dry plates were concerned, I had a camera capable of taking negative pictures so large, for me, as three inches square, and I live to regret the extravagance; for the special apparatus which I had also made at the same time for wet plates showed that one inch square, or, indeed, only as large as one's thumb nail, was quite enough, if properly employed, for any ordinary angle of view.

How that wet-plate apparatus, in taking single negative pictures, was managed, I do not enter into now; because in the month of May, 1866, when my own time was over-occupied in preparing my book, ***Life and Work at the Great Pyramid***, the novelties of the method were described—and very well described—to this Society by the then able Secretary, Mr. John Nicol, and his account was reported in full, as well as illustrated, in The British Journal of Photography for June 8th of the same year.

Method for Double Negatives.

But the taking of the double or stereoscopic negatives was not then touched on; and as they furnish points illustrative of the restless craving after improvement properly characteristic of the poor man, and not unworthy of adoption elsewhere, I will venture to say something upon them now.

While the rich public has, of late years, generally settled down into a state of apathetic content to have their stereographs of every kind of subject, with the single exception only of the sun and moon, treated with no more stereographic power than that resulting from the three-inch distance apart of the lenses of an ordinary binocular camera (an unhappy invention, from the date of which the present decay of public interest in stereographs took its rise), the *poor* man, in this case, provided himself with two separate cameras, capable of being fixed, according to the subject treated and the purposes it was wanted for, at any distance asunder, from three inches to three feet, and occasionally much more. And he applied to the two cameras a connecting-bar to make the motions of their nternal shutters—already described for a single instance by Mr. Nicol — exactly similar, simultaneous, and instantaneous also, if required.

This double apparatus I now exhibit, battered and bruised, as it came home from the campaign of the pyramids four years ago; and you will observe that one movement of one hand in one direction is nabled both to open and close the apertures of both cameras either quickly or slowly—slowly enough to suit the faintest objects at sunset; or quickly enough, as actually proved by an experiment, to take a bird on the wing.

Method of Single Copying.

Let us now suppose that all the negatives required have been taken in the field, and by two opposing parties. The rich man's servants have brought home his large glass plates in ponderous boxes; and then they busy themselves, according to his orders, in copying the negatives by the simple mechanical method of superposition, producing thereby positive copies in either silver or carbon, photolithography or photozincography—a dull and not very prolific or suggestive method, because it merely reproduces in positive just the scope and scene of view which was taken in by the mere material sides of the camera at the place.

Not so, however, acts the poor man, with his little box of very little negatives brought home modestly in his waistcoat pocket. Therewith he sits him down at a table, having a compound achromatic microscope before him—either the ordinary single one, or a double one like this now exhibited, and intended for viewing two pictures at once stereoscopically—and then, revelling in the marvellous magnifying power of that admirable optical instrument of modern times (which we owe to the father of the latest-elected, and not the least, of the professors in the Edinburgh University, Mr. Lister), the poor man wanders at will, truly the monarch of all he surveys, over the various parts of each picture; recalls all the circumstances under which it was taken; discovers characteristic detail which he never dreamed of before; and then—each picture you will remember having been taken *square*—he decides whether a positive copy should be taken as a long, *i.e.*, horizontal, rectangle, or as a tall, *i.e.*, vertical, rectangle; whether it should include from side to side of the negative plate, or stop short of its extremer parts; whether he should give more preponderance to the sky or to the foreground; or whether some special scientific purposes may not be better served by extracting one little subject alone out of the whole scene, and making a very highly-magnified picture out of that one item by itself.

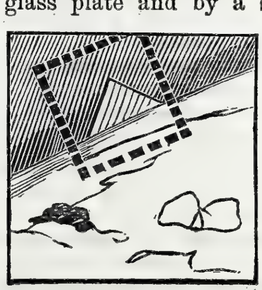
With all these notes taken at the microscope, the poor man then inserts his little negative into a copying and magnifying camera, and proceeds to realise all these various positive pictures, hitherto only sketched out in artistic or scientific idea, and makes them of any size that he can afford.

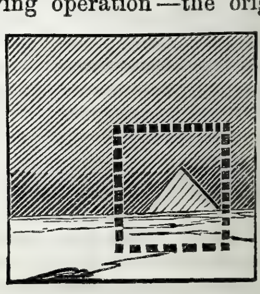
The twelve small pictures shown at the upper end of the room are a sample of about 150 that I prepared in this way for the oxyhydrogen lantern, and of which the more effective have been exhibited again and again on large screens before many public audiences. The rather larger ones at the lower end of the room are the remains of a set of about sixty, twice partly exhibited in public, and were prepared originally with a view of making octavo-sized book plates; while the middle set of twenty quarto-sized glass plates are the commencement of a new series never exhibited in public before this evening.

In the way of definition, I may call attention to No. 24; for, although it is magnified up to 10 × 8 inches from one of the small or one-inch-sized negatives, and although the Arab before the tomb door occupies only a subsidiary portion of the whole scene, yet the threads composing the cloth of his garment are discernible in those parts not affected by his breathing. No. 25, on the contrary, is an example of bad definition; but that is from a dry plate of the needlessly clumsy size of three inches square.

Method of Double Copying.

So far, then, for single copying. For the stereoscopic copying, however, there was required something more than the ordinary "copying and magnifying" camera. Seeing that the problem in this stereoscopic work is, given two pictures on separate glass plates, it is required to make a stereoscopic pair from them, or any small part of them, on one glass plate and by a single copying operation—the original





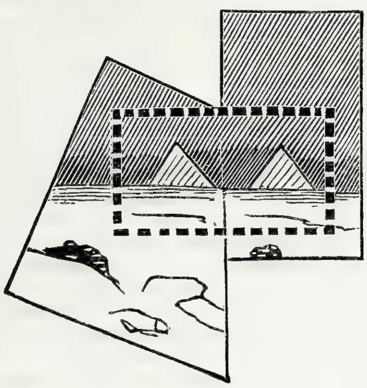
pictures, too, being perchance by no means symmetrically placed (by error of adjustment of the glasses in the bath, slides, or otherwise) on their respective plates, as in these two diagram examples, where

the dark surface shows the sky of the negative, and the small dotted rectangle the only portion of the whole scene required for the stereograph now in hand.

We must begin, then, here with a new copying camera, or a new head to the old one, having two object glasses, distant from each other, horizontally, centre to centre, a quantity to be decided by the eyes and stereoscopes afterwards to be employed in viewing the finished pictures; and which distance I have settled for myself and a superior class of achromatic stereoscope I have recently constructed at 2·7 inches.

We next put the two negatives into a double frame, like this now exhibited, to carry them in front of the object glasses; each half of the frame being so provided with three adjusting screws and antagonistic springs that each negative may have three motions given to it independently of the other, viz., horizontal, vertical, and rotatory in its own plane. By these means we may get the magnified images of the required parts of the negatives on the greyed focussing glass very exactly side by side, on a level and also with their objects in their own middle pictorial distance, at the precise 2·7 inches apart—a very important feature to be attended to for the comfort of future spectators.

But we cannot yet take a copy of these semi-Siamesed fragments on a photographic plate, because the images of the parts we want are overlapped or even covered by images of parts we do not want. To remedy that evil a vertical axial diaphragm, also now exhibited, is introduced inside the copying camera, toothed to avoid reflections of light being thrown towards the picture, and pushed up just such a distance in front of the ground glass that, while it still completely prevents one picture overlapping the other, it at the same time annihilates its own shadow and allows one picture to melt into the other at an invisible line, thus—



and we may then copy off, on a single stereoscopic glass plate of the usual size, just the double rectangle marked out, neglecting all other parts of the two pictures necessarily, because they are beyond the limits of the said stereo. plate.

In this manner have been prepared the twelve stereographs now on the President's table—all prepared from various parts of these same small, or one-inch-sized, negatives, but all equally magnified up into pictures 2·7 inches broad and 3·25 inches high; and I leave it to members, after the formal meeting is over, to try them, and say whether they do not find both a satisfactory amount of stereoscopic effect and no strain on the eyes—at least, when they look at them with the form of stereoscope which I have arranged for myself and for these Egyptian pictures; the chief characteristic of such stereoscope being achromatic lenses of unusually large diameter and short focal length, together with a right and left-handed screw movement for the convenient alteration of the distances of these lenses apart to suit the eyes of each spectator. Indeed, the last adjustment is so exceedingly important to get the best optical performance without strain on the eye and the brain, that it is my private opinion that no stereoscope should be offered for sale without it.

C. Piazzi Smyth.

(To be continued in our next.)

ON PRINTS AND THEIR PRODUCTION.

On Wednesday evening an elaborate paper *On Prints and their Production* was read at a meeting of the Society of Arts by Mr. S. T. Davenport, one of its officers.

After some remarks of a historical nature, Mr. Davenport passed under review the various processes employed in the production of prints, such as wood engraving, line engraving on metal plates, chalk or stippled engraving, mezzotints, aquatinta, and lithography. He then treated at some length those processes which depended upon photography for their existence, such as photogalvanography, Woodburytype, Swan's carbon process, photolithography, prints from gelatine, the process of M. Tessié du Motay, and the Albertype. He concluded with some observations on composition photographs, which, together with a general *resumé* of the topics treated, are here subjoined:—

Composition Photographs.—Let us return for a moment to the subject of photography proper. It may be urged by some that it is, after all, only a copyist's art, and, as such, has many limits placed upon its powers which the skill of the artistic draughtsman overcomes, but which the photographer cannot overcome. To this I would reply, by admitting that there is much in nature and in art which photography cannot be expected to copy. Mind acting on matter may change the condition under which natural objects are represented, but the camera cannot alter the condition under which nature is seen. Nevertheless, we must not come to conclusions too hastily as to the unfitness for, and inability of, the photographic artist to create by means of photography as the artist does with his pencil and brush. Composition pictures have already been executed by some able artists, both from natural objects and human models, as well as copies of drawings executed by artists for the express purpose of reproduction photographically. The earliest attempt in this direction was made by Mr. O. G. Rejlander, in a picture entitled *The Two Ways of Life*. It was produced in 1857, for exhibition at Manchester, and the means employed in its production and the picture are fully described by its author in the pages of the Photographic Society's journal, April 21, 1859. The picture consists of thirty figures and a background, and was conceived and executed in six weeks. Each portion of the picture was separately photographed, and then the whole of the parts were printed in their respective positions, and were harmonised at the various points of junction by acting upon the sensitive paper by means of pencils of light.

Such was the first attempt at photographic composition; and I am able, through the kindness of Mr. Rejlander, and his friend, Mr. Greenwood, of Liverpool, to whom the print belongs, to exhibit one of the original prints of that work.

Since Mr. Rejlander's picture was produced, we have had several works of a similar nature, and of great merit, presented to the public, among which, those from the studio of Messrs. Robinson and Cherrill claim priority, both as to date of production and number and variety of subjects. Mr. Robinson's first picture was issued in 1858, and was entitled *Fading Away*. The subject was selected as being eminently unsuited to rendering by any ordinary photographic treatment, and was intended to illustrate the fact that other conditions than those of actual life could be illustrated by its means. This picture was soon succeeded by others, and much adverse criticism followed, based upon ignorance of the means of their production. To correct mistaken notions, and inform the public as to their mode of production, Mr. Cherrill, in January last, read a paper before the Photographic Society, on the *Production of Composition Pictures*, which paper will be found in No. 201, page 203, of that Society's journal.

Messrs. Robinson and Cherrill have produced several most artistic works, some of which I am enabled, through their kindness, to exhibit this evening. The three pictures entitled *Returning Home*, *The Sleepers*, and *Over the Sea* show to what perfection they have now brought the art.

But fresh competitors are daily coming forward to claim the patronage of the public in this direction. Mr. J. Hubbard has issued two or three pictures—one entitled *Blighted Hopes*, another *Stolen Moments*. Of the artist's skill in the treatment and lighting of his subjects it is impossible to speak too highly; they are bright and full of colour, at the same time that they are quiet, and the tale they are intended to tell is easily read and full of interest. The pictures, by the kindness of Mr. Hubbard, are exhibited, and are, undoubtedly, the best of their kind yet produced.

The last work of this class to which I have to refer is full of interest from many other points of view. It is not only the last of the class produced, but it is also one of the largest. It also possesses an historical interest, and its interest is enhanced by the fact that the principal actor in the scene represented has recently passed away. Mr. McLachlan has just presented to the public a large picture, which includes portraits of all the members of the late Famine Committee which held its meetings at Manchester; of that committee the late Earl of Derby was chairman.

I have thus endeavoured to show that the artist photographers not only have the will, but the power, of creating for the public works which possess the richness of colour and pictorial and artistic effects which have hitherto alone resulted from a laborious study and translation of nature, or on to canvas by the artist painter.

From what I have said, it will be seen that we have now attained to a knowledge and use of the following modes of producing prints:—

1. By means of incised or indented surfaces, the design is produced in relief by pressure, and without colour of any kind.

2. By means of incised surfaces, a series of white lines upon a dark or coloured background are obtained by inking uniformly the entire surface of the block, and then removing the ink on to paper by pressure.

3. By means of raised surfaces, as in printing types and most wood-blocks, in which the design alone is capable of being inked, such sur-

faces yielding impressions in black or coloured inks, by means of pressure.

4. By means of incised metal plates, the incisions in which are charged by rubbing into them one or more black or coloured inks, and then carefully removing all the superfluous ink from the surface of the plate, after which it is covered with paper and pressure applied.

5. By using the lithographic stone, and giving one portion of the surface of the stone an affinity for greasy matter, while other portions of the same surface are made to repel it; thus, when ink is applied and afterwards removed by pressure, flat tints or prints from simple lines are procured on the paper.

6. By using a series of surface blocks or lithographic stones, either separately or in combination, from which surfaces various tinted inks or gradations of colour are printed either separately or in combination, as exhibited in illuminated printing and chromolithographs.

7. By the photographic process, in which light, by acting upon the salts of silver or other bodies, decomposes them, and the image obtained in the camera is then fixed by subsequent chemical treatment.

8. By a combination of the lithographic and photographic processes, as illustrated by Mr. Griggs' specimen prints of Indian fabrics.

9. By a mechanical distribution or sealing of a mixture of carbon and gelatine, as in Mr. Walter Woodbury's process.

10. By the preparation of an uniformly dense film of black or coloured carbon and gelatine, and then submitting the film to the partial action of light, thereby fixing and changing the condition of some portions of the film, while other portions remain unchanged, and are subsequently dissolved or melted out.

11. By using the gelatine after it has been chemically prepared and submitted to the partial action of light, as a matrix which is inked and printed from in a manner analogous to the lithographic process.

Let me now direct your attention for a few moments to the prints which are still produced by the processes in use a century since. Engraving for literary and commercial purposes I have stated has been superseded by newer and cheaper processes of production; but from the first introduction of the art of engraving to the present time there have been examples of higher aspirations by both artists and engravers, and greater powers of production than were needed for book illustration. But illustrations of literature, though in the main of a lower type than the examples of art-products I refer to, still served a useful purpose—they formed the training-ground on which young and fresh aspirants for fame tried their skill, and learned to manipulate their tools and materials. I regret that that school and training-ground no longer exists; and though I feel that the productions of the artist and engraver have, up to the present time, not been excelled or superseded by any of the new art-products hitherto produced, still I cannot fail to observe that it is probable that at no remote period engraving, like miniature painting, will have been swept out by the advances which the art of photography is now making. Let us hope that the result may, in the end, be favourable to the advancement of public taste. But so long as the art of engraving does exist, it is to be regretted that unprincipled persons skilled in the practice of modern arts are to be found, who, by copying the works of the artist and engraver which have been produced at great cost, and, following in the steps of the hawkers of Hogarth's time, undersell the original producer, and thereby rob him of his just reward.

Hogarth found his works, as soon as published, pirated on all hands, and the Copyright Bill of George the Second's reign was passed to secure to the artist an exclusive right in the work he had created, and, till a recent date, that right had not been materially jeopardised. But, within the last year or two, piracy has become so common among us, by means of photography, that the patrons of art are likely to be deprived of works such as those now produced by Landseer, Cousins, Doo, and others, by the withdrawal of the capital and enterprise which has hitherto been invested in their production; and it is only just to such persons as Mr. Graves and others that their property should be protected by an improved copyright law—a law such as the Society of Arts has been, for the last two years, endeavouring to introduce to the notice of the legislature, and under which the artist and photographer separately, or in connection with the capitalist, would have their rights defined and protected, and we might then look for a fresh and extended development of commercial enterprise and art-patronage.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Dec. 15th.......	Edinburgh	Hall, 5, St. Andrew-square.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

A special meeting of this Society was held on the 1st instant,—Mr. G. W. Simpson in the chair.

The object of the meeting was to consider the propositions relative to breaking up the Society which had been submitted to a previous meeting, and a copy of which had been sent to each member. These propositions were as follow:—

1.—That the Association be continued as an art-union and club, and that the funds in hand be appropriated to that purpose.

2.—That, in the event of the dissolution of the Association, it is proposed that the funds be appropriated to the advancement of photography, by handing them to the Photographic Society of London in lieu of entrance-fee and subscription for any member of this Association who may join that Society during the present year, such members to be entitled to all the privileges of the Society to the end of its current year without further payment, provided the said Society is willing to accept the funds on such conditions.

3.—That the funds of the Association be expended in the purchase of a photograph to be presented to all members who paid the subscription for the year 1868-9, and the Association be dissolved.

The Chairman referred to the pleasant associations connected with their meeting together as a Society, and the good service to the art that the Association had rendered in its time; but it appeared to be the general opinion that it had achieved its mission, that fact being proved by the non-attendance of members at its meetings and the difficulty of procuring papers to be read. It was accordingly conceived that, seeing that state of things had been reached, it was better to dissolve the Society and dispose of its funds in any manner that might be considered best.

After some conversation of a purely business nature, the votes contained in the letters of absent members were first ascertained and recorded, and the votes of those present taken by ballot. This having been accomplished,

The Chairman announced that as there was a majority of ten for the third resolution, viz., "that the funds of the Association be expended in the purchase of a photograph to be presented to all members who paid the subscription for 1868-9, and the Association be dissolved," he had with deep regret to announce that, in the terms of that resolution, the North London Photographic Association would henceforth cease to exist. Those of them who were still anxious to keep up their interest in the art knew, of course, that there were two other societies still in existence in the metropolis, viz., the South London Photographic Society and the Parent Society. They all knew that both of these societies were in excellent condition; the South London Society being a pleasant and genial body, having good papers read and pleasant discussions thereon. The Parent Society was also in a flourishing condition, as evidenced by the late exhibition. While they were dissolved as an organisation, he had no doubt that they would all frequently see each other at the meetings of one or other of the existing societies named.

The thanks of the meeting were awarded to the Chairman, and previous to the fiat of dissolution having been pronounced, the two albums belonging to the Society, with their contents, were, on the proposal of the Chairman, seconded by Mr. Shave, unanimously presented to Mr. Barnett, who had for so many years acted as Honorary Secretary. A committee was also appointed to procure and distribute the presentation print referred to in the resolution which was carried.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The second meeting of the above Society for the session was held in Craigie Hall, 5, St. Andrew-square, on the evening of Wednesday, the 1st inst.,—Sheriff Hallard, the President, in the chair.

The minutes having been read and approved of,

The Chairman, in opening the proceedings, said:—On behalf of the Edinburgh Photographic Society I have to make you all heartily welcome. This is one of the ordinary meetings of the Society, although from the very attractive nature of the address promised us we are not surprised, but we are rejoiced, to see such a large number of visitors present on this occasion. I have now to call on Professor Smyth to address the meeting.

Professor Piazzi Smyth, Astronomer-Royal for Scotland, then proceeded to read his paper, entitled, *A Poor Man's Photography at the Great Pyramid Compared with that of the Ordnance Survey Establishment, under the Orders of Colonel Sir Henry James, R.E., at the Same Place Four Years Afterwards.* [See page 591.]

The Chairman, on returning the thanks of the meeting to Professor Smyth for his interesting address, said:—I am sure that none of us, in listening to Professor Smyth, found that there was anything tiresome in those details. He possesses, almost greater than any man with whom I am acquainted, the power of imparting a peculiar charm to whatever he touches upon. I am not here to express any opinion whatever on the theory of the Great Pyramid to which Professor Smyth is so much attached. But what we have before us this evening is a contrast between two photographic results—the one produced by an official gentleman, wielding, to some extent, the power of the state, and backed up by the wealth of a very rich lady; while, on the other hand, you have photographic results produced by a gentleman working without these aids, but working with scientific attainments almost approaching to genius, and with the most indomitable perseverance and energy. I think you will soon see, by judging of the results before your eyes, which of these two photographers has come out victorious in the con-

test. One very remarkable object to us is made particularly plain by these results. Their authenticity is such that they fully bear out the Professor's remark that their testimony would be quite unimpeachable in any court of justice. What you see in these photographs is to be seen yonder in Egypt; if it were not so you would not see their image here.

An opportunity was given to the audience, as they retired, of inspecting the large collection of transparent photographs by which the lecture had been illustrated, a list of which will be found appended to Professor Smyth's paper.

At the close of the meeting Mr. William Mackechnie was elected a member of the Society.

The proceedings gave the utmost satisfaction to the large audience assembled, but, unfortunately, the hall was much too limited in dimensions for those who wished to be present.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

A SPECIAL general meeting of the Association was held at the Common Hall, Hackin's-hey, on Tuesday, the 23rd ult., to alter the rules of the Association so that in future the annual meeting for the election of officers should be held in November instead of in January—the President, Mr. O. R. Green, proposing, and Mr. Bell seconding, the motion, which was carried *nem. con.*

In accordance with the foregoing resolution, the sixth annual meeting was held on Tuesday, the 30th ult., at the Free Library, William Brown-street. There was a large attendance.

Mr. O. R. GREEN (the President), on taking the chair, first called upon the Secretary to read the minutes of the previous monthly meeting, which were duly confirmed. He (the Chairman) then gave his reasons for summoning the special meeting, the minutes of which were also read and confirmed.

Judges of the prints sent in for the prize competition were next appointed—these being Messrs. Phipps and Atkins; the Rev. T. B. Banner referee.

A letter was read from the Secretary of the Oldham Photographic Society, requesting contributions of specimens for their *soirée*, to which several members agreed to accede.

Mr. Henderson exhibited some prints on Obernetter paper, and described the mode of using it.

Mr. Sleddon showed an enlargement, some transparencies, and specimens in which quassia had been used as a preservative.

An interesting and practical paper was next read by Mr. Lewis Hughes, on *Photographic Enlargements of Microscopic Objects*, for which he received a vote of thanks.

The judges of the prints having given their decision, the prizes were awarded as follows:—

No. 1. For the best year's work entirely the production of the competitor, to Mr. John Henderson.

No. 2. For the best picture not less than fifty inches area, entirely the work of the competitor, to Mr. A. Tyrer.

No. 3. For the best photograph under fifty inches area, the entire work of the competitor, except preparation of the plate, to Mr. W. H. Wilson.

No. 4. For the best transparency, the plate to be prepared by the competitor, to Mr. Sleddon.

No. 5. For the most artistic photograph, to Mr. John Henderson.

Mr. Henderson, referring to a recent letter in THE BRITISH JOURNAL OF PHOTOGRAPHY, by Mr. Dawson, said that the method there named of preserving collodio-bromide of silver had been practised for years by members of the Association.

The Treasurer then read his report, which was considered very satisfactory.

The Secretary next read a report containing a summary of what the Association had accomplished during the past year. It may be briefly condensed here:—Monthly meetings had been kept up throughout the year, which is not usual in kindred societies. These had fully maintained their interest. There had been a net increase of six members. There had been six papers read on separate occasions. One meeting was devoted chiefly to an exhibition of photographs, and another to a beautiful display of lantern slides by the oxyhydrogen light. There had been six excursions during the year, two of which were of a most enjoyable character—that to the Valley of the Weaver, when a steamer was placed at the disposal of the members by the kindness of Mr. Thomas Higg n, and that to Chirk, when a large party of members and friends partook of the President's hospitality.

The Secretary was next called upon to read the minutes of the Council meeting at which the gentlemen whose names were to be recommended for election as officers for the ensuing year had been agreed upon. As a resolution for the re-election of Mr. O. R. GREEN to the office of President had been carried, that gentleman made the following remarks:—

I now ask you to give your attention to the election of a President for 1870, and in doing so I feel considerably embarrassed. I would be very sorry if, from anything which I shall say, you should form the impression that I think lightly of the honour you conferred upon me at the beginning of the year, and which your Council has recommended you to renew. I consider it a high honour to have been elected by so many of my fellow amateurs to the post of honour in our Association. I only regret that I have been able to do so little to further the art during the past season; and when I have been brought into contact with the energy, ability, and perseverance of some now around me, I have felt a wish to vacate the chair in their favour. During the year 1870 the British Association for the Advancement of Science will hold their meeting in our important town, and in all countries the eyes of men who search into the mysteries and laws of creation will be fixed upon the proceedings. Our Association amongst other local societies will be called upon to contribute something to interest the eminent visitors who will come here to impart, and I hope glean, instruction. It is, therefore, desirable that you should elect a gentleman as President who will have leisure for the occasion. As regards myself, although the spirit is willing, I am certain I shall not have the time to attend to it. I therefore hope you will not be offended by my now asking you to allow me to decline the honour of being your President for the year 1870. I am sure there are others in the Association who have more time, more ability and convenience, and, I may add, are more deserving of the honour than myself. If our senior Vice-President has the time, he has the ability, the zeal, and the interest of the Association at heart, which should make him worthy of the honour. I therefore beg to propose him to you as President for the year 1870.

The undermentioned officers were then elected for the year 1870:—*President:* Mr. John Henderson.—*Vice-Presidents:* Mr. E. Phipps and Mr. Thomas Higgin.—*Treasurer:* Mr. Lewis Hughes.—*Auditors:* Mr. W. H. Wilson and Mr. Atkins.—*Honorary Secretary:* Mr. Joseph Guyton.—Mr. R. C. Johnson, Mr. Tyrer, the Rev. G. J. Banner, and Mr. O. R. Green to be members of the Council instead of Mr. Roberts Mr. A. Cooke, Mr. R. Cooke, and Mr. Hubback, who retire by rotation.

The usual votes of thanks to the President and others were passed.

The presentation prints were distributed to the members present (*The Quarry Road*, by Messrs. Robinson and Cherrill), and the session of 1869 terminated.

Correspondence.

Foreign.

Paris, December 4, 1869.

As far as the titano-magnesia light of Dr. Monckhoven was concerned, we were in darkness at the meeting of the French Photographic Society on Friday evening. "Press of other matter, and the time necessary for the demonstrative experiments not being available," are the reasons for the postponement to the next meeting in January of this communication. We had, however, a very interesting communication from the President, M. Péligot, on the experiments upon the changes undergone by glass from exposure to the light, which have been published by Mr. Gaffield, of Boston. Most of these experiments are familiar to the students of THE BRITISH JOURNAL OF PHOTOGRAPHY; and, therefore, I need do no more than give you a sketch of what was presented to us on Friday.

M. Péligot began by remarking that attention was drawn to this subject many years ago by Professor Faraday. It was subsequently examined by M. Pelouze; but Mr. Gaffield had gone farther than his predecessors in experimenting, and appeared to have almost exhausted the subject. M. Pelouze found that the *white* window glass changed to yellow under the influence of light. Mr. Gaffield went beyond this, and stated that the change did not stay there, but that further exposure produced a violet shade in the glass. M. Péligot handed round numerous specimens sent by Mr. Gaffield in support of his experiments, and they were examined with peculiar interest. The changes were very apparent.

One of the most interesting objects exhibited was a gamut of coloured glasses produced by various exposures; the lowest in the scale was exposed one day, the next two, the next four, the next eight, and so on, till the last showed the effects of ten years' exposure to light. A photograph obtained by placing a number of pieces of different kinds of glass on a sheet of sensitised paper, and exposing the whole to sunlight, was shown, and it was curious to see how the impression under the yellow glass was stronger than under some others. This experiment was thought to be incomplete, from no data of the composition of the coloured glasses being furnished.

Another curious result of an experiment was shown in a photograph produced in the following manner:—Upon a sheet of colourless glass were painted some letters in opaque black varnish. This was exposed for twelve months. The letters were cleaned off, and the sheet of glass was used as a negative, and a decided impression of the letters was imprinted on the paper. The glasses least liable to change were found to be those of a bluish tint; any change which these underwent was rather of a bleaching nature than otherwise. The question of change in the lenses used by photographers was alluded to, and it was stated that glass with a lead base was not liable to change; it would only be the crown in which any alteration might be looked for.

M. B. Bontemps has been experimenting in the same direction near Paris, and he presented a *mémoire* on the subject to a recent meeting of the Academy of Sciences. He accompanied this *mémoire* by the specimens sent to Mr. Gaffield, to whom due honour was given. M. Bontemps has only been experimenting three months, and yet in this time he finds that a change is produced in certain kinds of glass. The whitest sheet of the St. Gobain Company becomes yellow, and in the glass of a green shade, made by this company for greenhouses, the change is a little less. Extra-white window glass, composed of silica, lime, and soda, having less chance of containing sulphate of soda, became very yellow. Very white window glass, composed of silica, lime, carbonate of potash, aud five per cent. of oxide of lead changes, but much less than the others. Crystal glass, composed of one part carbonate of potash, two parts of oxide of lead, and three parts of silica, does not undergo the least change. Optical flint glass the same. The bluish plate glass of the British Plate Glass Company does not change. Coloured glasses, one side only of which is covered with colour, were exposed, colour downwards, and it was found that the white upper glass was more changed than if it had been exposed alone; the light seemed to have "reverberated" from the coloured surface. These glasses exposed colour uppermost were not altered in three months. The explanations of the results of these experiments seem to M. Bontemps to be these:—Glass contains more or less protoxide and peroxide of iron when first made, as well as oxide of manganese. The green tint of glass is due to the mixture of the blue colour imparted by the protoxide of iron and the yellow by the peroxide. Peroxide of manganese gives a violet tint to glass. When glass thus prepared is exposed to the prolonged action of light the protoxide of iron becomes changed into peroxide, and the glass becomes yellow. Further exposure decomposes the peroxide of iron, the oxygen combining with the manganese, and thus producing the violet colour of the peroxide of this metal. The causes to which M. Pelouze attributed the change in glass, viz., to the presence of sulphate of soda and sulphide of sodium, are not considered to be correct.

M. Jeanrenaud read a communication respecting two modifications in the carbon process which he found useful. The first was in the manner of transferring the exposed picture to the sheet of albumenised paper. He adopted the plan of floating the two sheets upon a dish of cold water, containing a certain amount, say 500 grammes, and then pouring on the pictures the same quantity (measured) of boiling water, or in summer say 300 grammes. Then he described a remedy for over-exposure, and for preserving the whites of the picture instead of weak hydrochloric acid, as generally recommended. This remedy was a very weak solution of cyanide of potassium. He considered that it might also be used with advantage in the photo-enamel processes, for getting rid of all traces of the chromic salts.

Two claimants for priority of invention were heard. M. Despaquis quoted M. Poitevin's patent against the assertions of M. Placet at the last meeting, and in support of his own (M. Despaquis) respecting the use of photographically-prepared dies for stamping the heads of note paper, &c.

M. Poitevin protested against M. Albert, of Munich, calling the process employed by him for his beautiful photolithographs the Albertype. M. Poitevin contended that he had really invented this, and that M. Albert had worked it out to its present state of perfection, and therefore honour to whom honour is due.

In a recent number of *Les Mondes* I find capital engravings, or, rather, they would be, if carefully printed, of the photograph of the moon, and the solar spectrum taken by Mr. Rutherford. These engravings are made by Messrs. Van Inghem and Snyder, under the inspection of Mr. Henry Morton, and are intended to illustrate a work on the elements of astronomy by Professor Peabody. In the same number is a little woodcut of an arrangement adopted by Messrs. Wilson and Hood, and invented by Mr. Proctor, of Salem, Mass., for taking portraits in the night. It consists of a light framework of wood, in the form of the head of a waggon; this is lined with very white and shining paper. It must be made large enough to contain the sitter and "fixings;" the lens is pointed in at one end, the magnesium lamp or source of light is placed at an opening in the upper part of the frame over the lens, and the light diffused by the paper lining allows a negative portrait to be obtained in fifteen or twenty seconds. The inventor says that many of his best pictures are the results of "night work."

Reutlinger has been exposing as much as forty to fifty seconds during the dull weather of the past few weeks. His studio is always crowded, and, at this time of the year, the Paris photographers are busy with taking sittings to be delivered before New Year's day, to be then distributed as *etrennes*.

In my next I hope to have a "neat thing" in experimental and philosophical chemistry for the use of your readers who are fond of the manners, customs, and habits of the molecules of matter.

Printer's *erratum* in my last:—"*Il-y-e fagots et fagots*" should be "*il-y-a fagots et fagots.*" R. J. Fowler.

Home.

THE SWING BACK.

To the Editors.

Gentlemen,—The method of swinging the lens instead of the back of the camera, referred to by your correspondent "A Leicestershire Rector," has been used by me for some years in the manufacture of my improved Kinnear cameras.

I hope to send you a photograph illustrating this in a few days, or, if you would like to see one, I shall be happy to send a camera for inspection at your office.—I am, yours, &c., J. Rogerson.

20, *Albion-street, Gaythorn, Manchester, Dec.* 1, 1869.

[We shall be glad of the opportunity of examining the camera.—Eds.]

STAINING OF DEVELOPED PRINTS.

To the Editors.

Gentlemen,—I should feel greatly obliged if you would inform me, through the medium of your valuable Journal, the reason why the enclosed paper is stained (it is from an enlargement). I have great difficulty in getting clear whites.

The salting solution is as follows:—

Bromide of potassium	7½	grains.
Chloride of ammonia	3½	,,
Gelatine	3	,,
Water	1	ounce.

Sensitising solution:—

Nitrate of silver	50	grains.
Glacial acetic acid	1	drop.
Water	1	ounce.

Developing solution:—

Gallic acid	1	drachm.
Glacial acetic acid	1	drop.
Water	1	pint.

—I am, yours, &c., T. S.

Fleetwood, December 1, 1869.

[In olden times, previous to the introduction of collodion, when all negatives were taken upon paper, such staining as that upon the sample enclosed by our correspondent was very common. In his first experiments Mr. Fox Talbot found that one of the greatest drawbacks to the beauty of his negatives was the deposition of silver upon the portions which should be quite clear. Reasoning upon the subject, he instituted certain experiments, and found that when operating, as he did, upon paper it was imperative that a large proportion of acetic acid be mixed with the nitrate of silver exciting bath, the proportion being one-sixth of the volume of the silver bath. From the fact of a collodionised surface not requiring this addition of acid, the necessity that still exists for its use when *papers* are to be sensitised and developed is overlooked by many photographers, and among others by our correspondent, whose "one drop" of glacial acetic acid in the exciting bath must give way to a quantity more nearly represented by *sixty* times that amount, the want of the acid being, in this case, the cause of the impurity of the high lights.—Eds.]

THE "PERIPATETIC PHOTOGRAPHER" AND WEAK SILVER BATHS.

To the Editors.

Gentlemen,—Permit me to make some comments on a portion of the *Notes on Passing Events* in the last number of your Journal.

In speaking of the albumen being *dissolved* from off the paper, and of the albumen-dissolving propensity of a weak silver bath, the "Peripatetic Photographer" has fallen into a grave error, although a very general one. The albumen is not "dissolved" from off the paper by a nitrate of silver bath, however weak such a bath may be; nor has it, under any circumstances, any albumen-dissolving propensity. The albumen is simply *removed* from the surface of the paper without being "dissolved," and is deposited in the bath, at the bottom of which when left at rest it may be seen as a flocculent deposit.

Now, in opposition to the unwarrantable supposition of the "Peripatetic Photographer," that the question of the advantages to be derived from the use of the nitrate of soda bath cannot be decided, I unhesitatingly affirm that this matter *can* be "decided at once" by any person who is so disposed; and, moreover, that I have *proved* such to be the case in the chapters on *Nitrate of Soda Redivivus*, commencing at page 516 of your last year's volume. Therefore, the only authority for his making such a statement exists in imagination and not in fact.

This gentleman afterwards says:—"Here are two nitrate baths—one of silver of such a strength that it barely dissolves off the albumen from the paper; and the other of an alkaline nitrate, which also removes albumen. By adding the last to the first, and *adding silver*

to make allowance for the addition of water, will the first cease to dissolve the albumen? Will the mixed bath acquire a property not inherent in any of the two singly?"

I cannot understand the passage I have put in italics, as it is a solution of an alkaline nitrate that is the addition, and not water; besides, if the solution of the silver nitrate be of such a strength as to "barely" remove the albumen, adding silver would render it sufficiently strong to prevent the removal of the albumen, and the addition of a solution of an alkaline nitrate might then be fairly considered as superfluous, and as having nothing whatever to do with the non-removal of the albumen.

To the last question in the preceding quotation, I answer and positively affirm that the addition of an alkaline nitrate will *restore* to a solution of nitrate of silver the inherent property it has lost by being too much diluted, viz., that of retaining the albumen on the surface of the paper; and, moreover, what is still more inexplicable, such an addition will *confer* this power upon a solution of another salt—sulphate of copper, for instance, although it is not inherent in a solution of that salt under any circumstances whatever, and is also not possessed by a solution of the alkaline nitrate which confers it.

All this I have proved incontestably in the papers I have mentioned, and I therefore fearlessly challenge any one, be he a "Peripatetic," a "scientific," or a "pseudo-scientific" photographer, to gainsay or disprove the truth of a single experiment I have there given to prove the correctness of my statements. And yet, forsooth, we are told "it appears" that this matter cannot "be decided at once." I can only say that if "it appears" so, it can only be to those who *will* not see, and will not learn, or to those who, having committed themselves by the denial of facts, are too obstinate to acknowledge that they were in error.

We are asked if the mixed bath (that is, a weak bath of nitrate of silver having an alkaline nitrate bath added to it) will acquire a property not inherent in either of the two singly? Now, the "Peripatetic Photographer" ought to be aware that the property of removing, or, as he terms it, "dissolving" the albumen is *not* inherent in a solution of nitrate of silver, as its inherent property is to *prevent* its removal; therefore, when this inherent property has been *lost* by the solution of nitrate of silver being too much diluted, and is *regained* by the addition of an alkaline nitrate, the solution of nitrate of silver does not acquire by this addition a property which is not inherent in it. The restoration of a lost power is not the acquiring of a new one.—I am, yours, &c.,

December 6, 1869. GEORGE PRICE.

THE FIRST DISCOVERY OF THE COLLODION PROCESS.

To the EDITORS.

GENTLEMEN,—In your Journal of the 26th November you devote a very friendly criticism to the discussion which has arisen from a sentence in my address to the Edinburgh Photographic Society in reference to the discovery of the collodion process. From the concluding paragraph in your article you may have given occasion to some of your readers to think I have some merit in introducing the collodion process. Now, I wish it to be distinctly understood that I have no right to any such claim. I simply used the materials that Le Gray enumerated. I added nothing. I was only the recipient, and have had little to give in return for the gift.—I am, yours, &c., J. G. TUNNY.

Edinburgh, December 7, 1869.

Miscellanea.

A ROW AMONG THE "DARKIES."—Mr. Hunt, photographer, Piccadilly, having entered an action against the manager of the Christy Minstrels Company, for an assault committed upon him at the Concert-room, St. James's Hall, the case was tried on Tuesday last, the 7th instant, before the Lord Chief Baron. It appeared from the plaintiff's evidence that in return for having photographed all the members of the company, he had what he termed a "face ticket" to their performances —that is to say, on presenting himself to the check-takers he was admitted free. On the afternoon of the 6th of October last he went to the hall to see Mr. Moore, one of the proprietors of the company, relative to the tinting of a photograph of his daughter, depicting the fashionable get-up known as the "Grecian bend." Having had an interview with Mr. Moore, who was in full costume as "Bones," plaintiff said he remained in the concert-room. The manager, however, objected to his having entered without payment, and thereupon a *fracas* ensued, in the course of which the plaintiff was injured, and through incapacity to attend to business in consequence of this he had lost commissions to the extent of at least £40. For example, he had been unable to wait upon Mr. Millais to execute a photograph of a painting of his. His immediate fee for that would have been three guineas; but it was impossible exactly to estimate the indirect results from the association of his name with so eminent an artist. The evidence was of a conflicting nature, but after some deliberation the jury returned a verdict for the plaintiff—damages one farthing.

ALL THE DIFFERENCE.—We learn from the Melbourne papers that Mr. Bandmann, the tragedian, has been fined one shilling for "wilfully and maliciously" destroying a case of photographs belonging to a photographer named Norman. The smallness of the fine is accounted for by the provocation under which the tragedian committed the act referred to. It seems that the photographs placed Mr. Bandmann in a ridiculous light, inasmuch as they represented him attired as "Narcisse" in the character of "Hamlet." It speaks well for our artistes at home that, although nothing can exceed the ridiculous light in which many of them, especially the *danseusés*, are daily exhibited in photographs in the shop windows, they never attempt to destroy these works of art. The provocation, moreover, is greater than that which roused Mr. Bandmann to fury, the error committed in his case being only the substitution of one set of garments for another, whereas our actresses might plead in extenuation of their taking the law into their own hands that their photographs represent them as wearing hardly any garments at all.—*Pall Mall Gazette.*

ARRANGING OF FIGURES IN A GROUP.—A quaint old writer, Lairesse, thus speaks of managing portraits in a picture:—"Let the King or Prince have the first place, and next his retinue or other proper persons; if there be yet another party to be introduced of lesser moment than these, and yet essential to the composition, put them in the shade without more ado." A parallel passage occurs in Du Fresnoy's *Art of Painting*:—

"Fair in the front, in all the blaze of light,
The hero of thy piece should meet the sight
Supreme in beauty; lavish here thine art,
And bid him boldly from the canvas start;
While round that sov'reign form th' inferior train
In groups collected fill the pictured plain;
Fill but not crowd, &c. &c."

Reynolds properly remarks upon this stanza, "the principal figure may be too principal." "This rule, as enforced by Fresnoy, may be said more properly to belong to the art in its infant state, or to be directed to young students as a first precept; but the more advanced know that such an apparent artificial disposition would be in reality for that reason inartificial."

THE POSITION OF PHOTOGRAPHY.—Mr. Hamerton, in the *Painter's Camp*, has an instructive paper on "The Relation between Photography and Painting," wherein we find this decisive passage:—"Photography is not a fine art, but an art-science; narrow in range, emphatic in assertion, telling one truth for ten falsehoods, but telling always distinctly the one truth that it is able to perceive." And among the conclusions at which the writer had arrived is the following:—"Photography and painting are for ever independent of each other; there is no manner of rivally possible between them. Each has its own path." Furthermore, Mr. Hamerton is of opinion that "to art in general photography has rendered several inestimable services—first, by relieving it of the drudgery of detailing commonplace facts, where imagination and feeling are not wanted;" then, as leading consequently to a clearer understanding, on the part of the public, of the nature of fine art as distinguished from unintelligent copyism; also as affording a sound basis for criticism, by putting within everybody's reach an encyclopœdia of the rudimentary facts of nature; and lastly, by reproducing works of real art in an authentic and reliable manner." We would, in conclusion, add our own tribute to the services received from photography in the historic study of the arts. In fine, we may recal the dictum of an English judge, that our age has been distinguished by three discoveries—locomotion by steam, telegraphy by electricity, and, thirdly, and perhaps scarcely least, photography by aid of light.—*Saturday Review.*

PHOTOGRAPHIC PRINTING: MR. ROBINSON'S PATENT METHOD.—The following is the provisional specification of Mr. John Vincent Robinson, which received provisional protection only, for *Improvements in the Production of Negatives Applicable for Photographic Printing, and for Obtaining Raised Printing Surfaces.* The first part of my invention relates to the production of negatives for photographic printing, which I effect in the following manner:—Upon a plate of glass or other transparent material I deposit or affix a layer or stratum of suitable metal (preferably of silver) or metallic alloy, or it may be a preparation of aniline or other suitable matter upon which metallic or other surface a drawing may be made with pen or pencil. The lines of the drawing or design are then removed by means of a graver, etching needle, or other suitable instrument, or the drawing or design may be at once etched in without the aid of the first pen or pencil sketch if desired. A plate is thus obtained from which the metal is removed in the parts representing lines in the drawing or subject so as to admit light through the plate at those parts, and obstructing it wherever the metal deposit remains, thus producing what I term an etched negative. A print may now be obtained from the negative by placing it over an ordinary piece of sensitive photographic paper and exposing to light in the usual manner, or by any of the usual methods of photographic printing. The second part of my invention relates to the production of raised surfaces for printing purposes by means of the same etched negative obtained in the manner above described. To effect this I coat a plate of glass or metal, or it may be a stone or other suitable material, with a layer of gelatine, gum, or other suitable substance, to which has been added a bichromate, such as bichromate of potash or ammonia, or a mixture of said bichromates for the purpose of

rendering sensitive to light the layer of gelatine, gum, or other substance employed. The negative before described is placed in contact with the prepared gelatine or other surface and is exposed to light, which light, acting on the film of gelatine through the lines of the etched negative, hardens and renders insoluble in water the parts of the gelatine or other surface so acted on. The other parts of the gelatine film which have been protected from the action of light by the metal deposit on the negaive remain soluble. After thus exposing the gelatine plate to light I place it in warm water, which dissolves the gelatine in those parts not acted on by the light, leaving a picture in relief corresponding to the lines and marks of the etched negative, thus forming a raised printing surface. From this raised surface a print can be taken by any of the usual methods of block printing, or a transfer can be made on to stone, but I prefer to reproduce it in stereotype, cast electrotype, or by other method, and from any of these to print in the usual manner.

OUR ALMANAC.

Orders for a few more Advertisements can be received if forwarded before THURSDAY NEXT, the 16th inst.

EXCHANGE COLUMN.

A pair of dissolving-view lanterns, nearly new, in a box, will be exchanged for a Dallmeyer's No. 1 triplet or rapid rectilinear lens.—Address, F. T. P., care of Mr. Lane, 28, Charles-street, Hatton-garden, London.

An intensity coil, bare measuring 15 × 9, with commutator, five Bunsen's batteries, and a medical coil, all in first-rate order, will be exchanged for a good microscope or large musical box.—Address, T. B., 22, Nelson-street, Liverpool.

A.X., 10, Market-hill, Sudbury, Suffolk, will exchange for one of Dallmeyer's No. 4D or No. 5D group lenses, any of the following, value arranged:—Pair of Darlot's hemispheric lenses, 2⅝ inches focus, with camera, complete; an excellent 1-1 plate camera, suitable for stereo. or *carte*, brass bound; devotional chair, carved back, legs, &c.; univeral seven changes; a double ended studio table; a pair of splendid chromos, 40 × 28 inches, in super gilt frames; beautiful cheval looking-glass, carved, oval; a pair of fine engravings, 48 × 36 inches, in maple frames.

ANSWERS TO CORRESPONDENTS.

Each Picture sent for registration must be accompanied by fifteen stamps to defray the necessary registration fees.

PHOTOGRAPH REGISTERED DURING THE PAST WEEK.—

E. Bullock, Lynn.—*Photograph of Lord Claud John Hamilton.*

☞ *Correspondents should never write on both sides of the paper.*

*** Owing to an unusual pressure on our space this week we are reluctantly compelled to leave over several articles, reviews, correspondence, and other matters.

T. A. JEFFREY (Cheltenham)—The Journals have been sent.

C. LUARD.—You do not describe with sufficient accuracy the defects of the negatives; hence we cannot say whether they are damaged from vermicular crackings or from the film having become detached from the glass in the honey-combed form sometimes assumed by it. Write again, but more explicitly. Meanwhile, the vermicular crackings, if such be the form in which the damage exist, may be made to disappear by rubbing over the surface a soft pad of cotton wool charged with a finely-powdered black pigment, such as lampblack.

J. N. T. (Stroud)—If a dipper were made of very impure silver—that is, silver containing a large proportion of alloy—the nitrate of silver would be decomposed and metallic silver precipitated; but, before this could take place, the silver must be grossly adulterated. We have not yet had time to examine the "crystals" you enclosed; but from a cursory glance at the two or three particles that remain (the rest escaped from the paper enclosing it when opening your letter) we believe them to be composed of metallic silver. The description in your letter might have warranted the opinion that they were acetate of silver, instead of which they appear to be metallic silver. Examine the dipper very carefully, and ascertain whether, if made of good silver, there be not some piece of solder left about it which will account for the precipitation.

W. S. (Edinburgh).—The question you have put—"Which is the best dry process?"—is one which would be answered in a different way by the adherent of each particular process. By any one of them, carefully worked out, negatives of great excellence may be obtained. Those which are most practised by several gentlemen with whom we are sometimes intimately associated are the collodio-albumen, the gum-gallic, and the Fothergill processes. We are also acquainted with several amateurs who practise the collodio-bromide, the tannin, and the coffee processes. It would be impossible to say by which of these the best pictures have been produced. Popular favour—which, in dry processes, is indeed *very* changeable—appears, during the past summer, to have been divided between the collodio-albumen and gum-gallic processes; but next season these may be deposed, and other discarded favourites put in their places.

E. T.—It will be quite easy for you to take a full-length *carte* figure in the space at your command, but it will be necessary to employ for that purpose a lens of rather short focus. A lens having a *back* focus of from three and a-half to four and a-half, or even five, inches would answer your purpose. One trial with any of your lenses of about this focal length would decide the matter.

M. E. Z.—This correspondent writes:—"Is there a possibility of making by an admixture of chloride and oxide of zinc slabs on which photographs can be taken? Such a substance would be valuable to me and artists generally, as the surface would be excellent for the reception of colour." In our article on this subject [*ante* page 431] we have shown how slabs of the kind referred to may be made, although we have not given minutely-detailed directions concerning their manufacture. M. E. Z. has tried it, but as yet he has not succeeded in making a hard and compact substance, although he believes that it can be done. When we have leisure we may go into the subject in more detail; in the meantime we state the case of our correspondent's failure, in order that opinions may be elicited from those who have been more fortunate with its preparation.

DIBSMIT.—1. We are acquainted with photographers who have succeeded in defraying their expenses when making a tour among the "rural villages and out-of-the-way places" in the north of Scotland, but we have never heard of any who have made money by taking *cartes* in that way. There may, however, be a fortune in store in this direction for a really energetic person with good ability and an abundance of tact.—2. Persuade your expected customers to be content with glass positives, *if you can;* because as soon as the picture is taken and the charge is paid there is an end to the transaction, and you will be at liberty to depart from the place, if requisite, at half-an-hour's notice. But if *cartes* are insisted upon, then you must either take them or fall back upon the tact of which we presume you to be the possessor, and persuade your customer that it is for his interest to take what you advise.—3. What *kind* of "little book" do you wish us to recommend as a companion? If you mean a work that will give you information about the places which you might visit, a good gazetteer is published by Nelson; but if you refer to a work containing information concerning the various processes in photography, with observations upon everything connected with the science, you will find in our last ALMANAC all that you can desire.

RECEIVED.—William M'Craw (in our next); M. E. Rigby; E. Rogers; J. C. J.; C. A. E.; W. H.; and others.

PHOTOGRAPHS OF THE ECLIPSE.—Dr. Morton, Professor of Chemistry in the University of Pennsylvania, has forwarded to Mr. William Crookes, F.R.S., photographs of the phenomena of totality. By combining in the stereoscope pairs of these, separated by intervals of about half-a-minute of time, the black globe of the moon appears projected far in front of the luminous prominences and the corona, which are, therefore, clearly seen to belong to the sun. Glass transparencies from negatives specially selected for this purpose, and appropriately mounted, would show these phenomena in a very striking manner.

THE RECENT DESTRUCTION OF MR. BLANCHARD'S STUDIO.—We regret to have to supplement the notice that we gave last week of the destruction of Mr. Blanchard's studio, by the announcement that neither the studio nor any portion of its contents were insured. Preparations are in active progress for the speedy erection of a new and much improved structure, in which every appliance in lighting and general convenience will be rendered available for the production of those highly artistic portraits for which Mr. Blanchard has now acquired such a reputation. Special arrangements are also being made by which a greater number of pupils in the various branches of the art may be received than was possible under previous circumstances.

LONDON GAZETTE, *Tuesday, December* 7.

BANKRUPT.

THOMAS FRISBY BIRCHALL, Cheapside, photographer.—December 23rd, at the Bankrupts' Court, London.

METEOROLOGICAL REPORT,

For the Week ending December 8th, 1869.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
2	30.06	35	29	32	33	NNE	—	Dull
3	30 05	37	26	29	30	NE	—	Fine
4	29.77	—	28	35	36	NNE	—	Cloudy
6	30 58	40	29	38	39	NE	—	Cloudy
7	30.28	41	29	37·5	38	E	—	Cloudy
8	29.99	—	36	41	41	NE	—	Cloudy

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 502. Vol. XVI.—DECEMBER 17, 1869.

MR. HENDERSON'S READY-SENSITISED PAPER FOR PHOTOGRAPHIC PRINTING.

Nearly two months have now elapsed since we referred to the ready-sensitised paper recently introduced by Mr. Henderson. We then stated that our experiments as to the printing and toning qualities of this paper had been satisfactory, and that it did not work very differently from ordinary sensitised albumenised paper—with this exception, however, that it does not bear over-toning, since the tint is not lowered in the fixing bath.

Within the last few days we have again tried the paper with satisfactory results. The specimens of the paper that we operated upon were those which remained after the first trials of the new tissue. On removing them from the drawer in which they were kept we examined the slips carefully; but they had undergone no change in colour, notwithstanding the fact that they had been put aside without any extraordinary care being taken that they should not suffer from a rather moist atmosphere. In the matter of keeping its colour, the paper has not failed in the least after nearly two months' trial. We may add the same for sensibility to the action of light, and also as regards toning properties. Mr. Henderson's paper has, therefore, fulfilled to a great extent the promise of permanence that it originally gave, and there appears to be now good reason to believe that its performance will quite equal that of any of the other ready-sensitised papers which either have been or are in the photographic market.

There is one point, however, which we may notice relative to the toning of this paper. On a former occasion we stated that we had more than a suspicion that a compound of tin was present in the samples which we examined, and that, in all probability, the rich, warm tint the prints take in the ordinary acetate of soda and chloride of gold toning bath may be due to the formation of a small quantity of the well-known "purple of cassius." Now, it has long since been observed that this beautiful "purple of cassius" will not bear sunlight without alteration; for, when some of the rich, warm purple powder is spread on paper and exposed for some time to the sun, the tint is materially altered—a weak, steel-grey colour replacing the former hue. If the warm tint of the prints on the new paper be really due to the formation of the compound we have just referred to, it would be a matter of much interest to expose such prints to the action of light, in order to ascertain whether any change of colour would be noticed in the prints so treated.

The value of a paper such as that above referred to is self-evident. There appears to be no good reason why sensitised paper should not be supplied to the photographer as readily as any of the other materials every day employed in the art. Obviously, the only requisite is a paper whose keeping qualities can be depended upon. In years gone by it was the custom for the operator to make his own collodion, but the inexpediency of this soon became evident when it was found that an article could be purchased, at a trifling additional expense, which could be depended upon.

Again: until recently it was by no means unusual for photographic printers to albumenise the paper they used in printing, but now few think of taking this trouble, since papers of almost every desired quality can be easily purchased. The same is true, though to a less extent, of varnishes, of backgrounds, and numerous other matters, not to mention sensitive dry plates. If, then, the photographer find it to be his interest to purchase these materials rather than to make them, it would be reasonable to expect that the manufacturer of a ready-sensitised paper, which the operator could depend upon as being of uniform quality, would receive large and substantial support.

We hope soon to see the waste of paper and of time incurred in carrying out the present system of silver printing saved by the employment of a satisfactory ready-sensitised paper, manufactured upon a large scale and of uniform quality.

SAVING SILVER AND GOLD IN HYPO. WASTE.

As the subject of saving photographic silver waste has anew attracted a good deal of attention, owing to the recent appearance of several excellent articles in these columns, we may here touch upon one point about which some of our correspondents do not appear to be yet quite clear. We refer to the amount of solution of sulphide of potassium to be added to the waste hypo. bath. Mr. Webster has already stated distinctly that excess of the sulphide is quite as bad as too little of it; but some do not quite see why this should be so. The reason is very simple. Sulphide of gold is easily dissolved by sulphide of potassium, because the former has a great tendency to unite with the latter, forming a very soluble double salt. Sulphide of silver has no such tendency to unite with the alkaline sulphide; therefore, when it is desired to obtain any gold which may have been dissolved out in the fixing bath, as well as the silver, we must take great care to avoid using more of the sulphide of potassium than is absolutely necessary; but if we are content to waste the gold but save the silver, an excess of the sulphide does no harm. A more convenient plan, however, in some cases, is to add to the waste hypo. bath some oil of vitriol, stir well, and leave the mixture aside for some days; a precipitate will then be found at the bottom of the vessel composed of sulphide of silver, sulphide of gold, and free sulphur.

DR. MONCKHOVEN'S NEW ENLARGING APPARATUS.

Notwithstanding the various notices which have reached us concerning the new enlarging apparatus by Dr. Van Monckhoven, we have hitherto failed to accurately appreciate its "points;" but, owing to its having been exhibited in action on Tuesday evening at the meeting of the London Photographic Society, we are now in a position to present a brief summary of its principal features.

Dr. Monckhoven is well known as the maker of a very excellent solar camera, which was introduced in 1864; but, owing to the uncertainty and infrequency of the direct solar rays being poured upon us, and which are necessary to enable a solar camera to be made available, instruments of this kind have not been employed in this country to the same extent that they have been in more favoured lands, and hence any process of enlargement, to be really useful to us, must be one that depends on artificial rather than on solar light. How far the requirements of successful enlarging by means of other artificial

lights have been supplied we do not here pause to inquire, our object being at present merely to point out the specialities of the light now brought forward by Dr. Monckhoven.

The Light.—The source of illumination employed is what is known in this country as the safety oxyhydrogen burner; that is to say, the orifice of the oxygen jet or blowpipe is in the middle of the wider piece of tube by which the hydrogen or common gas is emitted. This burner is so well known and has been so often described that further description of it here is unnecessary. Instead of common gas a spirit lamp may be used, the jet of oxygen being allowed to blow through its flame.

Instead of the lime cylinder in common use, Dr. Monckhoven employs a square piece, or bar, of carbonate of magnesia. The pieces used on Tuesday evening were square bars one and a-quarter inch square and three and a-quarter inches long. The light appeared to be quite as luminous as that obtained from lime, but the colour was much more actinic, resembling in this respect that of the magnesium riband. A bar of magnesia does not last so long as a lime cylinder, one that we examined after it had been in use for a short time being quite honeycombed, and much of it converted into a pulverulent substance. Probably this defect may be overcome; however, as it is only for purposes of photographic enlargements and not for a lengthened exhibition that the light is required, the drawback in question is only a minor one.

The Apparatus.—The enlarging apparatus differs in no essential optical respect from a magic lantern. The body, however, instead of being made of tin is formed of polished oak, the front being also made of wood. The condensers used are of the kind known as Duboscq's; that is to say, two plano-convex lenses are placed with their convex sides next to each other. Those preferred in this country, we need hardly remind our readers, are those of Herschell, a plano-convex (or slight meniscus) lens mounted with its convex surface next to a double convex lens.

In Dr. Monckhoven's lantern both lenses were composed of flint. Each lens of the condenser was mounted in a wooden slide, which was inserted in the square wooden front of the lantern. The objective was a double combination portrait lens such as that employed for *cartes*. Owing to the necessarily short space of time intervening between the meeting and our going to press, we cannot enter into this subject with more detail at present; but enough has, we believe, been said to enable our readers to perceive the salient points of the enlarging apparatus—for further particulars concerning which we direct attention to the paper of Dr. Monckhoven, which will be found in another page.

MORE NOTES ON SILVER RESIDUES.

I am glad my recent articles on economising silver residues have aroused considerable attention among photographers to this branch of their laboratory arrangements. Very few, I know, have neglected to save, after one fashion or other, their silver wastes; but how few have set about the work in a business-like and proper manner!

Since the *Memorandum on Silver Residues* was published [page 494] I have received several inquiries as to the name of my refiner or melter. Almost without exception the great complaint in these letters is—"My refiner cheats me;" while some correspondents go further and enter into details of their mode of collecting print-washings, &c. From what I can gather from the information thus afforded me, it is evident a great many photographers have been sending to the melter a mass of rubbish which was thought to contain a large proportion of silver, whereas it contained very little; hence all the consequent disappointment arose from a want of knowledge, on the part of the photographer, how to set about collecting his wastes. Part of his residues were literally *wasted* by an improper method of precipitation, and, when precipitated, by being again sometimes put into solution by other bodies added to the *waste jar*. Again: some collect the trimmings of their prints *after they have been fixed and washed*, burn them with great care, and get a fine heap of ashes, which they fondly imagine contains a large percentage of silver. Vain hope! If the blackened margins of the prints are clipped off, as they ought to be, before they are washed or toned, he will be a singularly fortunate photographer who can recover five grains of slightly auriferous silver from a thousand grains of such ashes. These residues, then, are scarcely worth the trouble of collecting, unless on a very large scale. But should the *blackened* margins of the prints, by a bad economy, be allowed to pass through the gold toning bath, it will certainly be well worth while to reduce these, for the value of the *gold alone*, which can easily be recovered. I trust, however, no photographer is foolish enough, for his own sake, to waste the energy of gold solutions on uselessly blackened edges. From some of the letters recently received I can gather, also, how many valueless precipitates and insoluble substances find their way into the waste jars and swell the heap of the poorly auro-argentiferous mass sent to the melter.

Let me once more repeat what I have often said before. Collect your residues by a scientifically-consistent system, send them to a well-established refiner's firm, and depend upon it he will give you more value for them, after paying for his own trouble, than you yourself can possibly extract, unless you have skill and expensive appliances equal to his.

I have already [page 504] given instructions for the collecting and economising of those *silver* residues which are connected with positive printing. In an excellent practical article [page 565] Mr. Webster, F.C.S., supplements my remarks by extending his observations to the economies which may be practised in the *negative* operating room. With all that he says about his plans for saving residual silver I most cordially agree; and I would advise your readers who are not, but wish to be, endowed with "saving grace," to sit down by a cheery fire on some one of these foggy, frosty days, and carefully peruse Mr. Webster's communication along with both of mine. After the fog has cleared off, they who are not already basking in the sunshine of successful operations will rise up wiser and better men.

There are only very few points in Mr. Webster's able article which require more explanation, and which, I think, are not consistent with modern practice.

I *did* say [page 405] that the silver saved from the fixing solutions of positive prints would amply repay the expense and trouble of recovering it, were there a convenient place for the hydrosulphuric reduction, but that the nuisance arising from sulphurous stinks in confined situations was injurious to the photographer's health and bad for his photographs. Mr. Webster seems to have overlooked this emphatic statement of mine.

Again: when we take into consideration our modern system of printing, Mr. Webster seems to have committed an error in his estimate of the proportions of silver that can be recovered from the *washings* before toning and from the *fixing* solutions of prints. He carefully collected the washings from three sheets and a-half of albumenised paper (before toning, I presume), and found 35·73 grains of chloride of silver. From the fixing solution of the same sheets he obtained 22·89 grains of what he considered pure sulphide of silver.

These statements somewhat startled me, because from my "memorandum" [page 494] it will be seen I had actually recovered from the washings, &c., of the prints, without taking into account the residues from fixing solutions, three-fourths of the silver expended. It is true I was sensitising my paper on a nitrate bath ranging about sixty grains to the ounce, which might account for some discrepancy in our results; but, according to Mr. Webster, I must have been throwing away with my fixing solutions nearly half the silver that could have been saved. I do not think the refiner was likely to make an error in my favour, yet I know exactly what I received from him when I saw the lump weighed, and what I expended in nitrate of silver.

Let me examine the alleged value of these *fixings* a little more closely by the light of practical experience and the scientific deductions therefrom. The large firms for albumenising paper throughout the kingdom will vouch for the accuracy of my first estimate respecting the quantity of salt, &c., that enter into the composition of one full-sized sheet of photographic paper (22×18 inches), and Mr. Webster and others who have a knowledge of chemical notation will comprehend my scientific demonstration.

A ream of paper consists of 480 sheets. Six quarts of undiluted albumen are set aside for coating this quantity of paper. Six grains of soluble chloride (say chloride of ammonium) for each fluid ounce are whipped up with the albumen. In the course of albumenising one pint is lost by irrecoverable waste, and three pints are left after the whole ream is albumenised. By a little calculation it will be seen that each sheet of the albumenised paper now generally found in the market contains exactly two grains of soluble chloride (ammonium I have taken). Of course the second portion of the ream will be more highly salted than the first, because the water is in the meantime evaporating, but the average will still be two grains of salt per sheet.

A sheet of paper thus imbued with chloride and albumen is fully sensitised by nitrate of silver, and *all* the excess of the latter washed off before the print is toned. After this treatment there will remain

in the paper exactly 5·18 grains chloride of silver (without in the meantime taking into account the albumenate of silver). Thus:—

NH_4Cl		$AgCl$		Grains NH_4Cl		Grains $AgCl$
53·5	:	143·5	::	2	:	5·18

And 5·18 grains chloride of silver in each sheet are equivalent to 4·47 grains sulphide of silver. Thus:—

$AgCl$		AgS		Grains $AgCl$		Grains AgS
143·5	:	124	::	5·18	:	4·47

Again:—

AgS		Ag		Grains AgS		Grains of Silver.
124	:	108	::	4·47	:	3·08

Consequently, it is *impossible* to recover more than 3·08 grains of pure silver from the *fixings* of a sheet of photographic paper containing originally two grains of chloride of ammonium. But, when we take into account the facts that the image is mainly formed out of these 3·08 grains of silver, and that the most argentiferous portions of the hyposulphite adhere to the prints, and are thrown away in the subsequent washing, what remains in the fixing residue? If we allow one grain of silver—and that estimate is under the mark—for both these necessary and actual *wastes*, there will remain two grains of silver in the hyposulphite solution to represent each sheet of paper fixed in it. In other words, *you will have to precipitate the silver sulphide from* 240 *sheets, collect, dry, send the product to the melter, and pay him, too, out of five shillings and threepence worth of product!*

But, possibly, the albumen on the paper might take up a quantity of nitrate of silver, which might be soluble in hyposulphite of soda, although not in water, and thus increase the percentage of silver derivable from waste fixing solutions. This probable source of gain has been carefully inquired into.

I precipitated one ounce of egg albumen with a large excess of nitrate of silver, and washed the precipitate thoroughly in distilled water. The albumen was then exhausted of all the soluble silver that a thirty per cent. solution of soda could extract from it, and the solution treated with hydrosulphuric acid. The amount extracted was barely one-third of a grain of silver, or at the rate of one-tenth of a grain for each sheet.

In the silver recovered from the fixing solutions there is also an appreciable amount of gold; so that it *may* be possible to extract altogether as much as, but certainly not more than, six shillings' worth of the precious metals from the *fixings* of ten quires of albumenised paper salted as I have described.

Of course it is within our power to recover from the fixing bath a percentage of silver as high, or even higher, than that which Mr. Webster mentions. It can be got either by largely increasing the weight of salt in the albumen, or by fixing the prints without their having been previously washed. But I suppose no one now-a-days adopts either plan. It would be interesting to know how Mr. Webster operates.

I also find my experience to differ from Mr. Webster's in respect of the amount of silver that can be saved from the washing of prints before toning. Every sheet of my albumenised paper sensitised on a sixty-grain silver solution, and after being printed on, but before toning, yields on an average sixteen two-third grains of chloride from the washings, instead of the eight grains or under which Mr. Webster finds in his; but I always sensitise in a warm and dry room, and probably with a stronger bath than his, both of which would make considerable difference in my favour, and I have no doubt all other discrepancies of practice which I have been referring to can be easily reconciled if each one of us knew how the other worked.

After all Mr. Webster and I arrive, although by slightly different roads, at the same goal. He says the photographer is a careless one who does not get at least £8 10s. from every £10 worth of gold and silver used in his daily operations; or, in other words, who does not recover eighty-five per cent of his outlay in the precious metals. I, without counting the residues from fixing solutions, and after paying my refiner, actually recovered about seventy-five per cent of my outlay in nitrate of silver, and morevoer said that if I had taken the trouble to throw down and collect my hyposulphite residues, ninety per cent. would more truly represent the total saved [see page 505].

I have already told a melancholy and too true version of "a tale of a tub;" I will conclude this article with a no less true and suggestive story of "the man with many crucibles."

A few years ago the hero of my story, a photographer in this country, reached the highest point of eminence for skill in a certain kind of portraiture. His establishment grew and grew, and still extended, till he felt himself obliged to add to his staff of assistants a foreign gold and silver refiner supposed to know more than we do in this country about extracting the last shadow of a fraction of a grain of the precious metals from ores or photographic wastes. Gigantic tanks were fitted up for receiving the auro-argentiferous solutions. A furnace house for reduction was built on most approved principles, and a large waggon load of crucibles was taken into stock.

Time passed on, and reductions were being continuously made with this *very perfect* system, when it struck the head of the establishment to compare notes on his expenditure for silver and gold and on his savings from residues. He seems not to have been altogether pleased with the result of his comparison, and consequently sought the opinion of an eminent refiner in London, who asked the photographer to send him a sample of his used-up crucibles and waste slag or flux. The examination of the refiner indicated a large amount of silver and gold which had not been extracted. In consequence a small cartload—all that remained out of a great quantity of used-up matter—was sent to the refiner, who ground them up in one of those two-wheeled crushing machines used by builders for mixing up their mortar. After paying himself—handsomely, I daresay—for his trouble, the refiner sent the photographer a cheque for over £30 in recompense for the value of the precious metals contained in a *waste from wastes.* George Dawson, M.A., Ph.D.

HOW TO MULTIPLY NEGATIVES.

So long as photographs are printed by the agency of light, the dull weather that is so peculiar to the winter months, at least in this country, will continue to prove a serious barrier to the execution of large orders.

To mitigate this evil, one of the most obvious means to which recourse may be had is the multiplication of negatives. With a number of negatives an immense power of reproduction is obtained.

In the making of duplicate negatives it frequently happens that the reproduction is so hard and devoid of delicacy of tone that many photographers have not been slow to condemn, loudly and unhesitatingly, this system. During the past month we have seen negatives reproduced by three different methods, containing so much delicacy and having every inflexion of light so well rendered, as to place them more nearly on an equality with the original negative than any others that we had previously seen. The means by which they were taken we shall now describe.

First Method.—A few weeks ago we obtained from Mr. Solomon, of Red Lion-square, a small sheet of sensitive paper, which, acting under his instructions, we treated as follows:—

Having divided it into two pieces we printed one under a negative, allowing the printing to proceed to a considerable depth. This print we immersed in a bath which toned and fixed at one operation. Having washed it with water it was then laid down upon a plate of glass which had previously received a thin coating of gelatine, the face of the picture being of course next to the gelatined glass. A small squeegee served to effect the necessary close contact of the picture with the glass, and when they had become dry a little tepid water poured upon the back of the picture permitted the paper to be lifted up, leaving upon the glass the pellicle containing the picture and previously supported by the paper. The transfer was complete, and the glass now bore a very beautiful and soft transparency, the surface of which was then cleared of any of the adhesive material by which it had been previously attached to the paper.

The operation described above was then repeated, using the transparency as the *cliché* from which the next sheet of paper was impressed. This, too, was printed deeply, but was toned to a more non-actinic colour than the previous one. It was then transferred upon glass, and was so nearly a *facsimile* of the original negative that, in some instances, prints obtained from this duplicate negative could not be detected from those by the original.

It will have been already guessed that the transfer paper used in this experiment has an enamel surface which is coated with collodio-chloride. The exact method by which it is prepared is, of course, a trade secret, which we have no means of ascertaining; it is, however, a commercial production and keeps well, and may, probably, be purchased as cheap as, if not cheaper than, it could be made in small quantities.

Second Method.—By this method we have duplicate negatives of singular beauty. From a portrait negative, which it was desirous to reduce in size and yet retain all the essential features of delicacy which resided in it, a very sharp and fine enamel was taken by Mr. Henderson. This, being quite free from granularity or texture, was employed in the production of negatives by the camera, and, from the fineness of the vitrified surface, the great sharpness, and the transparency of the shadows, the negatives made in this way were of a high class.

There is, of course, this objection to the process described—Mr. Henderson's method of enamelling is not known. It is, therefore, important to obtain the next best surface on which to produce a print; and, although albumenised paper is too coarse for this purpose, there are several other kinds of paper, such as Obernetter's enamel paper, on which photographs may be obtained possessing the characteristics of the vitrified enamel.

It cannot be doubted that a film of collodio-chloride when laid upon one of Forrets's polished opal glass tablets will, if carefully printed and judiciously toned, yield a picture very little inferior to a vitrified enamel.

On whatever kind of surface the photograph is printed which is to serve as a basis for the production of negatives the following matters are absolutely necessary—a freedom from heavy blacks; thinness and transparency of the image; and a total absence of texture from the surface. Attention to these will enable an intelligent operator to produce any number of negatives which, if they be inferior to the original, will be so, probably, in an inappreciable degree; although it is quite as probable that they may prove better than the original.

Third Method.—Johnson's carbon process furnishes an excellent method of obtaining any required number of negatives possessing the greatest uniformity. Let us suppose that it is desirable to have upon one plate of glass a dozen *carte* negatives, all of them to be obtained from one original. On a sheet of paper coated with gelatine and a coloured pigment, and sensitised by bichromate of potash—the ordinary sensitised carbon tissue—is printed twelve *cartes* in suitable position with reference to each other, a proper mask being employed to protect from light all but the part under the negative. When the twelve impressions have been made the paper is taken into the dark room and soaked in water for a minute or two until it becomes flaccid. A glass plate somewhat larger than the paper having been provided, it is immersed in the water, and the wet tissue is plastered firmly down, its face being next to the glass. After it has become dry, or nearly so, the plate is immersed in warm water, by which means the paper is rendered easily removable, leaving a portion of its black pigment upon the glass. By allowing the action of the warm water to be continued the whole of the pigmented gelatine is removed, except that portion which goes to form the images, twelve of which, in the form of delicate and beautiful transparencies, will now be found upon the glass. The process just described is one of the best for producing transparencies with which we are acquainted.

The plate, with its images, is now placed so as to have a strongly-illuminated cloud, or even a sheet of paper, behind it—a large white card sloping back at an angle of forty-five degrees being one of the best methods of illumination. By means of a camera of sufficient size a negative is obtained which will, of course, be a direct reverse of the series of transparencies, and thus upon one plate of glass is obtained twelve negatives.

The above may prove suggestive to those photographers who, from the dullness of weather consequent upon the near approach of "the shortest day," might have some difficulty in supplying the demands for prints which may be made upon them.

A POOR MAN'S PHOTOGRAPHY AT THE GREAT PYRAMID, COMPARED WITH THAT OF THE ORDNANCE SURVEY ESTABLISHMENT, UNDER THE ORDERS OF COL. SIR HENRY JAMES, R.E., AT THE SAME PLACE FOUR YEARS AFTERWARDS.

COPIOUSLY ILLUSTRATED WITH TRANSPARENT PHOTOGRAPHS ON GLASS.*

Coalition Against the Poor Man.

Such, then, has been, in so far, the poor man's performance of the photographic part of his Egyptian work; and that was work, or, rather, labour of love, in as grand a field and noble a cause connected with the history of nations and the origin of civilisation, as time has opened up before the modern world. Both the work and its glorious cause, after three more years of untiring labour, he has endeavoured to set before the public in these four volumes, entitled *Life and Work at the Great Pyramid*, and *The Antiquity of Intellectual Man*. And now, after one more year still has passed away, but before he has recovered from his heavy expenses, what, think you, has been the poor man's exceeding bright reward?

It has been this: a coalition of rich and powerful ones in and about London has recently burst into his subject, animated by a ridiculously bitter hostility against himself, and a determination, apparently, to upset everything that he has been doing; and a few weeks ago he had the honour of receiving from them, under a cover, inscribed "On Her Majesty's service," and marked as forming one of the public documents of the national Ordnance Survey of Great Britain, this pamphlet, entitled *Notes on the Great Pyramid of Egypt*, &c., &c., by Colonel Sir Henry James, Royal Engineers, and Director-General of the Ordnance Survey, and wherein, although the writer gives somthing of a *catalogue raisonnée* of all authors and measurers of note or value at the Great Pyramid, from Professor Greaves, of Oxford, 230 years ago, down to and including his own officers and men this last spring, yet he has carefully omitted all mention of the poor man's name, books, measures, photographs, and everything else of his labours at the Pyramid—that is, all direct mention of them; for the autocrat of the pamphlet indulges by indirect insinuations and nameless abuse, sufficiently interpretable in denouncing all of them (though on little more than on his own false representations) as being vicious absurdities, extravagant nonsense, and folly worse than anything that can be paralleled from any times of even mediæval total ignorance of all physical science!

Now is not this agreeable information for the Astronomer-Royal for Scotland to receive "On Her Majesty's service" (if, indeed, that is true), and to be told that the pamphlet containing it all is expected not only to serve for the information of grown persons, but to be used also, far and wide, for the instruction of the rising generation "in our national and other schools;" and finally, that the expense of this magnificent onslaught upon him has been most liberally and generously defrayed by that so wealthy lady in London whom he has never seen—Miss Burdett Coutts. Can I, or ought I, to be altogether silent in such a case? Well, I will not attempt to say much just now, because—as I have already sufficiently demonstrated elsewhere a large number of both the blunders and something worse of this too remarkable pamphlet in its *literary* and *numerical* portions—I prefer now to examine only its *photographic* contents, and to inquire with regard to them before this experienced and photographically-learned meeting—What is there in the photographs of the pamphlet just issued by the rich and powerful Pyramid coalition in the south to justify them in their out-and-out attempt to stamp on, abuse, and drive out of existence the poor man's previous work of the same order in the selfsame field?

The Coalition's Photographs.

Now the photographs, or photozincographs rather, of the coalition pamphlet being only four in number, will not occupy us very long in their examination; and they are all arranged before the room in one view on the front of the President's table, while the President has another copy of the pamphlet in his hand.

Case 1.—The *frontispiece* of the pamphlet, though fair enough in general effect, is rather anomalous in its place, seeing that it does not represent anything about the Great Pyramid at all, but the Mohammedan-built Nilometer near Cairo. Nor is it even as such represented sufficiently well for scientific purposes; for if you take compasses and measure the cubits on the central stem, behold both lengths and breadths decrease continually from centre to either the top or bottom of the picture, showing that the photograph labours under the well-known evil of barrel-shaped distortion in the lens employed.

In such a case the *poor* man would have applied the same method of correction which he actually did employ in the same country four years previously, when he supplied himself with these black and white measuring rods—some 50 and some 100 inches long—and fixed or hung them about any important subject which he photographed, as, in fact, you may recognise in many of his pictures now exhibited, and test the dimensions of objects therein by means of them.

Case 2.—The next photozincograph, or that marked "Plate I.," is stated in the description to give the form of the Great Pyramid; and it is, moreover, the only general view of the Great Pyramid in the pamphlet confessedly upon that monument. We turn to the plate, therefore, hoping to study there minutely the intimate structure of the most pure and blameless building ever erected by man, when, lo! by a mere trick of the soldier photographer, the most prominent object of the scene is made to be, not the Great Pyramid, but that atrocious and biggest idol of all the earth, the Great Sphinx.

So far away has the Pyramid been put, in order to allow this dreadful Sphinx to shove its noseless face into the foreground, that nothing of the successive courses of the Pyramid's masonry, and many other equally important features, can be made out on the paper of this unhappy photozincograph. If, therefore, you want real information on the Great Pyramid masonry, you must come back, after all, to some of the *poor* man's much-despised photographs, such as Nos. 13, 87, 17, and others, where you may study that masonry's various features without interference from totally extraneous objects.

* Continued from page 593

Case 3.—But the third photozincograph of this pamphlet, or that marked there "Plate II.," ought to be something vastly better when the introduction says of it:—"The manner in which the Pyramid was originally cased may be seen in the photozincograph No. 2, which represents the second Pyramid, * * on which the casing stones of the top still remain in their places."

Now, these things are, without doubt, very important in Pyramidology; we turn, therefore, eagerly to behold them, when, lo! that horrid, monstrous idol—that idol of all idols, the Sphinx—stares us full and broad in the face once again, and from the best part of the foreground!

Were the Royal Engineers taken away from their proper employments in this country, and sent out to Egypt to do honour, and worship, and reverence to that iniquitous remnant of old idolatry, the half-bestial Sphinx, or to measure the Great Pyramid and illustrate the scientific refinements of its masonry so absolutely pure from all idolatry, whether of man or of false gods?

Let the engineer's works answer for them; and for all that they would, if they could, teach the poor little innocents "in our national and other schools." Yea, indeed, let their works answer for what was in their hearts, especially when contrasted with the poor man's picture, No. 14, representing in large the very identical casing stones of the second Pyramid, and nothing else unconnected, which the Royal Engineers ought to have given us on this occasion.

Case 4.—But surely the last photograph of the pamphlet will make up for all these defects of the earlier ones, especially as it is said in the introduction "to show the position of one of the sockets with reference to one of the present dilapidated corners (the north-east) of the Pyramid, with one of the Royal Engineers holding his staff in the farthest angle of the socket."

There, too, sure enough, you may see the Royal Engineer holding up a black and not very straight stick—possibly his walking-stick. But where is the socket? There is absolutely nothing identifiable as such! Was there, then, no proper socket in existence when the military photographers were there? or, have they photographed the surface of wretched rubbish, filling up and concealing the socket, and *called* that nasty stuff the socket?

Sir Henry James assumes to possess a surpassing knowledge of the sockets, not only during his men's time but during my time also at the Pyramid; for he declares them, precisely at that time, or previous to their excavation by Mr. Inglis, in 1865, to have been known to everyone "within a foot or two" of the place; and, also, to have been then "covered only with a little sand, easily removable by the hand." Now, this statement is in such utter, such flat, such merciless contradiction of what I had already published to the world at great length and in much detail in my *Life and Work at the Great Pyramid*, that I can only turn to my faithful photographs, which cannot lie, and I find there as follows:—

No. 25 shows the south-west foot of the Great Pyramid and the ground in front of it *before* Messrs. Inglis and Aiton with their Arabs began their work of excavation. No socket is there visible and no sand, only the hard and flattened surface of limestone, semi-concreted soil strewed with stones. But in No. 26, taken *after* these excavations—and after my assistance had been asked and given to help the excavators to find the socket by application of the theory, their own practical attempts during several previous days having ended in failure—behold the depth—much more than a hand-scrape, for it is some twenty inches—that they had to dig, on my directions, before they came to the socket; and there see its exquisite white and levelled surface, as well as the hard and stony composition of the ground that had to be cut through to get at it! C. Piazzi Smyth.

(To be concluded in our next.)

A PHOTOGRAPHIC JOURNEY THROUGH THE HIGHER HIMALAYAS.*

By S. Bourne.

About ten miles above Saltanpore we came across another solitary European residence, inhabited by two gentlemen who formerly belonged to the army, but were now engaged in growing and exporting wool. One of them was celebrated as a sportsman, and he here found ample opportunity for indulging in his favourite pursuit. This gentleman I had met before when an officer in the 93rd Highlanders; he now invited us to his bungalow, indulged us (or rather me, for the doctor did not drink it) with the luxury of some bottled beer, and gave us some useful information about the road. Shortly after leaving his bungalow we crossed the river, by a wooden bridge, to "Nugger Castle." Had we been going to Ladûk we should still have kept on the right bank of the river to the Rotung Pass, but, as we were bound for Spiti, our road lay to the right over the Humta Pass, which crowned the mountains on the east of the valley. "Nugger Castle" (so called, I believe, by a lady traveller, Mrs. Hervey) was formerly a Rajah's palace; it is built at a considerable elevation above the valley, and commands a splendid view of the beautiful scenery by which it is surrounded. Behind and above rise vast pine forests, till vegetation ceases and the snow line is reached. Looking across the valley another range of forest-clad mountains tower in gigantic masses till they also pierce the region of snow. Looking up the valley to the north large patches of rice cultivation are first beheld, beyond which a succession of wooded slopes, ascending on either hand from the plain of the valley, lead onward to the glaciers and snow-crowned summits of the Rotung Pass, which forms the northern boundary of the Beas Valley.

On this evening dense masses of sombre clouds rested on the surrounding mountains, concealing most of their summits, but which, by giving scope to the imagination, impressed a deeper solemnity on the scene. As evening approached there was something unspeakably grand in the solemn stillness and gigantic forms by which we were surrounded. Now and then, through the frowning masses of cloud which played around their summits, we could catch a glimpse of some enormous range, cold and sharp, which, in the darkening twilight, stood out in sombre majesty, piercing, as it seemed, the very heavens in its sublime altitude. None but those who have seen the Himalayas in their higher elevations can form an adequate idea of the solemn grandeur of their enormous masses when the deep gloom of coming darkness is spread over them, and only their far-off outlines can be seen relieved against the last flush of light that yet lingers in the darkening sky. Some of the summits visible from our position were fifteen or sixteen thousand feet high, but, great as this elevation may appear, surpassing the highest summits of the Swiss Alps, it dwindles into comparative insignificance by the side of those still loftier ranges which I shall have to speak of presently.

At Nugger we were hospitably entertained by Captain Knox and his lady, who were spending a few months in this delightful spot for the benefit of their health. When preparing to start next morning I found a mutiny amongst my coolies. Hitherto they had had a good road and comparatively easy work, but now that we were approaching the snows, and finding that we were going to cross one of these high passes, they did not like the prospect, and some eight or ten of them feigned illness or made some excuse or other and expressed a wish to return. I plainly told them that their excuses were idle and vain, that they had distinctly agreed to accompany me for the whole journey on the ground of getting a higher rate of pay, and that as they had hitherto had good roads and easy marches they were not going to leave me in the lurch now that the first piece of difficulty was approaching. But they were very resolute and stubborn, and declared they would not go, while two or three of them showed a disposition to bolt. On seeing this I took a handy stick, and laid it smartly about the shoulders of several of them till they lay whining on the ground. I gave them little time for this luxury, but made them buckle to their loads in double quick time. This bit of seasonable sovereignty had a good effect, as I never afterwards had the least trouble with these men; they stuck to me through heat and cold, climbing the highest and most difficult passes, and carrying their loads bravely over glaciers and places so difficult and dangerous that I, empty handed, only passed with fear and trembling.

Another march of ten miles brought us to a village called Jugutsook which we passed, and pitched our tents at another smaller village a little beyond, called Prini, where we halted for three days, in order that I might, if possible, get a few views of this part of the valley before leaving it to cross into Spiti. But I was doomed to be disappointed. From our encampment an exquisite view was obtained of the valley below, terminated by the Rotung Pass (1300 feet), with its glittering peaks and glaciers. But every day it was wrapt in clouds and mist; the only time it was visible was just before sunrise. By the time it was sufficiently light to take a photograph it had become enveloped, and its glories hidden; and not till the sun had again set would another glimpse of the snow-clad summits be obtained. During those three days many an anxious glance did I cast in its direction, and if ever a momentary break occurred I had my camera out, but before a plate could be prepared all was again invisible. There were other views to be had, including a pretty waterfall near our tents, but the weather was wet, dull, and altogether unfavourable to photography; and, as it was necessary to move on, I was reluctantly compelled to leave without having taken a single view since leaving Saltanpore of this by far the most beautiful part of the Kulu valley, I hope, if spared, to make another journey to this district at a more favourable season, either before or just after the rains (April to September), when, generally speaking, we get lovely weather in the hills.

(To be continued.)

* Continued from page 580.

THE TRUE ORIGIN OF THE COLLODION PROCESS IN SCOTLAND.

As the history of the introduction of the collodion process into Scotland may interest some readers, I propose to give the story circumstantially, as I believe the sequel will show that no one has a better right to speak authoritatively on the subject than I have; and, with this object in view, I will take a glance at the state or condition of photography, both in Edinburgh and in London, before the advent of the collodion process.

I will leave all the wonderful experiments that I performed in my early youth to the lively imagination of the reader, and hurry on to say that I was first led to take an active interest in photography, now upwards of twenty years ago (that is, to be particular, in September, 1849), by becoming the possessor of a complete set of apparatus for working the Daguerreotype, and taking lessons therein. This led to an introduction to Messrs. Ross and Thomson, of Edinburgh, from whom I received some additional lessons, and where I found that both the Daguerreotype and the Talbotype processes were established branches of an extensive business. Very shortly after this the albumen process came out, and was so successfully practised by that eminent firm that their fame was extended at home and abroad; and, I must say, to their honour, that, so far from making any mystery of the process, I remember seeing an intimation from them to the effect that their former pupils in the calotype process would be welcome to a lesson in the new process (and it may be noted that there was then an established "calotype club" in Edinburgh, mostly composed of advocates and such learned gentlemen). As I had not the title, however, to be put upon the free list, I compounded for a lesson in the albumen process—which, in brief, was to cover a glass plate with iodised albumen, and then hold it before a brisk fire with the fingers until it was dry, the plate being then ready for sensitising with silver.

This primitive mode of drying the plates did not approve itself to my astute mind, as the albumen had a tendency to run to the bottom, giving an unequal coating, besides the small matters of burning one's fingers and scorching one's face. I thereupon suggested an improvement, which was immediately put in practice, by taking a piece of wire and making a triangular loop at either end just large enough to catch the corner of the plate. The two ends being now placed together, and a twist given to the top, converted this wire into a sort of calliper or spring tongs. A piece of string to suspend it from completed the happy arrangement, and it was found to work admirably. The coated plate, being caught by the two extreme corners, was allowed to swing away horizontally and with the face down before the fire, giving an equal coating and no drawbacks.

This event, trifling as it may appear, could on no account be omitted from this veritable history, as it has an important connection with what is to follow; and, if it had not ocurred, this article might never have been written. My observant preceptors saw in it the power that it gave them to prepare plates of a large size, and they immediately put it in force by making a series of Scottish views of a magnificent size, the demand for which in London required a special agency, which was undertaken by Messrs. Henneman and Malone, of Regent-street.

About this time (1850) Mr. Tunny and I (having met before) were reintroduced to each other in the new capacity of amateur photographers, and we often met at Messrs. Ross and Thomson's when submitting our experiments, where all the scraps of photographic news, home or foreign, were eagerly discussed, and among others *I* got a copy of Le Gray's now famous pamphlet; everything of that kind was precious in those days, as you might have carried the collection in your pocket.

The grand aim at this time was evidently to increase the sensibility of the albumen process, so as to make it available for portraits from life; and, if I recollect well, about this time or about the beginning of the year 1851 some sensation was created by a notice of experiments by Mr. Fox Talbot in connection with an instantaneous process on glass, and of which the formula was published, by which the flight of a cannon ball could be photographed as well as a figure upon a rapidly-revolving wheel, illuminated by the flash of an electric spark. Then came the publication of Archer's collodion process—and Le Gray's bewildering dream was read. And yet the process was new, looked complicated and intricate; we had heard of Le Gray, and we knew Fox Talbot, but who was Archer? Mr. Ross confesses to the blunder of procuring some collodion and trying how his favourite albumen and it would amalgamate. So an appeal was made to a London authority for more information on Fox Talbot's new instantaneous process, but the oracle said:—"We have more hope of the collodion process." And cruel Mr. Tunny could smile and smile, and not enlighten us! And yet *he* knew all about it from Le Gray months if not years before, and had been using it in his public practice! Oh! Mr. Tunny!

I made a holiday trip to see the Great Exhibition of 1851 about the end of June, and on arriving in London (then for the second time) I was much struck with the size and beauty of the Daguerreotypes which met my view in all the leading streets. I, in due time, made my way to the establishment of Messrs. Henneman and Malone, in Regent-street, who enjoyed the reputation of being *en rapport* with the great Fox Talbot. The place to me had quite a welcome look, as I could see from a distance a great display of Messrs. Ross's large views of Edinburgh, with every one of which I was familiar.

Having been furnished with a letter of introduction to them from my friend Mr. Ross, I was cordially welcomed by the two gentlemen, and while I was proceeding, at their request, to demonstrate to them my new method of preparing albumenised plates, a gentleman entered who asked if they would like to see the new collodion process. Now, be it remembered, that this was three or four months after the full publication by Archer of his whole process in the *Chemist;* and yet this was the only place in London where portraits on paper were offered to the public, and they devoted themselves exclusively to them, taking *paper* negatives, the prints being beautifully worked up by miniature painters. Now, what is the inference? The poor baby, Collodion, with all the makings of a giant in him, had to be lifted out of his cradle and shown about when four months' old before people would believe he could live.

But to return to the gentleman who entered before I made this digression. He appeared to be a countryman of my own, and volunteered to show the collodion process. Another visitor, who spoke in French, and whose name, as I caught it, was Martin, was invited with me to witness the experiment. For this purpose the party of five, including our instructor, adjourned to the operating room, where some four small bottles were produced and a plate coated, excited, exposed in the camera for five seconds, and a negative was developed as if by enchantment. The lesson was given in the most methodical style, even to the removal of the collodion stopper and where and how to hold it, so as to make it impossible to forget to return it after coating the plate. I made a careful note of the composition of the new developer, &c., and was courteously informed that I could get all the chemicals from Messrs. Horne and Thornthwaite, in Newgate-street.

It is worth mentioning, to show the freedom and liberality with which this process was given to the public, that on making my first purchase of collodion, &c., at Horne and Thornthwaite's, which did not exceed in value the sum of ten or fifteen shillings, the shopman remarked that if I chose to wait a moment Mr. Wood would be delighted to go over the process with me.

I came home with my bottle, labelled "Archer's collodion," with its accompaniments, and lost no time in repeating the experiment in Messrs. Ross and Thomson's rooms, this being, as I believe, the first time it had been successfully tried in Scotland. I next visited Mr. Tunny at his modest little place, he having now resolved to try his luck as a professional photographer, and there again I went over the process with him. I made many subsequent visits to Mr. Tunny's studio, as he, being a beginner, was not so overwhelmed with sitters as my other friends. Upon one of these occasions, when a lady had been sitting to him unsuccessfully for her Daguerreotype, and as I knew the lady, I was permitted to try a collodion plate with my own collodion, which appeared to be quite satisfactory. Up to this time and at this comparatively late date—say the autumn of 1851! for I need not now be so particular about dates—the collodion process seemed still to remain in the hands of amateurs and experimentalists, and we had not far to seek for the reason of this. The Daguerreotype was the popular process for portraits, and they were in demand, so that every professional man who wished to make money of it naturally stuck to that process. But a "change came o'er the spirit of the dream" before long.

Let me state that when and after I had shown Mr. Tunny how to manipulate with collodion, as already related, he showed me, in an apologetic sort of way, a glass plate with something on it, as a thing not of any value in itself, but as having to him the scientific interest of being an actual experiment made by himself with collodion on glass. It had a queer, shiny look, as if silver had been deposited upon it in some way and then polished with three fingers, possibly in the hope of detecting some photographic traces; in fact, it was nothing more than a dirty little bit of glass; but taking it for what it was represented to be, it proved this—that my friend Mr. Tunny had experimented with collodion and failed.

Perhaps it might be said that Mr. Tunny is somewhat wanting in generosity in not acknowledging the invaluable services he received from a gentleman, whose name I cannot mention without his sanction.

This was Mr. T., a doctor in the navy, who was then enjoying some leisure time in the neighbourhood of Mr. Tunny's studio. The former gentleman devoted days and weeks together in experimenting with the latter, and many a message was sent from home for the errant doctor to come to his dinner. The result of their joint labours at last became apparent, and one day I was invited by Mr. Tunny to sit for a portrait, the doctor looking on, and I was presented with a capital negative of myself, developed with iron, the collodion, gun-cotton, and all having been made on the premises. This was in the latter end of 1851, and at least three months after I had first shown Mr. Tunny the process, and demonstrated its possibility to him.

William M'Craw.

ON A NEW ARTIFICIAL LIGHT SUITABLE FOR THE PRODUCTION OF PHOTOGRAPHIC ENLARGEMENTS.*

It is my intention to divide this communication into three parts. The first portion will relate to the description of a new light susceptible of employment in the production of enlargements; the second will treat of the nature of the enlarging apparatus; and the third part will include the details of the processes I employ for obtaining my enlarged prints.

I.—Artificial Illumination.

In M. Kirchhoff's analysis of the sun he has shown that there are burning upon the sun's surface large quantities of calcium, sodium, iron, magnesium, chromium, &c. Whether these metals exist in a free state on the sun's surface, or whether they are in the form of volatile compounds, is a question of little importance; for, as I trust to be able to prove, the presence of a very high temperature, *i.e.*, combustion, would be sufficient to yield not only an extremely dazzling light, but also one possessed of considerable chemical power. These conditions actually exist in the sun, the chemical action of whose rays is due mainly to the presence of chromium, titanium,† and magnesium.

I have found by experiment that nearly all the metals of the alkalies and alkaline earths, as likewise many of the metalloids, when burning in oxygen give rise to a large amount of chemical rays, and I very soon discovered that this fact was due to the production of an oxide at a high temperature, and that the same phenomenon was evident when the same oxides are produced by the decomposition of the metallic salts in a volatilised condition at a very high temperature. As an example of this curious fact I would cite magnesium, which, on burning, produces oxide of magnesium heated to whiteness by the flame. If we direct the jet of an oxyhydrogen lamp upon the carbonate or the chloride of magnesium, we produce in either case oxide of magnesium (magnesia) at a high temperature, and, moreover, obtain in both instances flames rich in chemical rays.

This experiment I will make in your presence, and you will see that so long as the salt is not entirely decomposed the light is sustained in all its brilliancy, but that when nothing but magnesia remains the light loses its brightness and, at the same time, the greater portion of its chemical activity.

If metallic oxides, such as lime, magnesia, alumina, zirconia, are employed and heated by the oxhydrogen flame to a very high temperature, the illumination is certainly very brilliant, but experience proves that it is much less photogenic in its character than when the oxide in a nascent condition is produced at a high temperature, as in the case of chlorides, carbonates, &c. In the latter instance the coloured lines of the spectrum inherent in each metal may be observed, but not in the former; and this circumstance induced me to believe that the chemical action of the sun is due to the cause mentioned at the beginning of this communication.

Magnesium is well known to emit an abundance of actinic rays; but I have no doubt I shall astonish my audience by informing them that chromium is possessed of far greater chemical intensity.

If dry hydrogen gas is passed through chloro-chromic acid and afterwards ignited in a current of oxygen, oxide of chromium is produced at a very high temperature, and at the same time a flame of such extraordinary chemical power that chloride of silver paper held at a distance of twenty centimetres (eight inches) blackens sensibly in thirty seconds, or about as quickly as in full daylight.

The same experiment may be conducted with equal success with chloride of titanium, which gives a blue flame of extraordinary chemical power.

Unfortunately these chlorides can be manipulated only by persons well versed in scientific research, as they become decomposed under the influence of moist gases, and the lamp then emits a considerable amount of vapour, as in the case of metallic magnesium.

Among the various other bodies with which I have experimented, I may mention zinc, antimony, cyanogen, and calcium; but none of these can be compared with those to which I have just now referred.

Sodium gives a yellow flame, potassium purple, barium green, and strontium red, as I shall be able to show you by directing the oxyhydrogen flame upon the chlorides of these metals; and you will then observe that as soon as the oxide ceases to be formed from the volatilised chlorides the light proper ceases, although the oxide is raised to a white heat. These flames, however, although very brilliant, are of a colour and quality which our present developers are unable to bring out; nevertheless they exert a vigorous action upon the violet chloride of silver.

Magnesium, chromium, and titanium, all of which exist in the sun, are, therefore, the sources of light most suitable for our purpose.

I am at the present moment occupied in establishing the coincidence of the ultra-violet rays of the spectrum with those of these metals, in order to substantiate more fully the theory expressed at the commencement, viz., that the chemical action of the solar rays is due to the formation of metallic oxides at a very high temperature.

Several methods exist by means of which the same phenomenon may be produced in our laboratories; these I will briefly pass in review:—

1. By mixing intimately metallic salts (containing volatile acids) with saltpetre, which gives out oxygen, and with charcoal to produce a high temperature; in this manner the pyrotechnic composition called "Bengal fire" is prepared with arsenic and antimony. It is easy to produce fires of this nature with the salts of magnesium and chromium, which are very suitable for photographic purposes, and I will hereafter indicate a few formulæ for the purpose. But all fires of this description produce too much smoke, and, besides, present a very large volume of flame, rendering them unsuitable for employment in optical apparatus.

2. By burning metal in the form of wire or ribbon, as in the case of magnesium. In this case the flame is of an uncertain and unequal character; and, moreover, a large volume of smoke is emitted. The price of this material is also very costly.

3. By submitting to the action of oxyhydrogen gas such metallic salts as yield oxides and furnish an actinic light.

It is this last method which, after repeated experiments, I have found to be the most practical.

Let us now pass from theory to practice.

II.—The Application of Artificial Light to Enlarging Apparatus.

Artificial lights to be employed in enlarging apparatus must present but a very small surface, must be of the most brilliant character, devoid of smoke, and constant for a period of at least half an hour.

Attempts have been made to apply electric light batteries from magneto-electric machines to this purpose; but the light afforded, although exceedingly dazzling to the eye, possesses but slight actinic power—a fact which is capable of explanation according to the views I have already given.

The Drummond light, in which a cylinder of quick-lime is submitted to the action of an oxyhydrogen jet, is not suitable for our purpose, as the illumination afforded, although very bright and steady, possesses but small actinic power, and it is necessary, moreover, to mix with the lime a proportion of carbonate, and continually to present a new surface to the gas-jet. It is for the above reasons that apparatus of this description are generally constructed so that the lime cylinder revolves upon its axis.

M. Tessié du Mothay substituted compressed magnesia, and, more recently, zirconia, for the lime; the light thus afforded is steady, but much less actinic than my own.

Instead of magnesia, Professor Carlevaris, of Genoa, employs little squares of retort-carbon saturated with chloride of magnesium; the Carlevaris light is very actinic, but the chloride is almost immediately decomposed, and nothing remains but heated charcoal, which developes no actinism whatever.

Of the above methods we have selected that of Drummond, substituting for the cylinder of lime one of very pure carbonate of magnesia, free from soda, baryta, and iron, either alone in a very compressed state, or containing titanite of magnesia obtained by a mixture of chloride of titanium and carbonate of magnesia.* The pillars are square at their base, three centimeters in diameter, and eight in height; they burn for an hour and a-half, and cost less than half a franc a piece. They emit a very brilliant and economical light, as I shall presently have the honour to show you.

Instead of pure hydrogen gas we may use ordinary coal gas, or even alcohol, together with oxygen.

The preparation of the oxygen, if my plan for doing so be adopted, is very easy, and entirely free from danger. I employ for the purpose calcined oxide of manganese; this is the ordinary native black peroxide which has been heated for two hours to whiteness, and which, from its original black, has passed to a brown colour. It is then finely powdered and passed through a sieve. The chlorate of potash I use is also pulverised and sifted; 600 grammes of brown manganese and 1,200 grammes

* Read at a meeting of the London Photographic Society, December 14, 1869.

† It is only lately that this metal has been discovered in the sun.

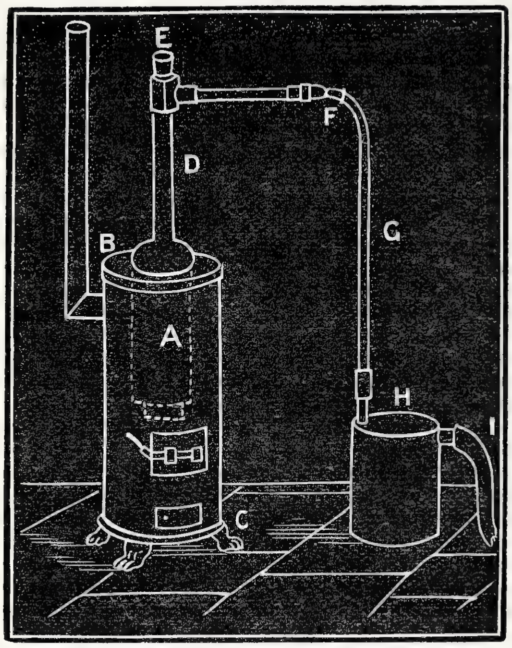
* Numerous experiments, made upon a large scale, show that when chloride of magnesium is purified from every trace of soda, baryta, and strontia, and is then precipitated by carbonate of ammonia, and the carbonate of magnesia so obtained, dried at 300 degrees Cent., and compressed by hydraulic power, almost the same amount of light is obtained as with a mixture of titanic acid. A compound made up of ten parts of carbonate of magnesia, two of charcoal, one of chloride of titanium, slightly damped, worked in a mortar, and compressed into pillars, gives a light almost twice as brilliant as the one above described, but costs ten times the amount. It is best to employ pillars of carbonate of magnesia; but these are exceedingly difficult of preparation, because it is necessary that they should be free from baryta, soda, and strontia, as, otherwise, a yellowish light is obtained.

of chlorate are well mixed by hand in an earthen vessel and sifted, care to be taken not to allow any organic matter to enter, and the whole is then introduced into the wrought iron retort A (*fig.* 1).

The cork stopper E, covered with tinfoil, is put into its place, and the junction F, and pipe G, in communication with the gas bag.

The delivery tube (I) should be of at least half-an-inch internal diameter, and the wash bottle H (*fig.* 1) must be half filled with water.

FIG. 1.



A small quantity of ignited charcoal is thrown into the little furnace B C, or a gas jet may be used, and after a lapse of a few minutes the India-rubber bag begins to inflate, and in twenty minutes it is full of oxygen; it is necessary during this operation to remove the weights and the pressure boards from the top of the bag.

When the operation is finished and the retort somewhat cooled, the junction F is unscrewed, the cork E taken away, and warm water poured in until the retort A is filled. The water is allowed to remain for an hour, and the contents are then poured into a large jar, where, after the lapse of an hour or so, the oxide of manganese subsides. The clear water is decanted off, and the black deposit put upon a plate near the hearth to dry, after which it is again ready for repeated employment as often as desired.

This operation is quite unattended with danger, if care is taken to employ calcined manganese. With ordinary native manganese a much higher temperature is necessary, the mixture having a tendency to puff up, and the operation becomes dangerous. For this reason it is advisable to use a cork-stopper E, and not a copper one, so that it may act as a safety-valve in case of danger from tumultuous evolution of gas or stoppage of the delivery tubes.

A killogramme of chloride of potash yields 270 litres of oxygen, and this quantity will supply the lamp for two or three hours; thus the cost of our light, including coal-gas and the magnesia, amounts to two francs per hour—a price very small when compared with the cost of the magnesium light.*

The oxygen is collected in an India-rubber bag, capable of holding 350 litres of gas; this bag is fixed between three upright supports, between which, and upon the bag, slides a cover bearing weights to the amount of 75 kilogrammes. When the apparatus is not actually at work the weights are removed, in order to avoid straining the bag unnecessarily. The oxygen may be preserved in this way for a month, and its production is so simple and certain, that the bag may at any time be refilled in the space of a quarter of an hour.

The oxyhydrogen burner which I use is very convenient. Those who have gas laid on in their houses will use the apparatus with two jets of gas; others will find it more expedient to employ the spirit-lamp arrangement. The coal gas does not mix with the oxygen, excepting in the flame itself, so that no danger need be apprehended on the score of explosion.

The manner of employing the apparatus is exceedingly simple. The tube and stop cock (connected with the supply of coal gas) is first opened and the gas ignited; the stopcock (in connection with the bag of oxygen) is also opened. The heat soon indents the pillar, and it *is only when a cavity has been formed that the light attains its highest degree of brilliancy;* at this stage the hydrogen stop cock is partially closed until the maximum amount of light has been secured. In the luminous hollow the most vividly incandescent particles of magnesia are seen, and these lose their brilliancy as soon as they become thoroughly calcined, when other particles are made to replace them. At the end of a quarter or half-an-hour the pillar is raised somewhat, so as to bring a fresh part of its surface into contact with the flame.

The stopcocks should not be opened fully until the maximum amount of light is required; for focussing, the oxygen tap should be opened but very little, and the other regulated accordingly. * * *

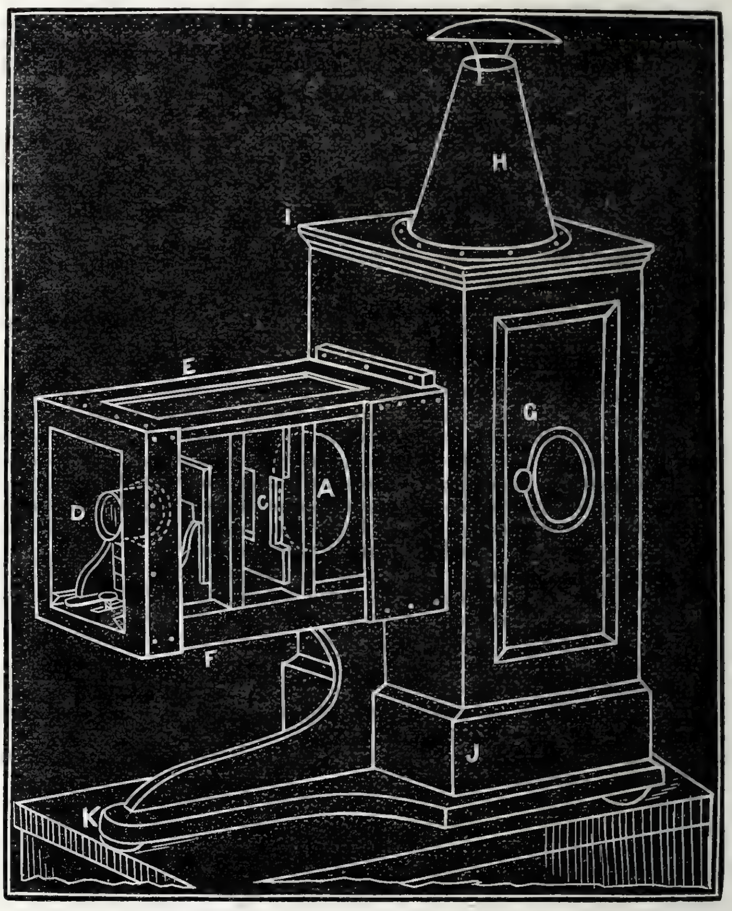
A certain amount of practice is, of course, necessary in manipulating, especially with the spirit-lamp arrangement. This latter yields a light slightly inferior to the double jet of gas; but, if properly managed, the difference is scarcely appreciable.

As you may observe, the construction of the whole apparatus is of a very simple and solid description, the light is exceedingly steady, and the flame free from all odour and smoke.

I have calculated that from five o'clock in the evening until midnight, a bag of this capacity would be sufficient to feed a large apparatus, provided that the oxygen is turned off when not absolutely required.

I will now proceed to describe the enlarging apparatus, which is shown in *fig.* 2.

FIG 2.



A case of polished oak, I J, surmounted by a chimney H, with doors at the sides G, furnished with green glass, contains the lamp. The optical apparatus is contained in the box E; it is formed of two lenses of very white flint glass, of which one is seen at A. These two lenses condense the light and transmit it through another lens, D.* Between this latter and the lenses A is placed the negative to be enlarged (held in the frame C). The lenses which condense the light are prepared from very transparent flint glass rather than lenses of crown glass, which latter possess to a considerable degree the power of absorbing chemical rays emitted at a low temperature, as is here the case. Besides this, it is easy to manufacture flint lenses of very short focus, because its index of refraction is greater.

The artificial light has approximately the diameter of the circle of aberration of the lens. It is necessary that its place in the apparatus be carefully chosen; for the brilliancy of the enlarged image may be varied from simple to triple power. Whether the artificial light is badly adjusted is easily ascertained by observing if upon the enlarged image there are any blue spots, and if around the field there is a strongly-marked circle of red light; if such be the case, the light either requires to be moved forwards or backwards, raised or lowered, until freedom from the defect is secured. The placing of the light in its correct position is soon acquired after a little experience.

As to the operation of focussing and the projection of the image, nothing need be said on my part which is not already well known.

* For English measurement, it may be well to remember that three pounds of chlorate of potash gives off thirteen cubic feet of oxygen. The charge required for Dr. Van Monckhoven's apparatus is somewhat less, since a kilogramme is equal to two one-tenth pounds.

* In apparatus where the lenses A are ten inches in diameter, one of them may be removed and the case I J also; then, by adjusting a reflector, it is possible to work by sunlight when the same is procurable.

I would call your attention to the extreme sharpness of the enlarged image. Here is a *carte-de-visite* negative representing a monument sharp in every detail; this I will enlarge. It is now of the size of six sheets of paper, and you perceive the image is still perfectly sharp, even to the very edge. This clearness of definition is due not only to the lens but likewise to the intensity of the light. You will observe, also, that the margin of the field is red and bright, and has an effect similar to that produced by solar light; this would by no means be the case if the condensing lenses were of crown glass, which give a field of a very green tint.

III.—Processes Suitable for the Production of Enlarged Images by Means of Artificial Light.

There are two ways of obtaining a large positive from a small negative. To enlarge it direct, or to make a large negative upon collodion or paper, retouch it thoroughly, and then print it in the ordinary manner.

Direct Enlargements.—The small negative is placed in the apparatus, and the enlarged image projected for a period of three or four minutes upon bromo-iodised albumenised paper. The preparation of this paper is very simple. A bath is compounded according to the following formula:—

Distilled water	2,500 grains.
Albumen, beaten to froth and allowed to subside	350 ,,
Iodide of cadmium	40 ,,
Bromide of potassium	40 ,,

The bath is of a milky character when first made; it is allowed to stand in a cellar for a few days and is then filtered, when it becomes as clear as water.

The paper, Saxe or Rive, is floated upon this bath for three minutes, and then hung up to dry, the reverse side being marked with a pencil. To sensitise, it is floated upon a bath of—

Distilled water	1,000 grains.
Nitrate of silver	70 ,,
Glacial acetic acid	70 ,,

The paper is exposed wet, and then immersed in a developer of—

Distilled water	1,000 grains.
Citric acid	4 ,,
Pyrogallic acid	2 ,,

The image is developed, as you perceive, in a very few minutes; it is washed, and then immersed in—

Water	1,000 grains.
Hyposulphite of soda	100 ,,
Chloride of gold	½ grain.

It remains five minutes in this fixing solution, and is finally washed in a plentiful supply of water.

Indirect Enlargement.—This method is, in the majority of instances, the preferable mode of proceeding, inasmuch as it is more certain and capable of yielding more beautiful results. I commence by taking from the negative to be enlarged a positive (by transparency) of the size of a *carte de visite*, which may be done in the camera with wet collodion; positives produced in this manner are, however, always flat, hazy, and wanting in sharpness, and are in no way comparable with positives obtained by copying the negative upon a plate coated with collodio-chloride of silver. Images secured in this way are much cleaner, more transparent, and are capable of enlargement in a third or fourth of the time required for positives on ordinary collodion. In order not to prolong this *mémoire*, I will describe my mode of obtaining these collodio-chloride positives in a separate article.

A transparent positive being obtained similar to the one I have in my hand, I proceed to enlarge it either upon collodion or paper. If the enlargement measures more than 45 × 59 centimetres (17½ × 23 inches) it is best to employ paper, but otherwise collodion is preferable.

I will proceed now to enlarge a transparent *carte* positive upon a collodionised plate measuring 48 centimetres by 60 (18¾ by 23½ inches); ten to fifteen seconds, you will perceive, is a sufficiently long exposure of this large negative, which will be found much superior to a negative of the same dimensions produced direct by means of the camera in the ordinary way. When this negative has been properly retouched any number of good positive prints may be produced from it without further trouble. We will now produce from another negative a life-size portrait upon Saxe paper, prepared in a bath of—

Water	1,000 grains.
Iodide of potassium	15 ,,
Bromide of potassium	5 ,,

and afterwards sensitised in the aceto-nitrate of silver bath, of which I previously mentioned the formula. I would call your attention to the time necessary for producing this enlargement; we will allow the damp sheet of paper to remain three minutes exposed to the action of the artificial light, and then develope, wash, and fix it. Here is the finished negative, of which you will be able to judge for yourselves. With this new enlarging apparatus and artificial light I have shown, then, that without any practical difficulty it is possible henceforth to be independent of the sun when working in connexion with this branch of photography. In summer it will, without doubt, be always preferable to employ a solar apparatus; but during the long evenings of the winter months apparatus of this description may be used with advantage.

D. van Monckhoven, Ph.D.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Dec. 23rd	Bristol	Philosophical Institution, Park-st

LONDON PHOTOGRAPHIC SOCIETY.

The first ordinary meeting for the present session of this Society was held on Tuesday evening, the 14th inst.,—the President, James Glaisher, Esq., F.R.S., in the chair.

The minutes of the previous meeting having been read and confirmed,

The following gentlemen were admitted members of the Society:—Messrs. William Brooks, Edmund Hyde, R. Slingsby, Richard Leigh, F. Beasley, Jun., J. C. Stoddart, Dr. Scott, R. Potter, J. M. Burgess, F. Downer, W. H. Stillman, F. G. Lloyd, and Abel Lewis.

The Secretary then read a paper, by Dr. D. van Monckhoven, *On a New Artificial Light Suitable for the Production of Photographic Enlargements.* [See page 605.]

Several enlargements of a good quality were handed round for examination.

Dr. Monckhoven, who was present, conducted, very successfully, the experiments mentioned in the paper, which the Secretary stated had been translated from the French. We have devoted a short article to a description of the apparatus, which will be found in another page.

Mr. Solomon wished that the word "explosion" had been left out of the paper just read, for it was extremely desirable that, whatever might be the nature of the enlarging apparatus or of the light employed, all sources of danger should be entirely eliminated.

The Chairman said that by the construction of the oxygen retort the cork in the retort head would be blown out if there was undue pressure or if the delivery pipe got choked.

Mr. Spiller said that it might be interesting for them to know that the possibility of obtaining a bright light by passing hydrogen through chloro-chromic acid was known to him so long ago as 1853 or 1854, at which time he assisted Dr. Hoffman in making experiments for his lectures demonstrating the nature of flame. Among the experiments referred to was the passing of hydrogen over both high and low hydrocarbons (benzole and other fluids), and also the chloro-chromic acid. In the latter case they obtained a brilliant light; but, so far as he was aware, it had not been used for photographic purposes.

Mr. Sebastian Davis had observed a recommendation that the oxide of manganese used with chlorate of potash in the production of oxygen should previously have been exposed to a certain degree of heat. He asked Dr. Monckhoven to inform him what object was sought to be attained by that.

Dr. Monckhoven, in reply, said that it was recommended by M. Sainte-Claire Deville.

Mr. Mayall explained that the object of adding manganese to the chlorate of potash was to permit the oxygen to be liberated more evenly.

Mr. Davis was aware of that. What he wished to know was why the previous calcination had been recommended.

Mr. Hart supposed that it was to avoid any carbon compound, such as soot, that might be accidentally mixed with the manganese, and which might cause the formation of an explosive compound. The calcination would get rid of this.

Mr. Mayall considered that the danger from oxyhydrogen explosions had been over-estimated.

Mr. Hughes remarked that, so far as he could see, the value of the communication made to them that evening consisted in combining the optical advantages of the oxyhydrogen light, viz., the definite point of light, together with its steadiness, with the great actinic power arising from the combustion of magnesium. He considered that in this light was combined the continuity of the action of the lime light with the actinic power of the magnesium light, owing to the substitution of carbonate of magnesia for the usual lime cylinder.

Mr. Dallmeyer expressed as his opinion that the substitution of the volatile preparation of magnesia for the metallic magnesium gave the same result. As regarded the practical part of the question the importance was greater. They had seen with what economy, rapidity, and certainty the picture was produced; by the process described, a means of obtaining enlargements quite irrespective of the solar light was placed at their disposal. He believed that it would be found that the salts of chromium were still more actinic than those of magnesium.

The Chairman, in conveying to Dr. Monckhoven the thanks of the Society, referred to the fact that it was about thirty-five years ago since he, along with Lieutenant Drummond, tried the light which was now known by that gentleman's name. Concerning an explosion, he considered that there was no chance of it in the burner employed by Dr. Monckhoven, seeing that the gases had no opportunity of mixing until they were both ejected from the burner.

The business for the next meeting was announced to be a paper by Mr. Highley on the magic lantern, and a paper by Mr. Dunmore on a new scheme of combination printing.

The meeting was then adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

This Society met on Thursday, the 9th instant, the chair being occupied by Mr. T. Sebastian Davis, Vice-President.

Messrs. E. Dunmore, Stanfield, and George Trucker were admitted as members.

As the meeting was the end of the financial year the Treasurer presented his report; and, the accounts having been duly audited and declared to be correct, it was found that there was a good balance left in the Treasurer's hands.

The Secretary read a letter from Mr. H. P. Robinson, which accompanied a piece of the negative from which he had printed his picture, *Sea Gulls*. Mr. Robinson gave no information concerning the method of production employed. The broken piece of negative was handed round for examination.

Mr. Baynham Jones, referring to a passage in Mr. Robinson's letter, could not understand the alleged reason for his declining to state by what means it had been taken, viz., because several opinions had been expressed concerning it.

Mr. Dunmore thought that there was a degree of flatness about the gulls which seemed to indicate that they were painted, and not taken from nature.

Mr. Cocking said that, as an artist, he would not undertake to paint on a negative such minute objects with so much detail.

Mr. Foxlee considered that there was no difficulty whatever in photographing a flock of gulls, provided that they only presented themselves before the camera. With a portrait lens having a large aperture, and a bright day, objects of that kind could be easily taken.

Mr. J. T. Taylor said that the light radiated from a flock of sea birds was greatly in excess of that which came from a London street with its dingy houses; and the apparent motion of gulls was occasionally much less than that of people and carriages in a busy street; and yet the latter had frequently been most successfully and sharply photographed by Blanchard, England, and many others. He had frequently seen stereoscopic marine views containing sea birds, and some of these were sufficiently sharp to bear enlarging to a very considerable degree.

After some desultory conversation on the effects that might be obtained by making enlargements from small instantaneous pictures, and obtaining from these enlargements other negatives after any defects had been stopped out, a vote of thanks was awarded to Mr. Robinson.

Mr. Baynham Jones submitted for examination some excellent cabinet portraits by Captain Tod, of Cheltenham.

Mr. Fitch exhibited several fine collodio-chloride pictures that had been exposed for six years without a protective covering. He said that they had not faded in any way.

Mr. Taylor exhibited a number of beautiful portraits of large size, as well as cabinet and *carte* portraits, all by Mr. Chancellor, of Dublin. These, he said, were the property of Mr. Sanford.

The thanks of the meeting were awarded to these gentlemen.

On the subject of the recent photographic exhibition,

The Chairman said that if they took into consideration the portraits exhibited three or four years ago and contrasted with them those produced this year, the advance had been so prominently developed in the recent exhibition as to leave no doubt that portrait photography had progressed immensely. There was now more sentiment displayed, and the English mind had turned to the production of pictures, and not of mere portraits. The works of Salomon secured the admiration and wonder of our countrymen, and with the characteristic pluck of Englishmen they determined to secure equal results. The aim of the artist should not be merely to obtain a likeness of the sitter—he should also convey some idea of the faculties of the individual there portrayed. He rejoiced that portraiture was taking that position. Whatever might be the future of landscape photography, portrait photography would always take a foremost position, for by no artistic means could a likeness be better produced than by the aid of the lens itself. It was admitted by many of the public that a photographer might not only be an artist himself, but that he might express his artistic knowledge in a photograph.

Mr. Hart had been on the continent in the autumn, and had had opportunities of seeing many exhibitions of photographs, but had seen none to equal that in Conduit-street. There were fewer full-length portraits produced on the continent than in this country. He thought that if the portraits of Mr. Blanchard were exhibited in Berlin they would revolutionise photography in that city, in the same way as Salomon's had done in London. In Berlin they were quite free from such fogs and smoke as they were subjected to in London, and, therefore, better pictures ought to be taken. The roof of Dr. Vogel's studio was very flat—so flat that, in London, it would be useless, on account of the soot which would fall and lie upon it. His system of blinds was very perfect, and by their means any effect of lighting could be obtained.

Mr. Blanchard was inclined to think that in photography, as well as in other departments of art, they were apt to get into a groove. In the *carte* miniature it was necessary to take a full figure, and they were taken with a light grey background. Thus the public was educated to look for those light grounds, forgetful that by force of contrast the full amount of delicacy could not be obtained in the flesh. He had, for some years, fought against that, but some people insist that a dark background is heavy and smudgy. When in Paris he was struck with the totally different treatment of portraiture there, and came back strongly impressed with the idea that photographers in this country were mere infants in portraiture compared with the great artists on the continent. It showed how they ran in a groove when they observed that they were now prepared to run to the opposite extreme. With too dark a background the face might become a white patch. In order to get a proper degree of rotundity of the face, the greatest judgment was required in the selection and lighting of the background.

Mr. Foxlee, in reference to a remark of Mr. Blanchard's concerning the background used by Salomon, said that it was evident that that artist produced his effects not by using a dark-coloured background, but by shading it during exposure.

After some further remarks the meeting was adjourned.

The annual dinner of this Society will take place to-morrow (Saturday) evening, at the Restaurant Royal, Regent-street.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Memoria Hall, on Thursday evening, the 9th inst.,—M. Noton, Esq., V.P., in the chair.

The minutes of the November meeting were read and confirmed, and the following resolutions recommended by the Council were agreed to:—

1.—That a *soirée* and exhibition be held during the present session.

2.—That the exhibition be open two days, namely, on the 28th February and the 1st March, and that the lantern exhibition take place on the evening of the 1st March; power being given to the *soirée* committee to change these dates, if necessary.

3.—That the members of the Council shall manage the *soirée*, and shall have power to add to their number.

4.—That the sum of £25 be placed at the disposal of the Council, to defray the necessary expenses.

5.—That an art-union be held in connection with the exhibition.

Mr. Holding originated a long discussion by asking why the works of members of the Society were inadmissible as art-union prizes.

After a tolerably free ventilation of the question, the Secretary read the following resolution, passed on the ninth of January, 1868:—That, with a view to encourage the loan of photographic works of art for exhibition at the annual *soirée*, there be an art-union held in connection therewith, and that the prizes be selected from the pictures of the various contributors who are *not* members of the Society.

It was ultimately decided to adhere to this resolution.

Mr. Sanderson made a few remarks on the keeping qualities of Durand's sensitive paper. He had accidentally left some pieces in the printing-frames quite six weeks, and at the end of that time toned them. The resulting prints were about equal in quality to such as would be obtained on ordinary silver paper two days' old.

Mr. Hutchison said he usually toned Durand's paper in the acetate of soda and gold bath, and found the results highly satisfactory. He always made his toning bath moderately quick of action.

Mr. Sanderson, who exhibited two negatives—one full of pinholes and the other quite free from them—said he wished to recal to the remembrance of the members a statement made at the September meeting, to the effect that if collodio-albumen plates were inclined to develope pinholes, the fault could be effectually prevented by gently rubbing them with cotton wool immediately *before development*. The plan then pointed out was not quite correct. The plates should be gently rubbed with cotton wool when washing them *after the second sensitising*. The defective condition alluded to arose from the bath being overcharged with iodide of silver, and a plate from such a bath, after being washed and drained for a short time, had a rough and sanded appearance on the surface. A very slight application of the cotton wool would be found sufficient to cure the evil, as would be seen from a comparison of the two plates on the table.

Mr. Atherton said the same effect would arise in working wet collodion with an old or over-charged bath.

Mr. Coote showed a few negatives that were marked in a very curious manner, and for which no satisfactory reason could be given.

Votes of thanks to Mr. Sanderson and the Chairman closed the proceedings.

Correspondence.

Foreign.

Paris, December 13, 1869.

How often have your readers been treated to a discourse upon the molecules of iodide, bromide, and chloride of silver, and their *rôle* in the production of the photographic image! At page 615, vol. xiv., of The British Journal of Photography, I find, from the pen of your intelligent correspondent, Mr. W. H. Harrison:—"In photographic films we consequently have waves of light beating upon ever-moving particles, which is the reason why all physicists of eminence now

believe the invisible image to be produced by the conversion of the energy of radiant light into the energy of chemical separation." Again:—"We may suppose iodine to attract silver with force 1, bromine with force 2, and chlorine with force 3." As a new addition to this branch of our science, I have to present to your readers some ingenious researches upon the molecular actions of chlorine, bromine, and iodine; and, although these were not undertaken with a special view of elucidating the theory of photographic phenomena, I am inclined to think they will give us fresh matter for thought in that direction.

As a specimen of neat philosophical experimenting and reasoning, your scientific readers will, I think, be pleased with the *mémoire* by M. Valson, which was recently presented to the Academy of Sciences by M. H. Sainte-Claire Deville:—"The height to which a liquid rises in a capillary tube depends upon the dimensions of the tube, and of a coefficient, which is a certain function of the forces of attraction set in action between the elementary molecules." Therefore, says M. Valson, if we compare the capillary heights of various bodies in a tube of, say, exactly one millimetre diameter the variations observed in these heights only depend upon the actions of the molecules of the various bodies compared, and they can, consequently, be used to compare these molecules with each other. But how can we obtain bromine, iodine, and chlorine in a liquid condition for these experiments? The bromine *might* be used in its normal condition, the two other bodies could not be. To reduce all to the same condition they must be combined with another body, say a metal; and this combination must be dissolved in pure water. Of course the metallic salts must be pure, and it is requisite to dissolve them in water so that the solution shall contain precisely—

1. The same quantity of water.
2. The same quantity of metal.
3. The same number of molecules of either chlorine, bromine, or iodine.

With these conditions the capillary effects may be considered as measuring the respective molecular actions of the three simple bodies. The author gives the following tables, which show the results obtained by using potassium and cadmium salts:—

TABLE No. I.		TABLE No. II.	
Proportion of Water = 20 cubic Centis. Temperature = 25° Centig.		Proportion of Water = 40 cubic Centis. Temperature = 27° Centig.	
Weight of Salts.	Heights in a tube of 1 millemeter diam.	Weight of Salts.	Heights in a tube of 1 millemeter diam.
Grs.	Millemetres.	Grs.	Millemetres.
K Cl = 7·45	27·57	Cad. Cl 9·12	25·87
K Br = 11·91	24·41	Cad. Br 13·57	23·70
K I = 16·51	22·04	Cad. I 18·17	22·20

If we add the heights of chloride and iodide of potassium together and halve the result, we have the capillary height of bromide very nearly this:—K Cl 27·57 + K I 22·04 = $\frac{49\cdot57}{2}$ = 24·78, say 24·80, or only ·40 more than 24·41 of bromide of potassium.

The same will be found true if the salts of cadmium are examined in the same way, as the differences in the heights are solely due to the subcitation of the three substances, chlorine, bromine, and iodine; the difference in the *intensity of the molecular actions* of these three bodies are in proportion to the capillary heights noted. Now, then, comes a clever "dodge" for getting at the correct proportions between these intensities. We can use bromine as we have used these solutions of haloid salts, and the capillary height of this liquid body is found to be equal to 5·5 millemetres in the same-sized tubes, and at a temperature of 20° Centig. We can calculate from this that, were chlorine and iodine capable of existing in the liquid condition, and of being experimented upon in the same way, their capillary heights would be six and five millemetres. The *intensities of the molecular actions*, therefore, of these three bodies are—

Chlorine	6·00
Bromine	5·50
Iodine	5·00

We deduce from this, I think, that the molecules of chlorides, being endued with the greatest amount of intensity amongst themselves, are the most difficult of separation from the acting external forces, and that those of iodides being possessed of the least intensity are the most easily affected by external forces. That a mixture of iodides and chlorides in equal proportions gives a body of nearly the molecular intensity of a bromide, our photographic experience will, I think, bear out these theoretical deductions; and I hope some one more able than myself will do justice to the researches of M. Valson as applied to the philosophy of the formation of the latent image, and to the best proportions for using the haloid salts in photography. This method of observing capillary heights is said by the author to be of such precision that he has used it for analysis. The instance he gives is precisely one that would be useful to photographic chemists. A sample of bromide of cadmium was under examination, and its purity was suspected. A solution was made in accordance with the experiments already cited, and it was found that its capillary height, instead of being equal to the mean between the chloride and iodide of the same metal, approached nearer to that of the chloride. It was, therefore, suspected that the bromide of cadmium was mixed with chloride of the same metal, and such was found to be the case.

The author proposes to extend his researches to other bodies, and concludes his *mémoire* with an interesting table, comparing the capillary heights, or call it "capillarity" of chlorine, bromine, and iodine, with some of the well-known physical properties of these substances:—

Substance.	State.	Equivalent.	Density in State of Gas.	Combn. with Hydro. State of Solution.	Combn. with Hydro. State of Gas.	Capillary Heights with Potassium
				Calorics.	Calorics.	M. M.
Chlorine......	Gaseous	35·5	2·42	41·262	23·783	27·57
Bromine......	Liquid	80·0	5.39	29·742	10·658	24·41
Iodine........	Solid ..	126·0	8·71	14·475	4·431	22·04
Mean of Chlor. and Iodine..	Liquid	80·4	5·56	27·868	9·676	24·80

I am endeavouring to find a copy of Le Gray's pamphlet published in 1850 or 1851, which has been referred to several times in your pages. I have by me a volume on photography, published in 1851 in Paris, forming one of the *Manuels-Roret.* I find from this work that up to that date nothing had been done in France in the collodion process; for, in the chapter on the "Improvements introduced into Photography on Glass, by MM. G. Le Gray, de Brebisson, Malone," I find *no mention whatever of collodion*, but the following:—"The treatise on photography, published last year by M. G. Le Gray, has been received with great favour, and this was mere justice, for the author, not content with endeavouring to perfect photography on paper, has wished to communicate his discoveries fully and freely to photographers. *We owe to M. Le Gray several happy ameliorations in the preparation* of albumenised plates." Then follows the process, and not one word about collodion. How is this? Was it that the use of collodion was not thought worthy of notice in this manual of photography, and that in this country (France) its announcement was not thought much of?

On the question of whitening the inside of the camera, as suggested by Mr. Blair in your pages, I find these remarks in this manual:—"The scientific journals have been much occupied for some time in discussing a curious fact which appears to upset all our ideas of the construction of the camera. A clever photographer at Munich, Herr Lauchever, advises whitening the interior of his camera to obtain a marked acceleration in the time of exposure of his pictures. M. Blanquart-Evrard, having heard of this, hastened to repeat his experiments, and has not only whitened the inside of his camera, but also of the tubes carrying the lenses." The results obtained by M. Evrard were stated by him to be—

1. The formation of the image in one-half the time of exposure.
2. The formation of the image with an exposure less than would be sufficient in the blackened camera.
3. Uniformity in the picture; the whites are not lost before the other parts of the picture are well come out.
4. Infinitely less resistance to the colours which usually refuse to be photographed well, such as the red, yellow, and green.

Baron Gros denied these advantages, *at least so far as photography on silver plates was concerned.* It is seen from this that the subject of whitening the inside of the camera is by no means new, as has been pointed out by one of your correspondents, and that, nineteen years ago, its advantages were discussed and experimented on. The result of these discussions and experiments I should suppose were not favourable to whitening the inside of the camera.

You gave, at page 573, an extract from the *Court Journal* respecting Parisian photographers keeping "property" babies for those ladies of maternal instincts who desire to be taken with a "little darling." I much doubt this assertion. I have never seen a "dummy" baby at any of the studios, and I do not think that the maternal instincts of the *Parisienne* are so great as to make them desire in their photographs what they do not care for in their domestic arrangements.

R. J. Fowler.

Printer's error in my last: Instead of "effects of *ten* years' exposure" (page 595), it should be *one* year's exposure."

Home.

ARTIFICIAL LIGHT.

To the Editors.

Gentlemen,—Last night I was quite unexpectedly called on to give an opinion on the light shown by Dr. Monckhoven. What I meant to express was the safety of magnesium against any of the artificial strong lights, and that such gentlemen as Dr. Monckhoven would confer a great boon if they would endeavour and produce any compound not explosive, and requiring the aid only of the spirit lamp or common gas to produce a brilliant actinic light.—I am, yours, &c.,

London, Nov. 15, 1869. J. Solomon.

CEMENTING PAPER TO GLASS.

To the EDITORS.

GENTLEMEN,—Please say in the next issue what is the best cement to use for fastening *paper upon glass, i.e.*, closing the edges of stereoscopic slides on glass or *passe partouts*. I find that gum arabic does very well when first attached, but it soon becomes loose and flies off, leaving the paper binding ragged and broken. Some cement which will remain *firmly attached* to glass is the thing desired, even though troublesome in use.—I am, yours, &c., LUX.

[" Lux" is not alone in his difficulty. Neither gum, gelatine, paste, nor starch effect a permanent junction of paper to glass. There is a substance known as " coaguline," which is said to answer the purpose perfectly. We have not tried it; but at the rate at which it is sold in London it will prove a somewhat expensive paste to use. We have heard that it is composed of gelatine to which a little chrome alum has been added. After it has once become dry it is no more soluble. Will any reader kindly communicate information on this subject?—EDS.]

PHOTO-ENAMELS.

To the EDITORS.

GENTLEMEN,—Will you have the goodness to inform me if the enamel processes that are for sale are infringements of any existing patents?

I fancy that Joubert, some years ago, patented a process now brought before the trade *as new* by MM. Geymet and Alker.

I can remember, as far back as 1855 or 1856, seeing in THE BRITISH JOURNAL OF PHOTOGRAPHY that Camarsac patented or published a process that has again been patented by Herr Grüne. Now, can I work these processes without molestation? An early answer will oblige,—Yours, &c., PROFESSIONAL.

London, December 15, 1869.

[Grüne's process of enamelling by substitution was, as our correspondent states, published by Lafon de Camarsac several years before the date of Herr Grüne's patent. We are not aware that MM. Geymet and Alker claimed for the " dusting-on " process any novelty. It has certainly been *repeatedly* published in this Journal. You may produce enamels either by the substitutionary process or by the dusting-on process without infringing any patent whatever.—EDS.]

EXCHANGE COLUMN.

I have a few dozen duplicate lantern slides, three and a-quarter square, for solar lamp, of Worcester cathedral and neighbourhood, and Malvern, which I shall be glad to exchange for other slides of interest.—Address, enclosing list of subjects, to C. A. FERNELEY, Melton Mowbray.

ANSWERS TO CORRESPONDENTS.

PHOTOGRAPHS REGISTERED DURING THE PAST WEEK.—

E. Bullock, Lynn—*Portrait of J. T. Pinnigar.*

Edmund Rogers, Salisbury—*Group of late Bishop of Hamilton and Family.*

Marie A. Rigby, Holyhead—*The New Church of " St. Seriol," Holyhead; Holyhead Harbour and Breakwater; The Old Church, Holyhead; The National School, Holyhead; and Soldiers' Point, Holyhead.*

T. H. Douglas, Edinburgh—*Two portraits of the Right Hon. the Earl of Dalhousie; Two portraits of His Imperial Highness Le Prince Rhodocanakis.*

C. F. JESSEN.—Thanks. In our next.

M. J. F.—Thanks; but it is unsuitable for our pages.

ANNA.—1. The iodide has not been thoroughly removed.—2. See an article in the present number.

A. S. B. (Leeds).—We do not recommend particular makers of lenses. The three named by you are good.

J. H. N. (Wandsworth).—Make a solution of wax in turpentine, benzole, or other solvent, and give the plate a light coating of it. This will prevent the adhesion of the tissue.

M. CAREY LEA.—Just received. Being greatly "overset" for this number, we regret being obliged to leave over till next week our esteemed correspondent's interesting communication.

OLD M.D.—A good landscape lens of sixteen inches focus ought to cover a 12 × 10 picture very well. It will not, however, do it with such a large stop as an inch, but in all probability it will with a half-inch, stop

A WOULD-BE PHOTO-CRAYON (Macclesfield).—Several articles on the subject of photo-crayons appeared in this Journal shortly after Mr. Sarony introduced the process. To these we refer you. The subject will be fully treated in our ALMANAC.

AND. DICKSON.—It is evident that the negative has been intensified by means analogous to the following:—After fixing and washing apply a solution of bichloride of mercury, and, after a thorough washing, follow with an application of iodide of potassium. The tone and general character of the negatives thus intensified will be similar to those of your friend's.

TROUBLED JUVENILE.—You ought to have warmed the plate before you applied the varnish. Try still the effect of heat. If you fail to obtain the brilliancy of surface required give it a second coat of varnish, taking care this time that it be made sufficiently warm.

JAMES R. MCINNES.—We cannot here enter into the question of the difference between a subject for registration and one for a patent. We may, however, say that the former gives protection simply for the shape or configuration of an article, and the latter for the combination of parts.

B. D.—On a projection above the camera, and several inches in front of the lens, fasten a shutter on the guillotine principle, which must be drawn up until the horizon appears. The lower edge of this shutter may be so prepared as to assimilate in shape to the outline of the view. If, when the exposure is commenced, the shutter be very slowly moved upwards, the result will prove that you have a sky shade that will permit of clouds being taken.

W. W. STAINTHORPE.—In photographing the interior of the church the magnesium should be burnt from a position close to the camera, care being taken that none of the light falls upon the lens. In the absence of a suitable lamp the best way to burn the magnesium will be to form it into a taper of three or four strands, holding the end by means of a pair of pincers. Hold up as close to the light as possible a large sheet of very white cardboard to serve as a reflector; you will thus economise your light. A spherical metallic reflector is not suitable, as it will concentrate the light upon one spot instead of diffusing it over the building.

THOS. BRASH, M.D.—There are many most excellent tents now manufactured by several firms, and it is difficult to conceive anything more convenient or perfect than those that have been brought before the photographic world during the past few years. The tent that we use when we practice the wet collodion process in the field is a modification of that first introduced by Edwards, and was made by Meagher. It is small enough to carry in one hand, and, when erected, is roomy enough to permit of the manipulation of plates even larger than those we use. Rouch, How, Thomas, and several others manufacture tents concerning which it would indeed be difficult to suggest any improvement. Your best method will be to come to town and devote a day towards seeing for yourself the various productions in this department, after having studied the catalogues or descriptions supplied by the makers, whose advertisements are to be found in our advertising columns. The specialities that you desire might be found in one and not in another; hence we advise you to see as many different kinds as possible, and then decide which of them will best suit you.

J. C. J. favours us with a description of a method of making vignetting glasses of any size. This, if we mistake not, has already been published by us; but as it may be new to some of our readers, we subjoin our correspondent's description:—" The high price of large vignetting glasses now-a-days prevent their admittance in large squadrons into the photographers' establishments. Now, every one in the photographic profession is aware of the false economy of printing with a deficiency of printing frames or vignetting glasses. The plan proposed is of infinite value, since it embraces all the qualities of the ones now in use at a fraction of their cost, and it matters not of what nature the development or intensification of the negative has been; the result will never extend past the oval of the glass, and be beautifully soft:—From a quarter vignetting glass take a print, or, better still, a picture, by contact with a dry plate, arranging for the former that the tone be of a pure black, and that the high lights of the latter (if it be chosen) be very deep, the shadows being correspondingly transparent. This now is the instrument from which may be produced an indefinite number of vignetting glasses of various sizes, by simply copying in a camera the one by reflected light, the other by transmitted, the intensification of the results being pushed very far."

*** The pressure on our space being still very great, we regret to have to leave over several valuable contributions.

RECEIVED.—Geo. Markham; Wm. M'Robert; George Dawson; George Price; A. L. Henderson; R. Stark, Canada (two letters, the first dated having been last received, owing to misdirection); M. Row (Redruth); Thos. Johnson; and several others.

☞ Editorial Communications should be addressed to "THE EDITORS"—Advertisements and Business Letters to "THE PUBLISHER"—at th Office, 2, York-street, Covent Garden, London, W.C.

APPLICATION FOR NEW PATENT.

December 8, 1869.—"Improvements in Photo-Mechanical Printing and the Reproductiou of Designs. No. 3,543."—ERNEST EDWARDS.

LONDON GAZETTE, *Tuesday, December* 14.

BANKRUPT.

T. M. BIRD, Cheltenham, photographic artist.—Dec. 28th, at Cheltenham.

CONTENTS.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 503. Vol. XVI.—DECEMBER 24, 1869.

EASY MODE OF REDUCING SILVER FROM OLD NITRATE BATHS.

Several months ago we proposed a plan for saving the waste silver from old baths of the nitrate of the metal; this process, in our hands, had yielded excellent results, and we therefore confidently recommended its use to amateurs and to those who wished to convert old and impure nitrate of silver baths into new ones with the greatest amount of ease, and without the employment of elaborate apparatus for the purpose.

During the last week a professional photographer in extensive practice in Dublin, Mr. John Vincent Robinson, has favoured us with an account of his trials of our process on a comparatively large scale, and the results at which this gentleman has arrived have been so very satisfactory that we have little doubt that an account of the method pursued by Mr. Robinson will prove of interest to our readers, more particularly since so much attention has of late been devoted to the discussion of the best modes of recovering silver waste.

We must here say that our opinion is strongly in favour of the photographer having nothing whatever to say to the reduction of his ordinary silver waste, as it is much more economical and satisfactory to send it to a respectable smelting firm, and have the paper ashes, residues from print washings, &c., turned into money with as little delay as possible, since the materials to be operated upon are bulky, and their proper treatment requires considerable experience and the command of a very high temperature. But old nitrate baths are so rich in silver it would always be more satisfactory for the photographer to reduce the silver from these himself, and redissolve the pure metal in nitric acid, so as to prepare a new bath. The process hitherto employed for this purpose—*i.e.*, for producing *pure* silver—requires apparatus and conveniences which are rarely at the disposal of the amateur. We, therefore, sought to arrange a process which would perfectly effect the desired object with as little trouble or inconvenience as might be possible. This is the process employed by Mr. Robinson, and which we will describe again in giving an account of his mode of operating.

The principle on which the method depends is very simple. The silver is precipitated in the form of oxalate. This compound, when dry and heated, gently decomposes into metallic silver, while carbonic acid gas is evolved. As this decomposition takes place with explosive violence, we mix with the oxalate an equal weight of common bicarbonate of soda. The heat of a spirit lamp is then sufficient to produce the decomposition without any explosion.

Mr. Robinson took a considerable quantity of old nitrate bath, and divided this into two portions. One part was set aside for a purpose to be presently stated, and to the second part a solution of oxalate of soda was added. This oxalate of soda was prepared by taking a quantity of oxalic acid of the shops, dissolving in water, and adding common carbonate of soda until the liquid exhibited a decidedly alkaline reaction—that is to say, until a piece of reddened litmus-paper was changed to a blue colour on being dipped into the solution. The silver bath was rendered slightly alkaline by addition of carbonate of soda, and the oxalate of soda solution poured in until no further precipitate was produced in the liquid by further addition of the oxalate. The precipitate of oxalate of silver subsides quickly and is somewhat granular in character. When caught in a filter it can be easily squeezed, and can so be readily freed from much of the water and then dried. When treated in this way the oxalate was mixed with its own weight of bicarbonate of soda, and then placed in a clay crucible. When this was heated in an ordinary fire decomposition speedily ensued, and, on continuing the heat, the whole fused quietly without any particular attention on the part of the operator. When the mixture had been kept in a fluid state for a sufficient time, the crucible was taken out and allowed to cool. On breaking it up and removing the contents, a clean, bright button of pure silver was obtained, and no droplets of the metal were seen through the slag. The weight of this button proved to be a little over six ounces.

The second portion of old bath solution already referred to was then taken and precipitated in the usual way with common salt, and the chloride of silver so obtained dried and mixed with carbonate of soda, placed in a crucible, and heated in the same way as the oxalate. The heat was found to be wholly insufficient for the purpose of reduction; it was therefore necessary to use a furnace. Then, on fusion during a time similar to that given for the accumulation of the metal in the first process, the crucible was removed and, when cool, broken up. Minute beads of metal were seen to be scattered through the slag, and the button of silver was dull, rather ill-formed, and weighed only five ounces.

The above-mentioned striking difference between the weights of the silver buttons obtained by the two processes, of course, simply shows that the metal can be much more readily collected into one mass when the new mode of reduction is employed than can be done at low temperatures with the chloride plan. In the latter case the ounce of silver apparently lost was in reality scattered through the slag, and, we need scarcely say, could be picked out with the expenditure of some time and trouble. We may add that the cost of the oxalate process is rather greater than that of the usual plan; but the slight increase in this direction is more than counterbalanced by the advantages attending its employment.

POISONOUS PROPERTIES OF PYROGALLIC ACID.

This valuable photographic agent, hitherto supposed to be particularly inoffensive, has been lately shown by M. Personne to be as dangerous a poison as phosphorus. M. Personne's researches on the toxic action of phosphorus led him to propose a theory of the action of that poison on the human system. He expressed his belief that the deadly effects of phosphorus are due to its power of absorbing oxygen from the blood, and so impeding the natural oxidation of the tissues. As this is equivalent to saying that the aërating functions of the lungs are neutralised, the symptoms produced by this poison should, in some degree, be similar to those resulting from suffocation, and such is found to be the case. In order to test his theory, M. Personne commenced experiments on the action of other substances capable of absorbing oxygen with rapidity, and he at once fixed upon pyrogallic acid as being most suitable for his purpose. Having administered this acid in solution in quantities of about thirty and sixty grains respectively to two unfortunate dogs, the animals were attacked with symptoms similar to those produced by the adminis-

tration of phosphorus. The animal which took the largest dose died in fifty hours, and that to which thirty grains had been administered died after sixty hours.

M. Personne will, no doubt, look forward with much interest to the occurrence of a case of poisoning with pyrogallic acid in a human being as enabling him to prove the accuracy of his theory, but we give our brethren of the camera this warning of the dangerous properties of our useful developing agent. Having stated the bane we should give the antidote, but this we are unfortunately not able to do directly. As an antidote to phosphorus poisoning M. Personne states that oil of turpentine is of extraordinary value, since its vapour is well known to check the oxidation of phosphorus. This treatment could scarcely apply to pyrogallic acid poisoning, since turpentine in no way impedes its deoxidising action. *A priori* we should say the line of treatment ought to be support of animal heat by warm applications, the administration of stimulants—brandy or turpentine, the latter with gruel or other mucilaginous liquid—and of acidified solutions of chlorate of potash. This salt is well known to pass through the system unchanged under ordinary circumstances, but there is some reason to believe that in the presence of pyrogallic acid it would yield up the large amount of oxygen which it contains.

LANDSCAPE PHOTOGRAPHY, WITH THE INTENSIFYING AND FIXING BEING DONE AT HOME.

Some of the pleasantest days I have spent since I took to photography have been during the past summer—one in particular, at Cossington Mills, Leicestershire. My brother, a friend, and myself started from home early in the morning, and had a charming drive of some ten or twelve miles. The day was one of which photographers dream, but very seldom practically realise. Not a leaf was stirring —it was a bright, sunshiny, gleaming day, so much conducive to atmospheric effects.

I shall now briefly resume my mode of working in the field:—I take three packages out with me, viz., for 5 × 4 plates.

Package No. 1.—Stand for the camera; stand for the tent; and the dark tent. The dark tent is of home manufacture, on the Wilsonian pattern; for a figure, &c., of it see The British Journal of Photography for September 16, 1864. It has served me faithfully for four seasons, and is, in my opinion, the best tent extant; for it takes up no room, being strapped on with the stands. I have used this tent for whole plates down to quarter size. It has rather a comical look from a distance, and very often country people pass some queer remarks upon it. One, in particular, I will mention. Two labourers were passing by; one of them said:—"I say, Bill, what is that there? It looks like a Roman priest praying." The other replied:—"I don't think it is, as I don't see any candles." It happened to be about two miles from a Roman Catholic college where I was photographing.

Package No. 2.—Two tin cans, one fitting in the other—the larger one for water for washing negatives; the smaller for waste developing solutions. In the smaller can is placed a sixteen-ounce bath, sixteen ounces of developing solution, four two-ounce bottles of collodion, small bottles of spirits of wine, nitric acid, glacial acetic acid, gutta-percha funnel, and developing glass. The large tin possesses a handle by which to carry it, and to which is attached a small tin jug for washing plates.

Package No. 3.—Camera, dark slide, top stands, gutta-percha bath, plate drainer, plate box, yellow calico. These are all strapped in the focussing cloth.

The lens, which is Grubb's stereoscopic, six-inch focus, I carry in a sling case.

Although this seems a great amount of paraphernalia to take out, it is not so in reality. A boy of twelve years of age and myself have walked as much as ten miles a-day, and carried them without being much fatigued.

I would here mention a few words about collodion, bath, and developers. The collodion I have used this season has been Thomas's and Huggon's. I prefer them for landscape work three weeks after iodising. The bath contains thirty grains to the ounce, slightly acidulated with nitric acid. The developing solution consisted of—

Water	16 ounces.
Sulphate of iron	½ ounce.
Acetic acid	½ „
Alcohol	*quant. suff.*

Upon arriving at the scene of action I first select a shady place for the tent, as free from dust as possible—the window facing the north. If a very bright day I pin an extra thickness of yellow calico over the window. While the camera is being unpacked, &c., I proceed to reconnoitre the neighbourhood, and ascertain what views I require and the best light for each. I find it a saving of time if I have been able to go over the ground the day before; but it is not always convenient for me to do so.

In developing I flood the plate well with developer, till I have got as much intensity as possible. I wash it well inside the tent, then bring it into the light, and again wash thoroughly. If the negative be not well washed at this stage it will turn brown, which will ruin it. The negative is then placed on a drainer to dry. By this means of developing, and fixing at home, I have been enabled to take four negatives in an hour.

My first operation at home is to varnish the edges of the plates a quarter of an inch all round, to prevent any liability of the film slipping. When the varnish is dry I pour water over the film, and then fix with cyanide of potassium. I again well wash and dry.

The plate is then ready for intensifying in the following manner:—Wet the plate well, and pour over it—water three ounces, adding tincture of iodine till it is of the colour of sherry. About two drachms will be sufficient for a 5 × 4 plate.

After this solution has been on about thirty seconds, the plate is well washed. I then proceed to intensify with pyrogallic acid and silver till the requisite density is obtained. Sometimes it is necessary to use the iodine solution and pyro. two or three times; but this is very seldom the case.

In varnishing I use Fry's varnish. I have used it during the past season, and have never found it become the least tacky.

After the negative has been varnished I paste on the back some tracing paper, which I find gives additional softness. If the skies require stopping out, I go over the tracing paper with gamboge two or three times.

For printing I use "eagle" paper.

Toning bath:—Gold, one grain; carbonate of soda, two scruples; acetate of soda, two scruples; water, twelve ounces.

Fixing bath:—Hyposulphite of soda, four ounces; water, one pint.

When working whole plates my outfit is slightly altered, viz., I take a mahogany camera with rising fronts for two lenses—a No. 1 Dallmeyer's triplet for architectural subjects, and a Lerebours' single lens for foliage, water, &c. When going out for a few days I take two nitrate baths, one pint of collodion, which I pack into a basket, with partitions for extra chemicals, &c.

I went to Worcester last season and brought home sixty negatives. I must say the plates did not seem to deteriorate in the least, although the fixing was sometimes done a fortnight after development.

Of composition I shall say nothing, leaving it to the artistic eye and taste of the operator. I always focus for the foreground, and the aërial perspective falls into its proper place.

Having briefly stated my *modus operandi*, I heartily wish it may be of service to the readers of your valuable Journal; and, should there be anything that I have inadvertently omitted to state, I shall be most happy to answer any questions put to me through these columns. Charles A. Ferneley.

EXPERIMENTS ON SUTTON'S PROCESS.

Mr. Sutton's little pamphlet, containing a description of new instantaneous wet and dry processes, has now been before the public for several months, but I have not seen the published experience of anyone, except of himself and Major Russell, who has practised it.

My own experiments with the new plan cannot be said to have been very extensive, although I have certainly given it several very fair trials with various kinds of chemicals. In the main I have succeeded, equally well and often, with impure as with the pure and special chemicals which Mr. Sutton says are indispensably necessary.

I first tried my usual acid and strong nitrate bath, bromised collodion, &c., exactly as for Russell's rapid dry process; the only difference in the preparation of the plates being alkaline gelatine for a preservative instead of tannin. In either case the wet plates were slightly more sensitive than the dry—the former, indeed, being appreciably more sensitive than my ordinary wet collodion. All gave good images, but there was more disposition to veiling of the negative on the gelatine prepared films.

I next sensitised the bromised collodion in an old printing silver solution, which was clarified with kaolin, made up to the strength of eighty grains per ounce, and slightly acidulated with nitric acid. The plates were washed, &c., as before, the only difference in treat-

ment being again a gelatine preservative—"organifier" Mr. Sutton calls it—in the one case, and tannin in the other. Here the tannin had decidedly the best of the comparison—not so much in sensitiveness as in the facility of development and in the brilliancy of the negatives.

There is, evidently, no great necessity for a pure silver bath when exciting bromised collodion for Russell's tannin preservative. An old clarified printing solution, when of the right strength, answers excellently well.

Thirdly: I tried the special chemicals recommended by Mr. Sutton, following out his instructions for manipulation to the very letter; and I compared both the sensitiveness of the films and the brilliancy of the negatives with other plates, prepared in the same bath and at the same time by Russell's method. If anything, the balance of advantage was in favour of tannin. But, perhaps, the difference arose from my being more *au fait* in the manipulations of the latter process.

My attempts to make alkaline gelatine useful in the collodio-bromide process has hitherto completely failed, from an invariable clouding of the film to a damaging extent during development. But in this, as in the other method with a strong silver bath, I found the gelatine films developed more freely and with less fogging if the plates were soaked for about two minutes in warm water and then rinsed in cold distilled water immediately before commencing the development. Mr. Sutton should take a memorandum of this little bit of experience of mine, and try whether it is consistent with his own.

Notwithstanding my experiments, it would he hazardous for me to affirm that we have gained nothing by the publication of Mr. Sutton's new idea of a photographic process. Progress can only make its way by careful and well-directed experiment; and if Mr. Sutton has succeeded in throwing even one little brick on our accumulating heap of experimental knowledge, all honour to him for so doing. But his attempts at theorising have, in my humble opinion, far outstripped the facts in his possession, and should be received with caution, else we may be led away into unsafe regions of philosophy when we twist our facts to suit a pet *hypothesis* instead of making our *theory* bend to them.

But, supposing Mr. Sutton's new *wet* process to possess all the advantages of superior sensitiveness, &c., which he claims for it, I do not see how it can supersede the existing modes of working. In his method the manipulations are more complicated and difficult; also, the proper amount of washing—no more and no less—to be given to the film after its removal from the sensitising bath is a matter of far greater importance than Mr. Sutton seems to think. Consistent with proper action of the alkaline developer no free nitrate of silver can exist in the film, but yet a little soluble bromide must be there. Ten minutes' washing will not remove all the free nitrate, and ten hours' washing will, in all probability, take away the last trace of soluble bromide, when in either case the plate will fog under the developer. How can the plates be kept in water for a day or more without the removal of all that is soluble in them? It is true some films are more porous than others, and therefore more easily washed. As a rule, my dry-plate collodion, which is very porous, takes about an hour's good washing to free it entirely from nitrate of silver, and another hour to remove all the soluble bromide except a trace sufficient to prevent fog. If I wash my plates for four or more hours in various changes of water fogging is sure to set in, develope how I may.

I should have very much more faith in the *dry* process as being calculated to supplant the usual wet methods of working; because here the washing can be accurately timed and the films can thus be depended upon to possess uniform sensitiveness and other properties. But, in Mr. Sutton's *wet* process, a whole batch of plates, sensitised at the same time, and kept in water till wanted for use, must possess varying degrees of sensitiveness and a disposition to fog or not according as they have been more or less washed; hence, the developer must be modified by experiment for each successive plate. Who, I may ask, would willingly face such a state of uncertainty with a tranquil mind?

I should be glad to learn from Mr. Sutton how he manages to obtain *uniformity* in his new wet process. It puzzles me to see how it can be got. His inventive genius has, no doubt, provided against this serious drawback, for which I have in vain sought a remedy; but I can nowhere find any plan proposed in his book to meet the difficulty.

If Mr. Sutton really means his process to take a prominent position in photographic practice, he would do well not to hedge it round with so many specialities, and, I may even add, impracticabilities; for, he may depend on it, modern photographers will not be troubled by doing, in a roundabout way, what can be more easily accomplished by other means. Mr. Sutton is a very enthusiastic photographer and gifted with originality of invention; but, in this case, it appears to me, he has only given us a repetition of the Russell rapid process with an enhanced complication of details, or, rather, specialities, which photographers do not usually possess; and, so far as I can yet see, has described a process which possesses no advantage over the other.

George Dawson, M.A., Ph.D.

A SIMPLE SKY SHADE.

Obtain a nice, soft, pliable piece of thin leather—the size must be regulated by the diameter of the sunshade of lens; but in every case it must be a parallelogram, being twice as long as it is broad. On its two longest sides run a *hem (fig.* 3). Into the upper one insert a stout piece of brass wire; into the lower side a similar rod or bar of soft lead, which must slip in easily, and should extend beyond the leather at least half-an-inch on either side.

FIG. 1.

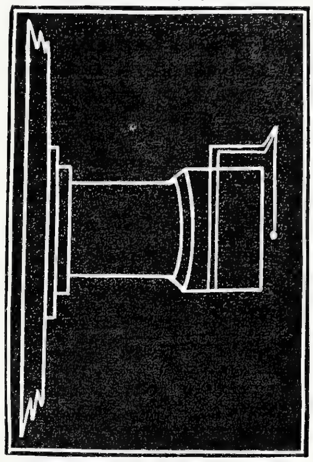


FIG. 2.

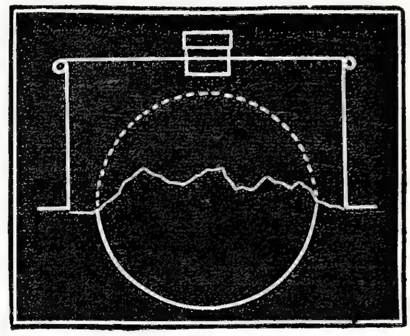


FIG. 3.

This is the sky shade, and may be mounted by attaching it to a bracket furnished with a spring clip *(fig.* 1) to slip over the sun shade or tube of the lens.

When *in situ* it does not interfere in the slightest degree with the capping or uncapping of the lens.

When about to use this shade first determine the relative amount of foreground and sky, and the stop to be used. Focus; then drop the shade in front of the lens, and the amount of sky to be veiled can be speedily adjusted, and any shape given to the sky shade by simply bending the lead rod in the direction required *(fig.* 2).

On exposing the plate the shade is allowed to hang down in front of the lens until a few moments before the expiration of the allotted time, when it is gently raised; and the clouds, having had their *quantum*, the lens is to be recapped.

Syntax.

A PHOTOGRAPHIC JOURNEY THROUGH THE HIGHER HIMALAYAS.*

By S. Bourne.

We now left this exquisite valley behind, commencing a steep ascent of the mountains which bound it on the east. We passed one or two small villages located where it was still possible to find a bit of cultivatable land, till presently all trace of a human habitation was left behind. In one or two places we crossed the track of enormous avalanches which had rolled from the heights above, carrying destruction before them, laying low thousands of noble trees, which obstructed our path, and gave an air of ruin and desolation to many a rood. On the banks of a little stream just emerged from the snow we pitched our tents, and gazed wistfully at the snow-clad heights of the Humta Pass, which we had to ascend on the morrow.

The morning dawned cold and frosty, and, after a rather more substantial *chata harzared* than usual, the doctor started for the pass, leaving me behind to take a picture of a pretty waterfall close by, so soon as the light should be sufficiently advanced. It was arranged that at some convenient place on the ascent he should halt for breakfast, where I hoped to rejoin him.

* Continued from page 603.

Having secured my picture I pushed on, as there was a long and, probably, a hard day's work before us. But I had scarcely gone a mile when I came upon another picture, which looked so tempting that I could not pass it by; so out with camera and tent again without losing a moment. When, however, I emerged with the plate my lovely view had disappeared—everything was shrouded in mist, and I was obliged to wait till it should clear again. I had thus to tarry two hours, and it was past twelve before I was again on the march. The mist had gathered thickly around, and it soon began to rain. Once it cleared off for an instant, and I saw before me a dreary valley eight or nine miles long, filled with boulders, ascending towards vast masses of snow visible in the distance, beneath a canopy of rolling clouds; and up this uninviting valley I had to pursue my trackless journey.

Beginning to feel rather hungry, I left the coolies behind and pushed on, in order to overtake my companion and the breakfast. The road was very rough; whenever there was a trace of a track I followed it, but soon found myself on steep snow slopes, where no track was visible, or on a tottering ridge of loose stones carried down by last winter's snows, from which it had apparently only just melted. After toiling some miles through rain and cold mist, I felt very much fatigued and hungry, and wondered why I had not come across the advance party. I shouted up the pass and down the pass, but the mountains only returned a dismal echo to my call. Again I toiled on, the road becoming steeper and worse at every step; but still no doctor—no breakfast!

It was four o'clock, and I was now so much exhausted that I could scarcely keep on my legs, and many a time sat down on the melting snow, straining my eyes in every direction to catch a glimpse of my companion. I shouted again and again, but no voice answered, save, as before, the hollow echo which came from the dreary solitude.

I now began to think that I had wandered in the wrong direction, and might almost give myself up as lost—not a very pleasant thought in such a place all alone. It was near five o'clock, and I was revolving in my mind the exigencies of my dismal situation, and wondering what I should do, when, to my infinite relief, there came a break in the clouds which enveloped us, and half-a-mile ahead I discovered four of my coolies slowly toiling up what appeared nearly the top of the pass. I called out to them with what strength I had left, but they heard me not, and still kept on their way. Again and again I shouted, but with no effect; and as they still toiled on, and I saw that in a few minutes they would be out of sight over the ridge of the ascent, I felt like the remnant of a shipwrecked crew who have been tossing on the waves for many days in a small boat, and see the ship which they fondly hoped would come to their rescue departing without having perceived their signal of distress.

At length they stopped for a moment to rest their loads on the wooden staff which they each carried for the purpose. Seeing this I renewed my shouts, when I perceived they heard me, as they turned their heads. I motioned them to wait till I could get up, and noticing them put down their loads to do so the prospect of relief gave me fresh energy, and I at length managed to crawl up to them. I asked where the "doctor sahib" was, and my servants with the breakfast. They said they had gone on before. Opening one of the *khilas* or baskets, I providentially discovered the remains of a Bologna sausage and two biscuits wedged in among plates and dishes. These, with a small quantity of brandy which I had still left in my flask, set me up again; and as we were now close to the top of the pass, and expecting to find our encampment not far on the other side, I plucked up courage and moved on.

The clouds still lowered about the pass concealing the grand and wild scenery which I knew must be on every hand. On arriving at the top, when a sudden gust of wind would for a moment cause a rift in the rolling mist, I obtained one or two glimpses of the surrounding peaks all embedded in snow, and which, seen dimly through the misty medium, looked very sublime in their cloudy home.

I at once resolved that I would halt below, and return to get some views of these splendid objects if the weather would permit. The descent was steep but short into the valley below, which was not so rough and desolate as that by which we had ascended. We had yet four miles to walk after descending before coming to the place where the doctor had thought it necessary to call a halt for the night.

It was dark when we got in, and I am afraid I accosted my friend in anything but a friendly manner for having deprived me of food and subjected me to so much suffering. He explained that on account of the rain the cook could not prepare breakfast, and they had kept on hoping it would clear up till they found themselves at the top of the pass, and he thought then it would be better to go on to an encamping ground below. He had not been taking pictures, and, walking more leisurely, and having plenty of men with him, he did not feel so much exhausted—had no sense of being lost, and so had not fancied I should be in a worse position. I felt very much disposed to grumble, as most people would do under the circumstances; but he took no offence, and we were soon as good friends as ever. I forgot my troubles in discussing the merits of a good dinner, and in that feeling of calm satisfaction which comes in looking back on troubles that are *past*.

I take some credit to myself for doing what I did on the next two days, as after such an experience of the place few photographers, I fancy, would have cared to go back five or six miles and reascend the pass to take pictures, with the probability of not succeeding, after all, on account of the clouds. Ah! you gentlemen! and you, careless public! who think that landscape photography is a pleasant and easy task—a sort of holiday pastime—look at me toiling up that steep ascent in the grey dawn of a cold morning in fear and trembling that my labour would be all in vain! See me sitting for ten mortal hours, shivering in cold and mist, on the top of that bleak pass, waiting for a "break," which would *not* come! See me descending, disappointed, at night to my tent, to return next day and go through the same again, and say if *this* is pleasant pastime!

Pastime indeed! What says that veteran landscape photographer, Wilson, of Aberdeen, on this subject in a letter which I had the pleasure to receive from him a short time ago? Referring to some of the pictures I took on this journey, he says:—"I think I can almost appreciate your amount of toil and trouble expended upon these views, but very few of the general public can do so, and I am often *riled* when I hear people speak of landscape photography as mere holiday work. I believe that the only reason why I have managed to get on here is that I have worked like a horse, and done things and suffered things that few people would submit to."

I only got one picture for my first day's climb, though I waited many hours for another. I left camera and chemicals under a rock ready for next day. Before sunrise I stood on that pass again, and was now rewarded for my perseverance. The sky was one deep blue, without a speck of cloud visible anywhere; and as the glorious peaks around pierced it sharp and crisp in the solemn stillness of the morning, becoming more and more dazzling in their brightness as the sun rose and threw his beams across them, I felt that the mere privilege of looking on such a sublime spectacle was ample reward for all that I had undergone.

But I had something more to do than gaze on the grand scene, and lost no time in getting tent and camera under way. By eight o'clock I had securely boxed three 12×10 negatives, when the clouds, which for the last hour had been fast forming and gathering round every summit, now closed round me and hid everything from view.

Though I had now four negatives, they did not represent all I wanted; there were two or three more views quite as good, if not better, than those I had, so I resolved to wait for the chance of a break. But, alas! no break came; rain and cloud drew an impenetrable curtain over all, and I was wrapt as in a shroud. But I waited on through all the weary hours of that day. The coolies, shivering under their blankets, cast towards me many a wistful glance, wondering what possessed me to stay so long in such a place as this. It was not till five o'clock that another chance came; there was then a break, but only for *seven minutes;* but this was quite sufficient to permit me to secure one more negative, when the clouds reformed, and I packed up and descended to my tent, half starved, but not altogether dissatisfied with my day's work.

I may here mention that I have since lost one of the best of the negatives I took on this occasion, with several other valuable ones taken on this journey, by that intolerable annoyance—reticulation of the film. I am well aware that this, the most serious danger to which our negatives are liable, arises from damp, but I am equally certain that the varnish has much to do with it.

(To be continued.)

NOTES ON RESIDUES.

The article, *More Notes on Residues,* in the last number of the Journal forms a most interesting example of two persons agreeing in principle and practice, and yet arriving at widely divergent results. I wish to show that my method of working is entirely consistent with modern practice, and that I have not committed the slightest error in my proportions.

Mr. Dawson's lucid deductions clearly showed me either that I had made a mistake, or that we were working on entirely dissimilar bases. Being quite certain as to the correctness of my experiments, I wrote, immediately after reading the article, to the manufacturers of the paper I then was using. I enclose their letter, and give here

the substance of it, merely premising that the writer is one of the largest albumenisers in London:—

"We use *ten grains* of chloride of ammonium to the ounce of albumen, and, as near as we can reckon, 270 ounces of albumen are consumed by one ream of paper, exclusive of drip, &c."

I think Mr. Dawson will find, upon still further inquiry, that these proportions and practice will be the experience of the majority of the large albumenised paper manufacturers.

I am inclined to doubt the *possibility* of coating a ream of paper with so small a quantity of albumen as eight pints. It is only one-third of an ounce to the sheet; that is, within a small fraction, the same quantity of comparatively thickly-flowing albumen as of thin easily-flowing silver bath is retained by a sheet of paper (estimating from Mr. Dawson's yield of chloride).

Here at once is seen the secret of our difference. A sheet of Mr. Dawson's paper contains two grains of chloride; a sheet of mine contains 5·83 grains. Let us proceed to apply the theory, and see what could be produced from my paper.

To save complication, we may directly calculate the amount of metallic silver producible from one sheet thus—$\frac{108\left(\frac{10 \times 270}{480}\right)}{53 \cdot 5} = 11 \cdot 76$ grains. Allowing Mr. Dawson's estimate of one grain of silver to the sheet for the formation of the image and waste, there would remain 10·76 grains in the fixing solution from one sheet, or 35·86 grains from three and one-third sheets. This clearly proves that the amount I obtained and estimated was *under* instead of *over* the theoretically obtainable quantity.

An error of calculation* will be noticed in two of Mr. Dawson's three proportions; 5·18 should be 5·36, and 3·08 should be 3·88. The correctly-calculated amount of silver from a sheet of his paper is 4·03; thus $\frac{2 \times 108}{53 \cdot 5} = 4 \cdot 03$. This, however, does not materially alter the result.

With rgard to print washings: while stating that I work with a seventy-five-grain silver bath, I can only reiterate the exactness of my experiments. But it can easily be seen that the great discrepancy between Mr. Dawson's results and my own in the matter of chlorides could easily be explained by differences of temperature, time of floating, thickness of paper, &c.

I hope at some future time to give the practical results of my printing and toning experiences.

G. Watmough Webster, F.C.S.

A POOR MAN'S PHOTOGRAPHY AT THE GREAT PYRAMID, COMPARED WITH THAT OF THE ORDNANCE SURVEY ESTABLISHMENT, UNDER THE ORDERS OF COL. SIR HENRY JAMES, R.E., AT THE SAME PLACE FOUR YEARS AFTERWARDS.

COPIOUSLY ILLUSTRATED WITH TRANSPARENT PHOTOGRAPHS ON GLASS.†

Then No. 27 shows the ground in front of the north-east foot of the Great Pyramid *before* the excavations began, and again no socket visible and no sand, only hardened lime, soil, and stones. But *after* the excavation, behold the socket—the well-cut and admirably levelled floor of the socket—in both No. 28 and No. 29!—a witness (it is clothed in its own pure white, and almost twelve feet square) to speak to the unrivalled workmanship of the ancient builders. There, too, is Mr. Inglis, with his foremen of Arab diggers, the two shiekhs of the Pyramid; there, too, is my attendant, Alee Dobree; and Mr. Inglis had just before told me with wonder and admiration, "I have levelled all over the floor of the socket with my spirit level, and can find no error in it." Only think what a testimony is that to correct work after 4,040 years have passed away! Will it be said of any of our works, after a like amount of time has elapsed, that men of that day, with all their improved instruments of precision, can find no error in what we have done?

No. 30, again, shows the socket at the south-west corner of the Great Pyramid, and you see there the same white level floor and the same stony soil that had to be cut through (upon my indications in this case as well as in that of the south-west socket, obtained only by theory and angular measures, after the practical plans of both Mr. Inglis and the Arabs had totally failed) before it was discovered. And, finally, No. 31 shows the south-east socket, the smallest but the deepest down of all the four sockets of the Great Pyramid, and covered it had been with the thickest and stoniest coating of rubbish, concreted almost into very rock. In the presence, indeed, of only this one photograph, and fortified by that regard which all the world is rapidly acquiring for the remarkable *witnessing* capacities of the art-science of photography, I would ask the President if there lives the man, in Scotland at least, with hands so hard or unfeeling, or so totally unlike human hands, that he could, whether easily, as Sir Henry James declares of himself, or painfully, as I should fancy, have grubbed out that hole and cleared that socket in that material, as you see it before you, with his hands alone? Take your magnifying glasses, gentlemen, and examine the rough and angular stones still sticking in the steep sides of the hole. Look at them, also, in the stereoscopic view, No. 48, on the table, and then pause before any of *you* undertake the task which the Director-General of the Ordnance Survey of Great Britain has laid himself under something more than moral obligations, both to the public in general and Miss Burdett Coutts in particular, to perform with nothing but his bare hands.

Such is the unflinching style of testimony of not a few of the *poor* man's long previous photographs against the overweening, but scant and faulty, photography of the recent pamphlet by the rich and powerful coalition in the south. Against other parts of that publication worse faults still have been established elsewhere, and more are to come.

What, then, can possibly be the advantage—at least to men's exact knowledge of the Great Pyramid—that the said *poor* man's work should be covered with obloquy and consigned to oblivion, in order that its place may be occupied by the coalition's pamphlet, and this be sent about the country in covers "On Her Majesty's service?" Who, too, are the members of Her Majesty's Government who are implicated in the transaction and all that it implies?

These questions are, however, so far, too deep for me that I must fain leave them in the hands of the public to solve in their own established manner; but I cannot conclude without giving my best thanks both to the President and the meeting for having had the kindness to listen to me thus long and patiently. Nor should I forget to testify my acknowledgments to the several members of your working committee, as to Mr. Davies, the Secretary, and to Messrs. Nicol and Slight, for their unwearied services in preparing all these illuminating methods by which my photographs, such as they are, have now been exhibited before you. C. Piazzi Smyth.

Appendix.

List of positive transparencies on glass, prepared by the author from his negatives taken in Egypt in 1865, and exhibited on this occasion at the Edinburgh Photographic Society.

Character.

1 to 12, on glasses 6·75 by 3·25 inches.
13 to 32, on glasses 10 by 8 inches.
33 to 38, on glasses 7·75 by 4·25 inches.
39 to 50, stereoscopic, each of the pair of pictures being 2·7 inches broad by 3·25 inches high.

Subjects.

1. The Valley of Egypt and the Mokattam Hills, from the Great Pyramid hill.
2. The Jeezeh Pyramids, from the hill of petrified shells.
3. A portion of the foreground of the above view highly magnified to show the shells more clearly.
4. The Great Pyramid, and the causeway from the plain on the east.
5. The Great Pyramid and the Second Pyramid, from the plain on the north-east.
6. The Artificial Esplanade on the north front of the Great Pyramid, overlooked from Desert Hills to the north west.
7. The rubbish heap—a difficulty to measurers—on the west side of the Great Pyramid.
8. The Core Masonry at the north-east angle of the Great Pyramid.
9. Colonel Heward Vyse's hole on the south side of the Great Pyramid.
10. The Mark of an Egyptian visitor of the Theban Empire on the rock enclosure of the Second Pyramid.
11. What the entrance passage of King Shafre's tomb really points to; being a refutation of an assertion by M. Renan.
12. The last man, after an exciting day at the Great Pyramid.
13. The Great Pyramid, with an answer to Strabo's question as to what the builders did with the chips of all their worked stones.
14. The casing-stone remnant near the summit of the Second Pyramid.
15. The modern rubbish mounds on the north side of the Great Pyramid.
16. The entrance into the Great Pyramid and Caliph Al Mamoon's hole.
17. The inclined courses of masonry connected with the entrance-passage of the Great Pyramid.

* It will be seen from a note by Mr. Dawson, under the head of "Correspondence," that he has himself discovered this error of calculation.—Eds.

† Concluded from page 603.

18. Beginning of the entrance-passage of the Great Pyramid, showing some of the fine and true joints of the masonry, together with much modern barbarity.
19. The dark entrance into the Great Pyramid viewed on its own plane, which is really inclined 26° 27′ to the vertical.
20. The first picture taken inside the Great Pyramid, by magnesium light, in the King's Chamber.
21. The broken corner of the coffer in the King's Chamber, by magnesium light.
22. Base of the niche in the Queen's Chamber of the Great Pyramid, by magnesium light.
23. The well-chamber in King Shafre's tomb at the instant of noon, computed from astronomical observation.
24. Alee Dobree in front of one of the tombs on the eastern side of the Great Pyramid hill.
25. The south-west foot of the Great Pyramid, and the ground in front of it, *before* the sockets were opened by Messrs. Aiton, Inglis, &c., in 1865.
26. The same south-west foot of the Great Pyramid *after* the socket had been discovered and excavated.
27. The north-east foot of the Great Pyramid, and the ground in front of it, *before* the socket was uncovered or excavated in 1865.
28. The same north-east foot of the Great Pyramid *after* the socket had been excavated.
29. The north-east socket of the Great Pyramid after excavation.
30. The north-west socket of the Great Pyramid after excavation.
31. The south-east socket of the Great Pyramid after excavation.
32. The outer end of the ancient east-north-east azimuth trench on the eastern side of the Great Pyramid.
33. The Great Pyramid from the plains on the north.
34. The Great Pyramid, with the Sphinx shown in its relative insignificance and disconnection, as seen from the summit of the hill near the southern causeway.
35. The Great Pyramid and the east tombs' cliff, as seen from the eastern plains.
36. All the Jeezeh Pyramids, as seen from the south-west.
37. The masonry courses of the Great Pyramid at its south-western angle.
38. Exterior of the entrance passage of King Shafre's tomb, of which the interior was shown in photograph No. 11.
39. The east tombs' cliff on the eastern side of the Pyramid hill.
40. Alee Dobree at east tombs.
41. Bones at east tombs.
42. Smashings of tombs on Pyramid hill.
43. Top of Great Pyramid from the east-north-east azimuth trench.
44. The outward end of the east-north-east azimuth trench.
45. The socket and the north-east foot of the Great Pyramid.
46. The north-east socket of the Great Pyramid.
47. The north-west socket of the Great Pyramid.
48. The south-east socket of the Great Pyramid.
49. The coffer in the King's Chamber of the Great Pyramid, by magnesium light.
50. The broken corner of the coffer, in the King's Chamber of the Great Pyramid, by magnesium light.

LANDSCAPE PHOTOGRAPHY.*

This subject has been written upon so often that new material of interest is somewhat difficult to obtain; but as every photographer has some peculiarity in ideas and manipulation different from his neighbour, it sometimes is interesting to know what those peculiarities may be. I will, therefore, try to give a few practical suggestions on the subject of landscape photography.

In arranging the many articles necessary for a photographic trip, it is desirable to have some system of packing. I have, for example, a card placed in some conspicuous position in my laboratory with the names of all the chemicals and apparatus that are to be included in the expedition distinctly written upon it.

When packing, I read over the list, and place each article as mentioned on a table kept clear of other things. By this simple plan I have seldom found it necessary to lament the loss of anything of importance. When miles away from my laboratory, for convenience in travelling, I have used, for many years, a basket in preference to boxes for carrying my traps. It is much lighter and is not subjected to such hard usage when travelling by rail. A tin can can be readily made to fit into it, so that bottles of chemicals may be in separate compartments and less liable to breakage.

Do not let the sole object of the journey be to make as many negatives as is possible in a given time. Pictures that are made in great haste usually show faults in arrangement that might have been avoided by a careful study of the different localities before attempting to expose a plate.

Try as much as possible to arrange the camera so that the lens shall not face the sun. When it cannot be avoided, hold the dark slide or any dark object (a hat, for example) in such a position that the direct rays of the sun will not strike the lens.

*Photo Mosaics.

The experience that I have had in the use of sky shades (Mr. Sutton's form of diaphragm) has been very satisfactory, and I would urgently advocate its general use in out-door work.

Advantage should be taken of the early morning and afternoon light in preference to midday during the summer months. Better pictures can generally be made before 11 a.m. and after 3 p.m., as the sun is not so directly overhead, and allows the introduction of the pleasing as well as artistic effect of long shadows in the landscape.

For out-door photography it is of the first importance to have the outfit made as light and portable as possible. Make it a study, before starting upon a trip, to reduce everything to the smallest weight and space. The lightest and easiest tent to carry, put up in working order, and repack, that I have ever used, is a spring-jointed tripod with a cone-shaped covering of dark material.

Use a covered bath somewhat larger than the plate used, which will allow more space to move the plate when coating.

After the collodionised plate has been a sufficient time in the silver bath, drain and rest its edge upon a piece of soft tissue-paper. Wipe the back with a damp sponge. By so doing, the plate-holder will be kept in a more cleanly condition, the slide not liable to stick, and the plate will not have the tendency to stain from excess of silver solution. Be particularly careful not to reverse the drainage after the plate has rested upon the tissue-paper.

One of the most frequent causes of failure in photographic views is, that the exposure has been too little. This is especially the case when lenses are used requiring very small stops. *To give plenty of time* is, in my judgment, one of the first steps towards success. Dry the negative perfectly before placing it in the plate-box. One box will then be found sufficient, except when far away from an abundant supply of water. Under such circumstances, wash the plate with as little water as possible after development, and flow over it a dilute solution of glycerine in water. Place the plate while wet in a box made of tin, similar in construction to an ordinary plate-box.

Negatives packed in this manner will remain wet for days, and can be redeveloped or fixed when convenient.

To save space, allow the grooves in the box to be wide enough for two, back to back.

After each day's work, make it a rule always to filter the nitrate solution, and, if necessary, wash out the bath, using a stick with a piece of sponge fastened to the end to clean it thoroughly. If many plates have been dipped, add nitrate of silver to bring up the strength to forty-five grains. It is not advisable to have a bath containing over that amount in silver.

Whatever may be the opinion in regard to the advisability of excessive sharpness in portrait photographs, I have never heard the statement doubted that the first point of importance in a landscape photograph should be the greatest amount of sharpness obtainable over the whole plate.

Yet how many pictures are constantly to be met with lacking that very desirable requisite! Various excuses are given for such defects, such as, "camera out of order," "bad lens," &c.; but I am inclined to think that most of the fault is traceable to want of care in focussing the picture. Mr. Zentmayer's admirable lens offers an easy stepping-stone over the difficulty, as no focussing is necessary in the field. The proper focus is carefully ascertained before leaving home, and a mark made upon the camera-box, which will in all cases be found correct. But lenses of different construction require great care to obtain the exact focus. It is unfortunate that rackwork is not attached to all lenses requiring a change of focus, as correct focussing is much more certain by turning the lens adjustment than by the camera rackwork.

A good plan in out-door photography is to focus upon the bark of a tree if possible, turning the focus of the lens upon the foreground rather than the extreme distance of the view.

One other fault is frequently observable—want of care in levelling the camera. In representations of buildings it is most likely to occur, giving the effect of the entire structure tumbling over with a crash. But landscape views are by no means free from its demoralising tendencies, for mountains and trees are frequently represented in the same tottering condition. To avoid such unpleasant effects, do not trust to having a straight eye, but have a spirit-level attached to the camera, and consult it before exposing the picture. Much time can be saved in adjusting by the use of a tripod having a ball-and-socket joint.

As a rule it is best not to intensify landscape negatives, as much of the softness or half-tones of the picture are sacrificed, even under the most favourable circumstances. John C. Browne.

Fire in a Photographic Studio.—On Saturday afternoon last, about five o'clock, the photographic studio of Mr. Wm. Wilson, Smith's-yard, Market-place, Preston, was discovered to be on fire. Information was at once sent to the fire-brigade station, and Mr. Marriott and his men were soon in attendance. The flames were extinguished with little difficulty in about five minutes by the brigade, but not before damage was done estimated at £200. Mr. Wilson was insured in the Provincial Insurance Company. The origin of the fire is unknown.

Contemporary Press.

ON A PERMANENT TONING BATH.

[PHOTO. MOSAICS.]

HAVING used the same solutions for toning for four or five years past, and finding the bath always reliable and uniform in acting, I think it desirable to be known by photographers generally.

The first thing to be done in preparing this toning bath is to provide a neutral solution of chloride of gold. This I do by adding excess of carbonate of baryta to a strong solution of chloride of gold. At ordinary temperatures and with occasional shaking, the solution will be ready for use in three days. The strength of solution of gold is one bottle or fifteen grains of Anthony's chloride of gold to an ounce of water. This solution being ready, the bath is prepared as follows:—

In one gallon of water diffuse ten grains of fresh, dry chloride of lime, thirty grains of air-slaked lime, one drachm of salt, and one ounce of the above neutral gold solution, shake them thoroughly together and allow to stand for a week; the bath can then be used. Pour off the clear portion free from the sediment and add one-quarter ounce of the neutral gold solution, stir intimately and allow to stand a short time. Try a single print. If the bath tones grey and flat, the prints not acquiring the deep colour necessary in the shadows, add to the bath from five to ten grains of crystalline acetate of soda; this will correct the tendency to flatness. If now the prints tone too slowly, add from five to ten grains of bicarbonate of soda. By the judicious use of the alkaline materials generally used in toning and the chloride of lime, this bath can be used, as our experience shows, for years, making a great economy in the expense of gold. The probable reason why this bath continues to act is that the gold being already neutralised when added to the bath, needs no excess of alkali to produce that effect. The amount added in the presence of the free chlorine is not sufficient to reduce the gold to the metallic state, and the reduction is determined by the presence of the silver of the print. The moment the print is removed the reducing action is arrested and the bath remains without change.

It remains but to observe that no gold should be added to the bath but the neutralised gold described. The addition of the materials from time to time should be small in quantity. The chloride of lime, when needed, should never be added in quantity larger than ordinary pigeon-shot. In adding this it should be moistened in the palm of the hand with a little of the toning bath, rubbed into a pasty consistence, and then washed off into the bath and thoroughly mixed with it. The bath should always smell perceptibly of free chlorine.

After using, it should be poured into the bottle in which it was mixed and tightly corked. H. T. ANTHONY.

Meetings of Societies.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A COUNCIL meeting of the above Society was held on the 15th inst., at 12, York-place, Portman-square,—Col. the Hon. D. F. de Ros in the chair.

The minutes of the previous meeting having been read and confirmed, the following members and subscribers were elected:—

Capt. John Board.	Col. Sir H. St. John Halford, Bart.
Malcolm Edge, Esq., R.N.	Capt. F. M. Allen.
T. Sopwith, Esq., F.R.S.	J. G. Nichols, Esq., F.S.A.
W. M. Charnby, Esq.	T. Walton, Esq.
J. E. Madden, Esq.	T. Higgin, Esq.
W. Cayley, Jun., Esq.	Percy Mortimer, Esq.
D. R. Morier, Esq.	C. Sylvester, Esq., M.D.
N. Bond, Esq.	Laurence Baron, Esq.
T. W. Parker, Esq.	Miss Dora Blencoe.
F. W. Mitchell, Esq.	J. C. Waterhouse, Esq.
John Turnly, Esq.	W. J. A. Grant, Esq.

The SECRETARY then reported that, partly owing to the large increase of negatives over those of any previous year, and also from the members generally having been later than usual in sending their plates, the award ~~of the prizes~~ had been delayed until this late season of the year.

This led to some discussion as to the expediency of appointing a fixed date after which no more negatives might be received; and it was proposed by the Chairman, seconded by Dr. Arthur Farre, and decided by the meeting, that in future years no negatives should be received after the 1st of November.

The Secretary then laid before the meeting the pictures contributed by the members for the current year, which greatly exceeded in number those of any previous occasion; and after an examination, which lasted several hours, it was found impossible to do more than arrange the pictures in three classes, viz.:—Class A, from which the prize pictures were to be selected; Class B, from which the certificates of honourable mention might be chosen; and Class C, which comprised the remainder.

Mr. Glaisher was then asked if he would be able to devote sufficient time to arrange the pictures according to their respective merits, and prepare a report upon them, as he had done in previous years. This he kindly consented to do, and the meeting was then adjourned until Thursday (yesterday), the 23rd inst. A. J. MELHUISH, Hon. Sec.

PHOTOGRAPHIC SOCIETY OF FRANCE.

A MEETING of this Society took place on the 5th ult.,—M. Peligot in the chair.

M. Chafré exhibited a collodion filter which he had had constructed for the purpose of preventing the evaporation of ether and alcohol. This apparatus is essentially a decanter, in the neck of which is a tube roughened with emery, and which contains a filter of folded paper through which the liquid is poured.

M. Despaquis presented to the Society photographic proofs in relief, reproduced by the aid of a dry stamp upon paper or metal, white or coloured. The proofs on paper were chiefly intended for heads of letters. He (M. Despaquis) was aware that M. Poitevin and others had made moulds and counter moulds in sulphur, in plaster, or in metal, for casting medals; he knew, also, that M. Poitevin had employed these moulds for making images by the Woodbury process with transparent colours, but neither these moulds nor these medals had been employed to be mounted as dry stamps for stamping either paper or metal—whether dry and in relief, or wet with opaque colours. To sum up the matter: he (M. Despaquis) had also taken out a patent for obtaining enamels in metals, filling with ink or powder, convertible into glass, the cavities of a photographic image on metal, and melting afterwards by means of a muffle or lamp.

After the above communication had been read,

M. PLACET said that he considered it his duty to claim on his own account the processes put in practice by M. Despaquis. He then quoted certain extracts from his patents dated 1861 and 1863.

M. DESPAQUIS stated that he could only refer to the communication he had already made to the meeting, and say again that it was not the production of the moulds or the counter moulds that he had presented, but the employment of them for dry or wet stamping, and particularly for the production of heads of photographic letters.

M. Marion presented to the Society the following note on a modification which he had introduced in the mode of operating for the production of carbon proofs:—

"I have the honour to communicate to the Society a modification in the mode of operating to obtain carbon positive proofs described by me last year. This modification is the consequence of a special quality of albumenised paper being employed as the vehicle. I have, in fact, found that the coagulation of albumen by vapour has an effect quite opposite to that which is produced by coagulation by means of alcohol—that is to say, instead of unsizing the paper, the former strengthens the size, and gives to the albumenised layer a horny surface, so solid that water glides over it as upon glass without penetrating it; the paper does not imbibe water, except on the reverse side—a very important advantage, which considerably facilitates the application and adhesion of this paper to that of a carbonised surface, and sensitised by the following way of proceeding:—By plunging the coagulated albumenised paper into water, the albumen being uppermost, avoiding the production of bubbles on the surface, and introducing gently into the same water the impressed paper, the mixture side being undermost, and avoiding the production of air-bubbles between the two papers.

"The borders of the composite paper have a tendency at first to roll inwardly, but soon they spread out and offer no resistance to the pressure of the fingers; it is at this precise moment and without waiting till they curl outwardly that it is necessary to make use of the India-rubber squeegee, making it to glide delicately, without strong pressure, over the two papers, one placed over the other at the bottom of the bath, in order to drive away the air-bubbles; at this time there should be little water in the bath. The most suitable baths are those with glass bottoms, or any other at the bottom of which a strong glass plate can be previously placed.

"Instead of placing in the first instance the albumenised paper in the water, the paper bearing the mixture, and impressed, may be commenced with. There is, perhaps, an advantage in this, because this is longer in being penetrated by the liquid, and, when thus placed, it is easier to apply the albumenised paper upon its surface after the latter has imbibed the water.

"Whatever may have been the manner of applying the two papers it is necessary, while they are yet full of water and placed on a horizontal plate fixed for the purpose, to pass the hand lightly over them in order to dispel the air-bubbles. The passage of a light brass roller over them afterwards will eliminate the last particles of water and air which may have remained, and will force at the same time the papers to adhere one to the other by the attraction of hard and plane surfaces; the press will do the rest. This operation of pasting the two papers one upon the other is one of the utmost importance, and too much care cannot be bestowed upon it; it is necessary that the duration of the pressure should not be less than from half-an-hour to an hour. The solid and horny surface of the albumen coagulated by vapour requires this time; but, on the other hand, the operator is complete master of his work, and need fear neither the separating of the paper nor the unequal scattering of the albumen, the results of which are so fatal.

"Nothing is changed in the manner of developing the image, except that this development is effected with much greater facility on account of the strengthening of the size of the paper, and the albumenised surface being rendered impermeable also by the employment of grenetine—a gelatinous product, very pure, and of great solubility, which I now employ in the mixture. Instead of coagulated albumenised paper, the gelatinised paper treated with alum may be employed; but I much prefer the former on account of its extreme solidity and its withstanding every proof trial in hot and cold water baths.

"One important recommendation for preserving the borders of the image from blistering, &c., is to frame the *cliché* with bands of black paper, in order that the proof may come upon the paper with a complete margin as if mounted on cardboard."

M. Marion likewise presented a note on the production of pellicular proofs, which was as follows:—

"I have the honour to submit to the Society some transparent pellicular proofs, and to state the practical means I employ in order to obtain them.

"The composite sheet, sensitised and impressed under a *cliché*, is transferred to a metallic plate. I once thought that a silvered plate was preferable to any other. The experience I have acquired after repeated trials has shown me my error. It is the copper plate scraped, smoothed, and polished which should be chosen in preference, and, strange enough, the same metal when plated has not the same attraction. Zinc might be used for the purpose, but is rejected on account of its oxidising so easily. We must here note that the exposure for transfer on metallic plates should be a little longer than that upon paper. The copper plate having been previously covered with wax dissolved in turpentine for preserving it from oxidising, and at the same time facilitating the detaching of the image after development and desiccation, as I shall presently show, the application of the composite sheet sensitised and printed upon this plate is then proceeded with, precisely in the same manner as I have indicated for the coagulated albumenised paper, and it is then subjected to pressure during from six to twelve hours.

"The image is also developed as usual; but for transfer upon metal rather more is required than for transfer upon paper. The *cliché* requires to be encircled with a black frame to prevent accidents, as before mentioned.

"When, after the development, the metallic plate is quite divested of all the mixture that remains soluble, it is left to dry spontaneously in a fresh place, where there are not any currents of air. The desiccation is not generally perfect until after from twelve to twenty hours. When all trace of humidity has disappeared, the plate is carried into the open air outside. The image is seen almost immediately to rise of itself from the top of the plate, and to detach itself therefrom completely, in the form of a transparent pellicle with all the value of a *cliché*.

"If a negative proof has been proceeded with a positive pellicle will have been obtained, which, in its turn, will serve as a *cliché* for obtaining a negative, and *vice versâ*. If, on the contrary, a positive *cliché* has been operated with upon glass (and that is perhaps the surest way of arriving at perfection) a pellicular negative will have been at once obtained, proper for printing indistinctly '*recto inverso*.' This is the desideratum of carbon photography—a transfer upon albumen, which may also be used for silver printing.

"The transparent images thus produced are very thin. In order to preserve them in good condition and able to bear much printing they should be placed between two pellicles of collodion. Thus preserved they may be printed as numerously as desired.

"If it be desired to have pellicular images strong and resistant, they are easily obtained by pouring a bed of gelatine upon the image after its development, and having previously made the plate level. It is a convenient way to make edges with bands of cardboard to keep the gelatine even upon the picture. In this case the desiccation is much slower. It does not last less than three or four days. I submit a pellicle thus obtained.

"Another means not so long, more sure, and easier is the following:—The paper is covered with a double mixture; the first bed is coloured in black or yellow, the second and upper bed is absolutely uncoloured. The printing takes place as usual, whether under a positive or negative *cliché*, but the exposure requires to be prolonged one-third over the ordinary time for transfer on paper."

"The action produced is this:—The light attacks the uncoloured mixture, penetrates it, and then attacks the coloured mixture below, as permitted by the screen. The drawing, with its contours, its reliefs, and its cavities is formed upon both layers, but in reality only exists on the lower coloured layer; the uncoloured upper layer only serves to shield it and give it the desired strength.

"The development takes place in the same manner as with the thin pellicles, but it is much easier on account of the strength and greater solidity of the pellicle. The latter takes longer to dry, but it is detached just like the other and by the same means.

"I also submit to the Society some of the proofs obtained in this manner, and I would remark that it seems to be adapted to numerous and varied applications of the carbon process when it shall have been studied and practised by men gifted in the art, and who are better able than myself to turn it to account.

"For example: instead of making a pellicular positive proof, a positive proof on glass by Johnson's process can be taken and used to make a pellicular negative, and thus a *cliché*, which may be printed from either side indistinctly, may be obtained more easily, more certainly, and far more rapidly."

The Society having thanked M. Marion for his communication, there was some discussion respecting the success of the last Paris exhibition and propositions respecting future exhibitions.

M. Davanne communicated to the Society, in the name of M. Belbèze, the result of his investigations as regards the preservation of sensitive plates prepared according to the Taupenôt process, and on the alkaline development of collodio-albumen plates. M. Belbèze, wishing to provide a remedy for the instability of preserved sensitive plates prepared according to the Taupenôt process, has endeavoured to find out whether the preserving agent proposed by him last year to replace tannin would answer the purpose. He had ascertained that the ordinary collodionised plates, covered with an infusion of tea, retained their sensitiveness for more than a year, and he wished to try whether this same infusion would prevent alteration in collodio-albumen plates (an alteration most probably due to the combination of albumen with nitrate of silver), and whether the employment of this preservative would communicate to the plates this advantage, while allowing them to retain the special qualities which characterise the employment of albumen. The following are the results of his experiments:—

"Take a sensitised Taupenôt plate, and, after having washed it twice, give it two successive applications of tea, consisting of—

Water	500 cubic centimetres.
Tea	20 grammes.
Sugar	25 ,,
Alcohol	25 cubic centimetres.

Leave them to dry completely before shutting up the plates, for I have known them to be better after eight days than on the following day, and I attribute this to their more complete desiccation. In some trials made in January last I had discovered a complete preservative of the sensitiveness, but, before speaking of it, I preferred making further experiments in confirmation thereof.

"I can now guarantee that plates so prepared will keep for eight or nine months; for I exposed in the camera last August some plates made in November, 1868, and after comparative exposure made with a tannin plate only six days' old, I found about the same sensitiveness with nearly ten times the length of exposure for the wet collodion. The plates retain, after development, the aspect of negatives obtained by the Taupenôt process. In these experiments the development was made according to the formulæ usually employed for proofs executed by that process."

After the usual courtesies the meeting terminated.

Correspondence.

Foreign.

Philadelphia, November 24, 1869.

YOUR correspondent Mr. Davies, from whose articles there is always something to be learned, asks, in a recent communication, if I have ever used his favourite dry-plate preservative—albumen, ale, and gallic acid. About a year ago, I think, on seeing a previous article by him, I tried albumen and ale, but did not get so good a result as with the lead bath and gallic acid process which I have published, and which, in its turn, I have now given up for the quicker one of gum, sugar, and litmus.

I may take the opportunity of repeating what I sometime since mentioned in your columns, that there is no *best* preservative for the collodio-bromide process. All depends upon the pyroxyline. One specimen will give the best results with one preservative and another with another. This I have fully verified by trials made by myself, and in this I see the explanation of the great diversities of opinion which prevail.

Albumen when used in the collodio-bromide process has seemed in some cases to increase the tendency to blister. Even this, however, must not be said in too general a way. The preservative applied along with the albumen greatly modifies its action, and the older the collodion the less the blistering.

Perhaps Mr. Davies will, at some time, take a leisure hour to put down what advantages he finds in the use of albumen in connection with collodio-bromide, and why he ascribes greater fineness to bromide plates made with a bath.

To this method of working bromide with a bath there seems to exist the objection (at least in the case of large plates) of the use of baths containing so large a quantity of nitrate of silver—say for 8 × 10 plates thirty ounces of silver. For to work it conveniently three baths must be at hand to receive the plates. I, like most others, use vertical baths, and my 8 × 10 glass baths contain sixty ounces of solution—in all, say 180 ounces. Russell directs an eighty-grain solution, or one ounce to six, therefore thirty to 180 ounces of bath. The very numerous mani-

pulations are also troublesome. As respects fineness, I have never got finer negatives, even by the wet process, than by the collodio-bromide.

Mr. Davies's preference for carbonate of soda as an alkali evidently depends (as I feel no doubt on reading his paper over) on his disposition to give long exposures. To get details well made out in the shadows with a brief exposure, I do not think a fixed alkali will ever be found equal to ammonia. This tendency to give long exposures seems general with those who work the collodio-albumen processes. It is undoubtedly an advantage in a dry process to have indefinite prolongation of exposure, so that it cannot be over-exposed. Coffee dry plates are so. I have exposed a coffee dry plate for twenty minutes in sunshine (to be sure it was late November sunshine), and have got an excellent negative with no unpleasing sun effect. The sky and high lights were distinctly visible when the plate was removed from the slide. I should also remark that this long exposure was with a twelve-inch focus lens. Coffee plates are all the better for protracted exposures; their fault is that, unless they get a strong impression, they do not develope into pleasing negatives, and one has to be very careful about the distance if it be well lighted, otherwise it becomes too dense to print.

I saw lately an ingenious suggestion in the *Photographische Mitthielungen*, which I mention here because it seems capable of other applications besides those for which it was proposed.

The original idea was to permit of strengthening some parts of a negative, without affecting others, by first varnishing the fixed negative, and then going over with thin gum water those parts which were not to be changed. Next: the varnish not covered with the gum was to be dissolved away by a suitable solvent, and the parts thus uncovered only would be affected by employing a redeveloper over the whole plate. The writer remarks that the conditions of success are simply to use the gum water thin, and not to apply too strong alcohol to dissolve the varnish, as otherwise it will abstract water from the film of gum and cause it to wrinkle up, to the injury of the image.

This idea of a local application of a gum protective might be extended to other cases. Suppose, for example, that a negative having a white sky have all the face excepting the sky thus covered with gum water, without even varnishing the plate. Next, let us apply mixed alcohol and ether, and so remove the whole of the sky, collodion, and all. Next, print a suitable sky on thin paper, wax it, cut it out to the shape of the horizon line, and gum it carefully to the negative. We thus have the means of combining the landscape and the sky at one printing instead of having to double print each time. If this were done it would, doubtless, be necessary to print in the shade, or else to gum the paper clouds to the back of the plate.

Properly speaking, the paper on which the clouds were printed should not be taken direct from the cloud negative, or else the lights and shades in the final print would be reversed; but first a positive of the clouds should be made on glass or paper, and a negative from that.

Paper negatives made by contact printing can be made to print most beautifully. At one time, some years ago, I made many trials in that direction. I used thin French letter-paper, albumenised it with a flat camel's-hair brush. I found no difficulty in printing in this way upon almost any sample of paper, especially as the final colour of the print is unimportant, seeing that it is to be copied from. This thin paper, when nicely paraffined, becomes extremely transparent. A benzine varnish renders it almost like glass. Some of the benzine varnishes made for varnishing negatives are excellent for this purpose, and there is scarcely any difference between the transparency of such paper and that of glass itself. To get the most perfect transparency the paper should lie for a few minutes in a portion of the varnish poured out into a basin.

In connection with the question of alkaline preservatives for dry plates, I mentioned in a previous communication that, a year ago, I had tried an alkaline coffee bath with collodio-bromide plates, but without satisfactory results.

On looking over my note-book lately I found that I tried at that time not this one alkaline preservative only, but at least eight or ten. As a general thing I did not find that an alkaline condition of the preservative bath increased the sensitiveness of the plates. I do not mean to say that I did not often get good results on plates with alkaline preservatives; but I did not find that there existed any special relation between alkalinity and sensitiveness, and the bath which I finally fixed upon at that time as the best was an acid one. It was more sensitive than any alkaline bath that I tried. The objection to alkalinity was *not* a tendency to fog, but simply that on the whole better results were got without alkali.

In the course of my experiments, which I took up again some time back, I may at any time find an alkaline bath giving good results; but what I mean here to affirm is simply this—that there is no essential condition between an alkaline preservative and sensitiveness. Given two preservatives—one alkaline, the other acid: either may prove the most sensitive, and there is no presumption *à priori* in favour of either. In fact, each different substance has its own definite relation to the silver compound. *Gallic acid*, for example, produces a definite amount of sensitiveness. Used in connection with a less sensitive preserver it increases sensitiveness—in connectien with a more sensitive preserver it diminishes it. When two preservatives of unequal sensitiveness are mixed and applied, the resulting sensitiveness of the film will be intermediate between that belonging to the two separately, but inclining most towards the *less* sensitive of the two.

But this case of mixture must not be confounded with that in which one of the substances, though scarcely a preservative in itself, acts mechanically upon the film. This is the case with sugar, which, as I have before endeavoured to show, acts by keeping the film in an open porous condition, and so, when dissolved out in the development, leaves a spongy film that quickly admits the developer to every part, and so brings the whole of the actinic impression under the reach of the reducing agent.

According to views lately published by Dr. Van Monckhoven, ammonia acts upon certain silver films to check solarisation. Now, in the honey-glycerine process, this solarisation is the great danger. If a honey-glycerine plate be over-exposed, even but little, this red solarisation appears. For example: a rock, well lighted, but whose asperities and inequalities cover it with light and shade, will perhaps appear in the negative as a smooth red surface. Even the darker shades had received light enough to make a maximum impression, and of course the higher lights could go no further; so that the whole surface prints a flat tint, spoiling the whole negative.

Of course this is only where a negative has been over-exposed. But when we are not developing each negative as exposed, we can never be certain of the power of the light, and need absolutely a certain liberty of range. If the action of ammonia can check solarisation in one case, perhaps it can in another. I make the suggestion for the benefit of those who are using the process, which, when well managed, gives negatives that print exactly like wet ones. M. Carey Lea.

Paris, December 20, 1869.

I have for some time wanted to "have a word" on the artistic superiority of Parisian photographic portraits, as several articles have appeared in your pages with a tendency to depreciate the production of the French artists.

In *Random Thoughts on International Progress* it is asked, respecting two French artists who settled in London—"Where are they?" I cannot answer this question as to their present habitations; but that two French artists of talent should go to London and fail in making the Londoners appreciate their productions to the extent requisite to enable them to remain, is not, I take it, discreditable to the artists, but to their *clientèle*.

I think, too, that the fact that, during the card-portrait-of-celebrities' mania, the productions of Silvy and Disderi were invariably bought and preferred to others of the same subject speaks something in favour of their pictures. There was a portrait of the Princess Royal, by Silvy, of which copies could not be obtained to supply the demand. Again: the transparent stereographs of English scenery which are published here by MM. Leon and Levy are acknowledged to be superior to any produced in England. Hence I combat, also, the statement made by Mr. S. Fry in your pages, that "when foreigners fought with English photographers on our own ground they found their level." If they were obliged to come down to the general level in England it would be a pity. An English photographer coming to Paris to gain a living would probably find himself obliged to raise his productions to the Parisian level.

There is an English photographer here whose works will bear comparison with any productions of the same class, and I doubt not that he owes much of his success to the necessity of equalling or excelling the pictures of his *confrères* around him. He has found his level, and it is a high level. A German, also, M. Reutlinger, has found his level here, stays like the Englishman, and has become noted also for fine productions. If, therefore, clever foreign photographic artists fall in England, they rise here; and why? "Atmospheric influences," says one; "climate, you know," says another. It is not anything of the sort, I believe. Exposures are longer here than in England; chemicals often the same; lenses, also, and cameras, too, sometimes.

M. Blanquart-Evrard, in a letter to me upon this subject, remarks that for landscape photography the English are admirable—probably because they have "a nature eminently picturesque constantly before their eyes." On the other hand, as to the superiority of French photographic portraits, "will it not arise from artistic education being more advanced in France than in England? Is it not, also, because in no part of the world is artistic industry more advanced than in France? This is not to say that at times splendid portraits are not produced in England."

These remarks are made more to stir up our English artists to generous emulation, so that they may rise to the higher level of their foreign *confrères* whether at home or abroad, than to lower their works. I am glad to learn that progress is making in England in this respect. It is "never too late to mend;" and to acknowledge our faults is the first step towards eradicating them.

Never mind if some photographs owe much of their beauty to retouching the negative. "A thing of beauty is a joy for ever," and it is not everyone who can retouch a negative to perfection. It perhaps requires even more artistic knowledge of a higher order to do this well than it does to take a negative photographically perfect.

Having said so much myself, I have pleasure in again introducing the "Wandering Professional Photographer," who has kindly replied to some of my questions on these points amongst others. He writes:—

"Having just returned from a trip to Bordeaux, I thought my *impressions de voyage* might be useful and interesting to you.

"The first town of importance on the road is Limoges, the seat of the porcelain ware manufacture. This town has a very imposing appearance as seen from the top of the *diligence*—a position I generally choose when I have the misfortune to travel by that primitive means of locomotion.

"I should think Limoges must be something like Constantinople—looks very well at a distance, but there is a woeful falling off when you get into the town itself.

"Of course my first look-out was to see what sort of a turn-out the photographers made; but, after walking until I was tired, I discovered that out of the three there was one middling artist, the second was so-so, and the third—well, the least said about him the better. If ever he gets any customers they must be of that class which like it cheap.

"A thing which struck me in looking at the specimens of photographer No. 2 was a portrait of a gentleman, with the following written in a bold hand underneath:—'Portrait of M———, and he will not pay for it!' and if the resemblance was only on a par with the photographic manipulation, both the artist and the gentleman were quite right—the artist in putting the gentleman's name underneath (for I do not think it could have been recognised without), and the said gentleman in refusing to pay for it.

"I also noticed on my way to the railway station a stall where photographic reproductions were being sold at twenty centimes each (2d.)—a rather low figure, and yet the seller got nearly fifteen centimes (1½d.) profit, for I bought such myself in Paris at six francs (4s. 10d.) per hundred. They are made by a late professional photographer, who first, I believe, got up what he calls the '*cartes programmes*;' that is, when a new piece comes out at any of the theatres, the portraits of the actors, the name of the piece, &c., are mounted on a *carte de visite*, and sold in the theatres and on the boulevards at twenty-five centimes (2½d.) each. For a few that I got from him I paid fifteen francs per hundred. All his pictures are nicely got up, and on the back of all the cards are to be found advertisements of perfumery, of which he is the inventor. I suppose these advertisements go for something in his calculations.

"'*En voiture, Messieurs!*' and off we go full speed to Bordeaux—a town well worth seeing. A fine river, a fine bridge, streets all alive with people, river all alive with boats and ships of different nations, and not a few flying the colours of old England—a sight always welcome to an Englishman abroad. Thoughts of home, of the old house, old friends, and old affections make him feel a little lonely for a minute; but with a 'never mind—it wont be for long!' he trudges on.

"I sauntered on in quest of photographers, and soon saw enough to supply a town larger than Bordeaux. I examined their specimen cases, but found their work of only average merit.

"Here allow me to digress a little. Having travelled a great deal through France, I flatter myself that I can form a tolerable idea of what French provincial photographers can do. I think that many who laud French photography so much do so from what they may have seen during an occasional visit to Paris; but they overlook the fact that Paris is the great centre of arts, and that men of exceptional talent rush thither from all parts of the world, and that all the best photographers are not all Frenchmen.

"Nay, it would be very easy to pick out several names of first-class photographic reputation which have decidedly a foreign sound. These men were photographers and men of artistic feeling before coming to Paris, and men who, I am bound to say, possess business capabilities of a superior kind, and who know that in a vast city like Paris talent must make its way. It is a city, too, where, in addition to its population, there is a great influx of strangers who come purposely to spend money, and it is in great part amongst these strangers that the first-class photographers do their trade.

"It is very little use saying that French photographers are obliged to work in a very superior style, in order to meet the inherent good taste of the French people; if so, why do not the provincial photographers work up to the standard of their Parisian *confrères?* Shall we suppose that French good taste, like everything else French, is to be found only in perfection in Paris? and that the moment we step outside the fortifications of Paris we leave all the really good things behind us, and that all else we meet is only to be mediocre? I confess it looks something like it. In London, on the contrary, all the best English photographers are not to be found.

"During a recent journey through England I made it my business to note down a few photographic items, and I found often, in small towns, photographers whose works would bear favourable comparison with anything London could produce, and in one small town nearly twenty miles from Birmingham, I saw some portraits of which some of the first Parisian houses would not be ashamed. In fact, I came to this conclusion:—Show me one French provincial photographer who turns out daily work like Reutlinger, and I will find you ten English provincial photographers whose work will rank well with any first-rate London house.

"If a few Parisian houses beat us at present, depend upon it that it will not be for long; the work has begun, and, if I know the character of an Englishman, it will be sure to be finished to their satisfaction. So soon as we can enlist a few really good painters and sculptors who will not think it derogatory to write 'photographer' on their signboards, thus following the example set by their Parisian brother artists, and give a helping hand to photography and make a fortune at the same time—so soon, I say, as we can do this, we shall not be far from the end which every well-wisher of photography desires, viz., equal to the best the world can produce."

I think that the case is now pretty well before your readers, the arguments on both sides being represented; and I hope good will result from any further discussion of the subject.

Wishing your readers a very pleasant and happy Christmas, I must postpone till next week the remainder of the communication from the "Wandering Professional Photographer." R. J. FOWLER.

Home.

WHO DISCOVERED THE COLLODION PROCESS?

To the EDITORS.

GENTLEMEN,—Since my former letter was published in the Journal, one of our early and distinguished photographers has kindly sent me the extract from Le Gray's pamphlet, on which his claim is founded. We have now his exact words, as follow:—

"APPENDIX.

"I have just discovered a process upon glass, by hydrofluoric ether, the fluoride of potassium and soda dissolved in alcohol 40 degrees, mixed with sulphuric ether, and afterwards saturated with collodion; I afterwards react with aceto-nitrate of silver, and thus obtain proofs in the camera in five seconds in shade. I develope the image by a very weak solution of sulphate of iron, and fix with hyposulphite of soda. I hope by this process to arrive at great rapidity. Ammonia and bromide of potassium give great variations of promptitude. As soon as my experiments are complete, I will publish the result in an appendix. This application upon glass is very easy. The same agents employed with albumen and dextrine give also excellent results, and very quick. I have also experimented with a mucilage produced by a fucus (a kind of seaweed), which promises future success. I hope, by some of these means, to succeed in taking portraits in three or four seconds."

In reading this we must bear in mind what was known of processes at that date, and must not interpret his words by the light of modern knowledge; and it is clear, I think, that the present collodion process could never, without absolute discovery, have been evolved from Le Gray's hint. In fact the directions given, if they amount to anything at all beyond a hint for an inventive mind, would lead to something totally different from our existing collodion process. The most intelligible interpretation it admits of is the dry albumen process with collodion substituted for albumen, in which the sensitising is effected with aceto-nitrate—a very different thing, as all photographers know, from the modern nitrate bath.

Looking at this, coupled with Le Gray's actual abandonment of the idea, as I pointed out in my former letter, it is conclusive to my mind against his claim to the discovery.—I am, yours, &c.,

December 21, 1869. P. LE NEVE FOSTER.

RESIDUES.

To the EDITORS.

GENTLEMEN,—I wish to correct two errors of calculation which have crept into my MS., apparently while being transcribed from my rough laboratory notes. At page 601, the result of the first and third calculations should have been 5·36 and 3·88 grains respectively. The effect of this alteration would be to increase the amount of silver recoverable from the sulphide in each sheet of paper by about three-quarters of a grain.—I am, yours, &c., GEORGE DAWSON.

King's College, December 18, 1869.

THE PROSPECTS OF PHOTOGRAPHIC EMIGRANTS IN CANADA.

To the EDITORS.

GENTLEMEN,—I see in your number for November 5th a very unjust and uncalled-for slur on the working class. *Emigration of Photographers to Canada* is the title of the article, written by a resident in Toronto.

The writer says:—"There is no other way to get a living here unless you are a good machinist; and that, if you should be *so lucky as to get a job*, is very poorly paid—three dollars a week, two and a-half of which you must pay for bed and board, leaving half-a-dollar only for dress, washing, &c."

Now this writer must be a long way from civilisation, or he must wish to impose upon the ignorance of those who might wish to come to this country.

To be sure I live some miles south of Canada, yet I know something about that part of the country, and have friends living there. Now, I will say for the advantage of those who wish to know, that the wages in Canada are nearly as high as in the States, and a good machinist can get here from three dollars to five dollars per day and *plenty of work.* To be sure these prices are in currency, of which it takes 1.22 to buy 100 in gold, or twenty-two cents on a dollar gold premium. Board is from four to six dollars per week in the States, and is less than that in Canada.

Now for photographers, of whom I am one. The wages are from nine to fifty dollars per week. An ordinary artist gets from fifteen to twenty-five or thirty dollars per week; but the demand for photographers is not nearly what it is for artisans. Carpenters, machinists, masons, painters, &c., &c., are in constant demand, and at wages ranging from two to five (and sometimes more) dollars per day, just according to their ability.

Any other information that I can impart to the readers of your truly valuable Journal I shall be pleased to give.

I enclose you a photograph or two of my work—not that they are as

good as many of my contemporaries do, but because they are the best I have, and criticism is good for us all.—I am, yours, &c.,

HORACE L. BUNDY.

Middleton, Conn., U.S.A., Dec. 6, 1869.

P.S.—I see by your number for November 19 a few remarks, under the head of *Emigration to Canada*, which come much nearer the truth than anything else I have seen. There is *no need* of want in this country if one be *willing* and *able* to work.—H. L. B.

[The portraits enclosed testify to the excellence of our correspondent's work.—EDS.]

Miscellanea.

ART IN PHOTOGRAPHY.—An honest, outspoken book, which should protect the public against the perpetrations of photography and the impositions of many of its practitioners, would be a real boon. Much has been said to prove that photography is an art, and in favour of the proposition may be adduced at any rate the indubitable fact that many broken-down artists practise it. But photography in a wordly point of view is better than an art—it is a trade; it makes a fine display in shop windows, it pays well when puffed, and brings to a man of commercial habits a comfortable income. God forbid that we should speak one word in disparagement of a true sun-picture from Nature herself, which, to adapt Milton's well-known simile, may be compared to "a good book, the precious life blood" of nature, "embalmed and treasured up on purpose to a life beyond life." But for the ten thousand parodies upon nature and art that are sold plenteously at home and abroad we confess to have infinite contempt. Any treatise, then, which should by its teachings tend to abate this growing nuisance, fatal to the better forms of art, all but destructive to engraving, and a sore discouragement to painting and the painter, we should, as we have said, account a public benefactor.—*Saturday Review.*

LICHTDRUCK, A NEW MODE OF PHOTOGRAPHIC PRINTING.—The ollowing method of printing is stated to be similar to that connected with the name of Herr Albert, of Munich. Our account of it is taken from the *Bradford Observer*:—An invention recently brought to the notice of the Society of Photographers at Berlin will, it is believed, inaugurate a new era in the art of photography. By means of this process any number of impressions can be printed from a previously-prepared glass plate in quick succession on any kind of unprepared paper with an effect equal to the best copper, steel, or lithographic prints, in distinctness of colour, definiteness of light and shade, delicacy of outlines, boldness of figure, and indestructibility. The specimen of work shown at the meeting excited the wonder and admiration of the members present, and the inventors received a high eulogium from the president of the society for the production of their lichtdrucks, which had been obtained by a peculiarly-constructed printing press and a composition of colouring matter, the principal substance of which consists of carbon, well known to be indestructible as a printing ingredient. The different subjects thus produced, consisting of landscapes taken from nature or other prints, groups, portraits, statues, &c., demonstrated in themselves the efficacy and importance of the invention by their high finish, elegance, clearness, and other artistic merits in a degree hitherto impossible to obtain. The inventors claim for their process that it not only distances every other attempt thus far made, but will entirely revolutionise all other known processes in photography; that the fading of photograms of the old process is entirely obviated, the new lichtdruck being indestructible. The process of this invention is quite simple. A plate for printing can be prepared in a short time upon common glass from a negative. The outlay is not costly, as neither gold nor silver preparations are needed. One penny will cover all the expenses in materials to prepare a common-sized plate, and, if an impression be taken in the morning, several hundred lichtdrucks of the finest finish can be ready by evening. The outlay for the peculiarly-constructed printing press and a few minor utensils is very moderate, and within the reach of any photographer. Any description of paper is adaptable for this kind of printing, while for highly-finished prints the inventors use another class of paper, specially prepared by themselves. The saving in expensive ingredients, utensils, &c., used in the old process is enormous; and the facility, precision, and certainty with which lichtdrucks can be obtained must prove highly beneficial to photographers and others making use of this branch of art. The inventors are now establishing a large academy to teach their new system of lichtdruck to a select number of pupils at Berlin, and intend to do the same in this country as soon as a sufficient number of pupils are obtained, which there is little doubt they will do, as the premium for teaching the lichtdruck is very moderate, and, as far as we are informed, applications from various parts of this country have already been made by some of our eminent photographers to be enrolled as disciples of the new process. Such are the claims set forth by the inventors, whose agents for England are the Allemannia Offie, 6, Ship Alley, Bradford. We have only to add that we have had the opportunity of seeing a number of specimens of the new process, and as far as can be judged from them, the results are most satisfactory. In clearness of detail and in softness of shadow we never saw them supassed.

"TAM O'SHANTER."—This most humorous production of the poet Burns has been photolithographed from the original manuscripts in the possession of P. A. Moore, Esq., of Kensington. There are few photographers in London circles who are not aware of the complete mastery that Mr. William Griggs, of Avenue House, Peckham, has over the details of photolithography; and the mention of his name as the producer of the work in question carries with it a guarantee of the excellent manner in which the photolithographic *facsimile* has been effected. The interest that attaches to such a reproduction must be very great. We have before us the bold, manly hand of the Ayrshire poet, with every dash, every obliteration and correction, every broken letter and blot of ink, precisely as they came from the author's pen. In addition to *Tam O'Shanter* there is also the *Lament of Mary Queen of Scots*, photolithographed in the same style. This combined work—impossible but for photolithography—is about to be published at a low, almost a nominal, price by Mr. E. W. Allen, of Stationers' Hall-court.

SCIENTIFIC PRINCIPLES APPLIED TO PHOTOGRAPHY.—That great discovery of modern science, the law of the conservation of energy, which demonstrates that force can neither be created nor destroyed, but only turned into particular channels or modes of manifestation by man, may be of some little use when applied to photographic experiments. The force which sets up molecular disturbance on the sensitive plate is wave motion, and it probably acts by setting up a motion of separation between the atom of iodine and the atom of silver. This much is certain, namely, that the energy of radiant light is transformed into the energy of molecular disturbance, whatever the precise nature of that disturbance may be. Any chemical rays, therefore, which pass through the sensitive film and the glass plate without doing work represent so much lost power, which lost power must either necessitate longer exposure to get a picture, or be a cause of less energetic and less intense development. Nearly all wet and dry plates used in photography permit some of the actinic rays to pass through the film. These rays thus wasted often do a certain amount of positive harm in addition; for the back surface of the glass often reflects them once more upon the film, so as to produce a blurred and indistinct picture. In practice, wet red blotting-paper is often placed in optical contact with the back of the glass plate to prevent this blurring by reflected light. Manifestly, then, the most perfect films are those which absorb nearly all the chemical rays, and as few such films are employed in photography except in rare instances, when they are obtained by accident, there is plenty of room for experiment in this direction. Plenty of yellow iodide of silver in the film is chemically more opaque than plenty of bromide of silver, and this is another reason why photographers should once more give iodised collodion a trial, as recently recommended in this journal. In dry plates the use of deeply-coloured organifiers well deserves a trial. Having obtained a film which utilises all the mechanical power of the chemical waves of light, it is desirable that every part of the sensitive surface should come into immediate contact with the developer when it is applied. When bromide of silver is held in suspension in a very weak solution of gelatine, and some of this solution is allowed to dry upon an accurately-levelled glass plate, a rough film results, held to the plate only by a mere trace of gelatine. Such a film gives an intense picture very rapidly when an alkaline developer is applied. But if the bromide of silver be held in suspension by a very strong solution of gelatine, and the same experiment tried, no picture whatever can be developed; in fact, the particles of bromide of silver might as well have been imbedded in the solid glass of the plate. Again: a wet sensitised collodion plate developes readily, but the same plate dried requires longer exposure and tedious development. Wet collodion films are soft and pulpy, but when once they have been dried they form a tough skin, and never return to their former state. Hardwich has pointed out that iodide of silver is much more sensitive to light in the interstices of wet collodion than in the interstices of wet paper or other medium, and he attributes this sensitiveness to the loose state of cohesion in which it is held in wet collodion. It is easy, therefore, to see that a tough sample of collodion may allow development to proceed more rapidly on the upper surface of the film than on the surface in contact with the glass. There is, in fact, ocular evidence that chemical action proceeds with unequal velocity at the two surfaces of collodion films, because pictures which appear to have been quite fixed by cyanide of potassium, when viewed from the one side are often seen not to be fixed when viewed through the glass from the other side. When a developer does not at once penetrate the film, a picture of low intensity is probably the result. This reasoning points to the conclusion that the best collodion films should let no actinic rays pass through them, and should be of a soft and spongy and not tough consistency. Other qualities, well known to photographers, are likewise necessary in good collodion. There is plenty of room for experiment in this direction by some good photographer versed in the manufacture of collodion who should keep these principles in view, and ascertain the nature of the structure of the film given after sensitising, by each of his samples of collodion, the microscope being the medium of examination. Very probably in the best dry-plate processes of the future collodion will be entirely abolished; at all events a layer of dry bromide of silver containing a trace of organic matter, and not imbedded in a collodion or any other skinny film, gives a picture which comes out under the alkaline developer with marvellous facility.—*Mechanics' Magazine.*

Identification through a Photograph.—The man who was recently found dead in a ditch at Cuckfield has been identified by his photograph as a Mr. Williams, an architect, who for several weeks lived at Twickenham, stopping for some time at the Prince of Wales Inn, and latterly at the Coach and Horses. He was of very intemperate habits, and it is said during his stay in Twickenham he squandered away about £90. It is thought that, having run through this sum, he had gone to Brighton and got some more money from his friends. Last week a policeman brought to Twickenham a photograph, which was at once identified by the landlord of the Coach and Horses and other persons. The impression is that Mr. Williams was murdered and robbed, as only fourpence was found upon him.

The Late Mr. J. B. Hockin.—We regret to hear of the death of Mr. Hockin, of Duke-street, Manchester-square. Being by profession a chemist, the subject of the deposition of metals by galvanic agency had for him a peculiar charm, and he published a manual on this subject. But in his case, as in that of many others, this subject was not able to maintain its charms when the superior attractions of photography asserted their claims; accordingly he devoted much of his time to the study of the chemical principles involved in the various processes of photography on metallic plates, paper, and glass. His *Practical Hints on Photography* formed a very complete epitome of the art-science at the time (1860) when it was published. Mr. Hockin was born at Launceston in 1822, and died on the 25th ult., aged forty-seven.

A Case of Distress.—A gentleman who has been an occasional contributor to photographic literature is in such a state of destitution that the Vicar of Tintagel, Camelford, is making an earnest appeal to the friends of art to render aid. This gentleman is sixty-six years of age, and, after having nearly all his lifetime been engaged in making achæological sketches in various places, is, through loss of sight, entirely unable to use his pencil, and is now quite destitute, without a relation in the world. A sum of £50 has been promised towards the purchasing of an annuity of £20, provided the rest of the money required be raised; and it is to be hoped that those of our readers who are in a position to do so will render such aid as they can to the poor artist who is in such sad affliction. His father was one of Lord Nelson's officers. From motives which every reader will appreciate, we do not publish the name of the gentleman, although we shall willingly communicate it privately to any who will take an interest in the case. Contributions may be sent either to the Publisher of this Journal (in which case acknowledgments will be made among our "Answers to Correspondents"), or to the Rev. R. B. Kinsman, vicar of Tintagle, Camelford, Cornwall.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

The Tannin Process.—Mr. Dawson informs us, in connection with what we stated concerning the tannin process as being the one taught at King's College, that he instructs his students in many others; at the same time he gives the preference to tannin as a preservative, because he thinks it the best that has yet been devised.

F. Green.—Instead of "grammes" read the formula as "parts," and you will experience no difficulty whatever.

J. T. P.—It will not be in our power to try the developer for some days. If possible, however, we will give our opinion of it next week.

C. J.—From your description the collodion is gelatinous, and not merely thick. Do not thin it by the mixture of ether and alcohol proposed by you, but do it with ether alone.

D. Taylor (Kilburn).—In our forthcoming Almanac you will find an article on the subject alluded to in your letter, and with which, from the practical tone which pervades it, you will be much pleased.

Alick—We are not aware of any who now tone their prints by the "old hypo." method. Some may employ this mode of toning by way of occasional experiment, but no one now uses it regularly, so far as we know.

C. B.—If the quarter-plate portrait combination be corrected so as to give a flat field, it will answer for *cartes;* but it would be better to use one of rather longer focus and constructed expressly for *carte* portraiture.

Arthur Rodney.—You will receive all requisite information about Nicephore Niepce and his heliographic process from some articles that appeared in The British Journal of Photography in November and December, 1864.

Thomas Langlands.—The deep shadows under the eyes arise from the excess of your top light. Erect some kind of awning over the heads of your sitters, and you will then be able to obtain portraits not much inferior to those taken in a glass house.

S. Bourne.—Your experience with the varnish is so very different from that of ourselves and some others, we purpose devoting the first spare evening to an investigation of the circumstances under which tackiness occurs. Of the result of this investigation we shall apprise you.

An Old Subscriber.—The proper kind of negative for enlarging is one in which there is so little silver deposited that it will not print properly. It must be full of detail, but deficient in density. What you term a good positive will not answer; it must be an over-exposed positive, in which there are no portions wholly devoid of a silver deposit, but the very darkest shadows.

A Paris Photographer.—The process respecting which you write is known here by various names, but it is employed by very few, if any, of the profession. It was known some time ago as Chambay's process, and an agent of that artist's exhibited some excellent pictures here three or four years ago.

J. B. (Greenwich).—Place the bath solution in an open vessel on a sand-bath, and allow it to boil for a minute or two. This will effectually eradicate the evils of which you complain. You must, however, after the solution has reached the boiling point, follow up with the treatment you intended giving.

Amateur.—The plan of your house is good. You may, however, increase its efficiency by making it three feet longer than it is at present. Submit your plans to the surveyor of your district before you commence to build, otherwise you may find difficulties interposed in your way. Your plans are left as requested

W. H. S.—You will not be able to obtain a better kind of lens than that which you are now using. We refer, of course, to a particular class of picture. For landscapes a single combination is usually preferred to a triple; but for taking architectural subjects it will not answer so well, in consequence of its distorting the subject.

J. Beringer (Helston).—1. You will find an article, by Mr Griggs, in our last Almanac, giving an account of the process by which the photolithograph was obtained. It is only adapted for the reproduction of line subjects, such as engravings, and will not answer for photographic portraits. 2. For an account of the best carbon process see our number for April 2.

H—y F—r.—There is an optical principle involved in the production of the sunk-in appearance of your opalotypes, which it would take too long to explain at present. It will be sufficient for you to be informed that, by using flashed opal glass, the picture will be more brilliant than if you employ "pot metal." The latter causes the appearance of which you complain.

J. Baker.—We have transferred many collodion positives to both leather and japanned cloth. The latter may be procured both from photographic "stock-dealers" and also from some trimming shops, as it is chiefly used by ladies in the preparation of some species of embroidery or lacework. To use it, dry the picture, and then pour over its surface a little spirits of wine to which has been added a drop or two of nitric acid to the ounce. Wet the surface of the cloth with the same fluid, and press the picture and the cloth together, removing the superfluous spirit with blotting-paper. Keep them pressed together until they are dry, which will be the case in fifteen or twenty minutes. Now raise up the cloth gently by one corner, and it will be found that the picture will come clean away from the glass.

Received —James Valentine; M. Row; J. Martin; G. W. W., and others In our next.

LONDON GAZETTE, *Friday, December* 17.

Notice of Sitting for Last Examination.

R. Stubbs, photographic artist, King's-road, Chelsea.—April 1.

Tuesday, Dec. 21.

Bankrupt.

Josiah Clements, photographer, Birkenhead and Liverpool —Dec. 31, at Liverpool.

Notice of Sitting for Last Examination

J. Latham, photographer, late of Longton, Staffordshire.—Jan. 10.

METEOROLOGICAL REPORT,

For the Fortnight ending December 22nd, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Dec. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
9	29·92	43	39	41	41	WNW	0·02	Foggy
10	29·97	48	38	42	42	SW	—	Overcast
11	29·49	51	38	47	48	SW	—	Fine
13	29·51	52	34	47	48	SW	0·03	Cloudy
14	29·36	49	41	42	44	WSW	0·30	Fine
15	29·44	—	38	43	44	WSW	—	Fine
16	29·87	51	36	41	42	WSW	0·47	Fine
17	29·66	51	36	40	42	NW	0·05	Fine
18	29·57	51	40	50	50	SSW	—	Raining
20	29·65	45	36	39	40	SW	—	Fine
21	29·37	44	37	43	43	E	0·45	Raining
22	29.51	—	34	36	37	NNW	—	Overcast

NOTICE.—Orders for this Journal sent through Provincial Booksellers to their London Correspondents, ought to ensure its punctual delivery in any part of Great Britain and Ireland. The Publishing Office is at 2, York Street, Covent Garden, W.C.; and, when any difficulty is experienced in so procuring it punctually, the orders should be sent direct to the Publisher at the above address.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 504. Vol. XVI.—DECEMBER 31, 1869.

MR. M. CAREY LEA'S NEW PROCESS.

Let us congratulate our friend and correspondent, Mr. Lea, upon having brought to such a successful issue his investigations in connection with the chloro-bromide of silver, resulting in the publication in the present number of a process which will, we believe, prove of great value. It is pleasing to be able to place on record during the year in which it has been worked out such a solid contribution to our dry-plate processes.

In a short time the process will be tried by many of our readers, and each will then be in a position to decide upon its merits; but, whatever modification may be deemed desirable, or whatever alteration be made, in common justice to our indefatigable friend, Mr. Lea, his name will, we trust, henceforth be associated with the new "Chloro-Bromide Process." We think the last remark to be necessary, inasmuch as, from inadvertence rather than from design, Mr. Lea has not, in connection with some of his previous researches, experienced that full and hearty acknowledgment which is so justly his due. With these remarks we cordially commend his chloro-bromide process to the attention of our readers.

RETROSPECTIVE.

It has been our custom at the termination of each year to touch upon the chief points of photographic interest which have been brought under the notice of our readers during the past twelve months. In this respect our duties this year, so far as real novelties are concerned, are very light; but though it has not been our lot to chronicle any very striking discoveries in our art-science, all photographers have good reason to be satisfied with the amount of progress which has been made.

In the ordinary wet process but little alteration has been effected; nor is it to be expected that any very material advance will take place in this direction, as we are already in possession of extremely rapid wet-plate methods which chiefly need to be rendered more certain in operation.

Attention has been principally given to the testing of dry-plate processes; and during the past summer immense numbers of dry plates, prepared by the most varied methods, have been exposed, and a large amount of experience gained in the use of the several processes. But by far the largest share of attention has been given to the mode of operating without a silver bath, proposed some years ago in this Journal by Messrs. Sayce and Bolton, and which has lately received such marked development at the hands of Mr. M. Carey Lea. But though some of the difficulties of this mode of operating have been made the subject of special study by Mr. George Dawson in this country, the danger of fogging remained when plates were prepared of the maximum degree of sensitiveness.

It is, therefore, with no slight gratification to us as photographers and, we may add, as journalists, that we present to our readers in the present number a valuable paper by Mr. Carey Lea, in which that indefatigable experimentalist gives the solution to this great difficulty of the collodio-bromide process, by announcing the discovery that the addition of a soluble *chloride* to the collodion not only appears to confer extra sensitiveness, but also gives almost complete immunity from fog. In fact, so strongly marked is the improvement resulting from this admixture, that Mr. Lea writes of it—"It will be found that this application of chloride of silver will be equal in importance and not dissimilar in charater to the introduction of bromide of silver into the regular wet process." This last contribution to our store of knowledge forms a fitting conclusion to the author's valuble labours during 1869.

Apart from the ingenious but unsatisfactory experiments of M. Ducos du Hauron and M. Cros, the subject of heliochromy has attracted but little attention during the past year; but we hope that long before the close of the decade on which we are now about to enter photography in natural colours will be an accomplished fact.

Though the progress in the general branches of photography has been satisfactory during 1869, it is specially in the matter of pigment and mechanical printing that we have had to chronicle the most marked advance. To justify this statement we need but point to the beautiful results obtained by Ohm and Grossman, Albert, and others, on the continent of Europe, and to the results achieved by the indomitable perseverance and energy of Mr. J. R. Johnson and Mr. Woodbury in this country. We hope that the time is not far distant when we shall see the silver printing process supplanted by the more permanent methods of mechanical printing, when the latter shall have become so simplified in details that the operator will find it not only more convenient to dispense to a great extent with the solar rays, but likewise more economical to do so. As it is probable a long time may elapse before so desirable an end will have been attained, we must still seek to improve the present mode of silver printing as far as possible, and while perfecting the details economise as well. The chief opening in this direction appears to be the production of a ready-sensitised paper, on the preparation and necessary qualities of which the photographer may depend.

At the commencement of the year just closing we announced the discovery of a new mode of preparing a paper which would but require fuming with ammonia in order to render it sensitive to light. We refer to the carbonate of silver paper of MM. Schæffner and Mohr. The hopes entertained of the value of this paper have not been realised; but we must recollect, nevertheless, that the inventors discovered a new mode of rendering certain insoluble compounds of silver sensitive to light by treatment with ammoniacal fumes. This discovery, though it has yet borne but little fruit, is of considerable value, and, moreover, is one which we hope soon to see utilised in a remarkable way.

But though the ready-sensitised papers of MM. Schæffner and Mohr, of Carrier, or of the Leptographic Company, have not attained a very high reputation, still it has been shown that the preparation of such a good keeping paper is possible; and the production of the new papers of M. Durand and of Mr. Henderson leads us to hope that we are near the satisfactory solution of this great difficulty of the ordinary printing process.

The publication by Mr. Sarony of a novel effect in connection with the production of enlargements has not been without its results, a

number of photographers having been led to give more of their attention to the best means of obtaining enlargements than they otherwise would have done.

In the optical department of photography matters remain in *statu quo*. The "wide angle" lens fever has subsided, and artists are realising the fact that a lens which includes a small angle of view well is, after all, the most generally useful instrument of the class.

The progress made in photo-enamelling in this country has been so satisfactory that, as a nation, we may now consider ourselves as occupying a position not inferior to any other.

Many intricate questions connected with the action of albumenised paper on the silver printing bath have been treated in these columns by Mr. George Price, who, in his usual trenchant style, has shown up some of the plausible fallacies into which photographers have in some cases insensibly glided.

The discussion on the value of alkaline nitrates—but especially that of ammonia—in the printing bath was reopened in an able paper by Mr. Nicol, of Edinburgh, whose experience with such a compound printing bath has led him to strongly recommend its general use. On a subject which has been such a fruitful cause of controversy it would be beside our present object to enter; but we would only say, "let every man be fully persuaded in his own mind," and then, if our practice be based on the intelligent observation of facts, it little matters to the individual who holds a contrary opinion.

The important economic question of the best modes of saving photographic residues has received much attention at the hands of Mr. George Dawson and Mr. Webster, who, in a clear and simple manner, have made the whole subject so plain that it would be difficult for the merest novice to go astray in carrying out the directions of either of these gentlemen.

Having glanced briefly at the past, we have now but to look hopefully forward to the future. During the last decade numerous valuable discoveries have been made, while the progress of science has been marked by great and, in some instances, violent revolutions. Let us hope that in the new period of time on which we are about to enter we may all be enabled to bury the animosities of the past, and to cherish, instead, the desire to do good to all, earnestly aiding by individual exertion the advancement of true knowledge. With such desires for the future we heartily wish our readers—

A Happy New Year.

OURSELVES.

While presenting to our readers, with a hearty good will, those compliments and good wishes incident upon the closing hours of the old and the speedy advent of the new year, we may take occasion to remark that our arrangements for 1870 enable us to state that, in addition to all the special features that have been considered valuable or interesting in this Journal in the past, others which have been for some time desiderated will be developed in our seventeenth annual volume, which commences with the new year. Thus will it be our endeavour to make this Journal in time to come, as it has been in times past, in reality as well as in name—*The* British Journal of Photography.

THE CHLORO-BROMIDE PROCESS.

I propose to give the above name to a new form of the collodio-bromide process which I have just finished working out.

Some years ago I made and published some experiments upon development on chloride of silver on paper. The chloride paper was exposed under a negative—in some cases for a very short time, in others until a visible image appeared. It was found that in the latter case, when the exposure was continued till the whole image was visible, and then finished by development, a better result was got than when iodo-bromide of silver was used; and I recommended this mode of development for regular use in development printing. But the most remarkable result was got when the exposure was very short. In an experiment in which a single magnesium spiral was burned in front of the negative, nothing at all was visible when the paper was removed from the frame. According to received ideas respecting the comparative insensibility of chloride of silver, a development of the under-exposed invisible image ought to have produced a very harsh black and white picture, instead of which a thin picture, crowded with detail, was obtained. I remember mentioning that some extremely faint detail which I had noticed in the negative, with the thought in my mind that that portion would never show in any print, was distinctly visible in the development. At the same time the image was so thin, flat, and destitute of vigour as to be wholly worthless as a positive, and was only of interest in connection with the curious properties so unexpectedly disclosed.

The publication of these experiments, showing such unthought-of sensitiveness in chloride of silver, naturally led others to experiment in the direction of the plates for the camera. Nothing, however, of interest was elicited, nor was any step made towards the discovery of the function of chloride of silver in connection with collodion negatives.

This function I believe I have now succeeded in making out. The true use of chloride of silver is to be found in connection with bromide in the collodio-bromide process; and, if I do not deceive myself, it will be found that the application of chloride of silver *will be equal in importance, and not dissimilar in character, to the introduction of bromide of silver into the regular wet process.*

For, although excellent work was done with the iodide of silver process, yet the introduction of bromide gave a great certainty, ease, and freedom from fog. So, although capital work can be done with the collodio-bromide process, nevertheless the introduction of chloride enables us with ease and certainty to get a bright, vigorous image, coming up with facility to any degree of intensity desired, supporting with great ease a redevelopment with nitrate of silver and acid pyro. if desired, in consequence of inadvertent under-exposure, and without any need of previous fixing. Indeed, the addition of even a very small quantity of chloride so effectually destroys all tendency to fog, that the use of a soluble bromide in the development becomes very superfluous, even when the sensitive collodion has been prepared with a large relative excess of nitrate of silver. A liberal excess of nitrate of silver in the collodion tends to exalt the sensibility, but obliges great care to be taken in development, and the use of plenty of bromide of potassium; but, by the introduction of chloride, all this tendency to fog disappears at once, and the development goes forward as brightly and clearly as can be desired.

The proportion of chloride necessary is singularly small. A grain to the ounce of collodion seems to be quite sufficient in most cases. In some it may be raised to two grains, in others lowered to half-a-grain. It is wonderful to see how complete a change in the character of the plate the addition of so small a quantity as half-a-grain will make. The amount to be added will always depend upon the character of the collodion in use and the result desired. The more chloride added the greater will be the vigour of the resulting negative.

The chloride which I have selected for use is the *chloride of copper*. Of course others may be used, such as the alkaline chlorides, chloride of cadmium, of calcium, &c., &c.; but the chloride of copper leaves nothing to be desired. It is easily obtained pure;* it is very soluble in alcohol, and works in all respects satisfactorily. So also, doubtless, will other metallic chlorides and chloride of lithium. Other alkaline chlorides than lithium I consider objectionable, because of their sparing solubility in collodion. A great deal of mischief results from the use of sparingly soluble salts in collodion, and this has been especially the case with bromide of ammonium. I cannot stop now to enlarge on this, but shall simply remark that the transparent specks that have greatly annoyed some who have tried the collodio-bromide process have resulted from this cause. More than two grains of bromide of ammonium cannot be usefully dissolved in any collodion as free from water as collodion should be. A larger quantity than this may, indeed, be got into solution by the use of hot alcohol. But when the collodion is so fully charged slight depressions of temperature will cause the ammonium salt to crystallise out in invisible particles that remain suspended in the liquid, and cause insensitive specks in the negative.

This is ample reason for rejecting all the alkaline chlorides which are still less soluble in alcohol than the bromides. Chloride of lithium is, of course, an exception; but it is scarce and expensive, and, as I said before, chloride of copper leaves nothing to be desired. I use it in solution in alcohol sixteen grains to the ounce, so that each half-drachm contains one grain. It may, of course, be dissolved in the collodion together with the bromides, but, at first at least, the photographer will find it more convenient to keep it separate, and to add it at the time of sensitising. In this way he can regulate the quantity according to the result obtained.

* The specimen used by me was obtained by dissolving precipitated carbonate of copper in hydrochloric acid.

The following are the formulæ which I recommend for use. I have always preferred to use a collodion richer in bromide than many others who use the collodio-bromide process. If found too thick, it is easy to thin it with ether to any desired thickness; but I have always found that it was best to apply the collodio-bromide as little thin as possible—a rich creamy film always gives the softest pictures, and with the most details in the shadows. I, therefore, make my collodion—

Alcohol and ether, equal parts	1 ounce.
Bromide of cadmium	10 grains.
Bromide of ammonium	2 „
Pyroxyline	6 „

Everything will depend upon the quality of the pyroxyline, which must be intense and powdery. The best I have had has been supplied me by Mr. Parys, of this city, though I have had very good intense "helion" from Mr. Cooper, of New York. A skinny collodion is very objectionable. This last quality is, of course, easily judged of by the common method of drawing the finger through the film just as it sets. The finger should plough straight through without tearing or making a jagged track. As to the *intensity* which it is essential if gum is to be the preservative (and it is by far the best), I know no better way than to procure several specimens, make them up, and set them aside for a month; then give them an actual trial and adopt that which gives the best result, laying in a supply to last for a long time.

As respects the keeping of collodion, my own experience has been that it gains in sensitiveness for a long time by standing. But some specimens blister worse after keeping for six or eight months than after one month. The trouble from blisters, however, when they occur, is more apparent than real. Gum, indeed, whilst giving the most sensitive plates of all preservatives that I have tried, tends to blisters. But if the plates are well washed, the blisters dry up without leaving stains; good washing after fixing is, however, essential.

Having then prepared a solution of chloride of copper sixteen grains to the ounce of alcohol, I add to each ounce of collodion half-a-drachm of the chloride solution, and sensitise it with twenty grains of finely-powdered nitrate of silver.

Now, in the sensitising, great differences of opinion have been expressed as to the time for which the mixture should wait after the silver is added, in order that it may reach its most sensitive stage. In my own experience, I have never found the mixture in its best condition until fully forty-eight hours have expired after the addition of the silver; and I think that more persons have, probably, failed in consequence of using the mixture too soon than from all other causes put together. A mixture after forty-eight hours will give plates that will be fully exposed with an amount of exposure which, had it been used at the end of twenty-four hours, would have given a half-exposed, chalky black and white negative.

Not only this, but I have long recognised and acted upon the fact that the mixture acts much better if it has been treated in the following way:—Suppose we want four ounces of sensitive mixture, we take less than this—say three ounces—and sensitise it; shake it frequently, and at the end of a day add the remaining ounce, thus bringing the bromide into excess. This stands, with occasional shaking, for half a day. Then the silver corresponding to the last addition of collodion is added, well shaken up at intervals, and at the end of another half-day (making in all two days), it is in its best condition. Although this proceeding is not absolutely necessary, and although very good results are got by simply adding the needful quantity of nitrate of silver to the whole of the collodion intended to be used, yet nevertheless there is a decided advantage in proceeding as above. I have used this method with unimportant variations for years, and have described it in my *Manual*, and, I think, in your pages.

After using what I want I add, according to the custom usual with those who work the collodio-bromide process, some of the bromised collodion to the residue, by which admixture it keeps well, and is again ready for use by adding nitrate of silver corresponding to the quantity of collodion last introduced into it. It is not well, however, to do this too often; but after thus treating the residue for three or four times, it is better to use it all up and start afresh. To explain why would require too much room at present.

I next come to the preservative. I greatly prefer preservatives in which gum forms an essential portion. Nothing, so far that I have experimented with (and I have used a vast number of substances), has given the same sensitiveness as gum; at the same time, if not properly managed, there is a tendency to thinness of the image and to fogging. As the introduction of the chloride is very favourable to the prevention of fogging, it is with gum that it will be found to be most useful. Together with gum I use sugar and litmus. The sugar seems to be chiefly useful for keeping the film in a porous condition. It dissolves out rapidly when the plate is developed, and leaves the film in a spongy condition favourable to the rapid and equal penetration of the developer. The litmus I at first used for the purpose of darkening the film and diminishing its penetrability to light, but it also proved to act most favourably upon the sensitiveness of the film and on the vigour of the image. It may be used either blue or may be reddened by acetic acid. If used blue it is best to lightly wash the plate beforehand, because silver gives a precipitate with blue litmus. With litmus reddened by acetic acid the tendency to precipitate is greatly diminished, and a previous washing becomes superfluous and even injurious. On the whole I prefer the blue; or the gum and sugar may be used without litmus at all—in which case, however, the sensibility is farther lessened. I give all three methods. The first involves a very little more trouble than the others, but it gives the best results. I therefore use it myself and give it the preference. All three, however, give good results:—

No. 1.—Take a quarter pound of good litmus (the French is better than the German); cover it with boiling water, and set it in a warm place for some hours or a day. Pour off the liquid into a filter; add more water; pour this off, and finally throw the grounds upon the filter and wash through with hot water until the filtrate amounts to a quart. Add a little carbolic acid (half a drachm), and the liquid will keep indefinitely. I have used it six and eight months old. The bath is made by dissolving—

Best gum arabic	20 grains.
Loaf sugar	12 „
Water	1 ounce.

The litmus solution is added to this in the proportion of an ounce to each four ounces of the gum-water.

After the plate is collodionised allow it to get barely set, and plunge it into a pan of water, where it may lie either a long or a short time, except that all greasiness must be gone. It is then plunged into the above bath, left there six, eight, or ten minutes (fifteen will do no harm), and is then dried.

No. 2 differs only from the above in this—that a little acetic acid is added. I use what is called No. 5, corresponding, I believe, to Beaufoy's acid, and put in twenty-five minims to each ounce of litmus solution—say a drachm to each two and a-quarter ounces or thereabouts. Into this the plate is plunged as soon as the collodion is set; it is left in until greasy marks are completely gone, allowing rather a little more time than less, and is then ready to dry.

No. 3 differs only from the foregoing in the entire omission of the litmus and, consequently, of the acetic acid. Plates are immersed without previous washing.

It is well worth while to take the little additional trouble required with the first of these methods, and so secure the best results.

The development is effected by plunging a plate into a bath which, for $6\frac{1}{2} \times 8\frac{1}{2}$ size, is made as follows:—

Water	6 ounces.
60-grain solution of pyrogallic acid	$\frac{1}{2}$ drachm.
80-grain solution of carbonate of ammonia	$\frac{1}{2}$ „

In my own experience I find bromide of potassium unnecessary, except there be indication of over-exposure by the too rapid flashing up of the image, when it may be well to add some. Fix in very weak hyposulphite.

It is altogether probable that the advantages of the chloride will be found to vary with different specimens of collodion and different preservatives. The great gain which I find in its use is that it admits of our raising the sensitiveness of the collodio-bromide mixture to the highest degreee, by protecting it from the dangers which accompany that mode of operating. Some have feared them so much as to recommend using either just sufficient nitrate to correspond with the bromides, or even to use less and leave the bromides in excess. In this way a clean plate is secured indeed, even if the operation has not been very well managed, but at a great sacrifice of sensitiveness. Now the introduction of the chloride enables us to obtain perfect clearness and, at the same time, retain the exalted sensitiveness, which can only be obtained by having present a liberal excess of nitrate of silver.

I propose to call the new process the "*chloro-bromide process*," in order to mark the characteristic feature which distinguishes it from all the other forms in which Messrs. Sayce and Bolton's invaluable collodio-bromide has been worked. M. Carey Lea.

Philadelphia, December 13, 1869.

Since mailing my communication of this morning, I find that I omitted to say that those who are working the collodio-bromide pro-

cess with a collodion different from that which I have recommended, can try the effect of the addition of chloride of silver by observing that when a grain to the ounce of chloride of copper is added, the quantity of nitrate of silver should be increased by *two and a-half grains.* Two and a-quarter would be nearer the equivalent amount, but when a chloride is used it will always be safe, and decidedly advantageous, to increase the amount of silver.

Therefore, those who use at present formulæ in which the nitrate of silver just about balances the bromide present, will find it advantageous to enlarge the excess. Thus, suppose any collodion contains bromide equivalent to (let us say) ten grains of nitrate of silver, it will be quite safe to use two grains of nitrate of silver in excess of this, and two and a-half grains to correspond with the grain of chloride of copper. Thus, in the whole, fourteen to fifteen grains of nitrate of silver will be proper for such a collodion.

But I would rather urge the adoption of the formula which I have sent you; those who cannot work except with a very fluid mixture can easily dilute with ether, and, at the same time, gradually acquire the facility of applying it thicker. M. Carey Lea.

ENLARGEMENTS.

It is well that, in the last Journal of the present year, we should, in the interests of many of our readers, take a glance, if only a passing one, at the present state and future prospects of enlargements; and this the more especially as we have just risen from verifying a series of experiments in a certain kind of enlarging which will, we think, find many adherents, and some details of which will be published in the course of the present article.

In lighting, the direct rays of the sun are very seldom employed. There are, it is true, occasional instances of photographers using a solar camera, and we know that first-class work has even in this country been obtained by this instrument; still the numbers using it for the direct production of proofs from the negative is not one in five hundred. To artificial light, therefore, must we turn as the source of illumination in the production of enlargements for the future.

The oxyhydrogen light when used with lime is very luminous, but is weak in actinic power. When, instead of lime, chloride of magnesia (as used by Professor Carlevaris), or a mixture of chloride and carbonate of magnesia (as used by Dr. Monckhoven) is employed, the luminousness of the flame is not only of a high order, but so also is its actinism, which nearly rivals that obtained from the direct combustion of metallic magnesium.

It has been urged as an objection to the magnesium light (when produced from a riband of the metal) that when the metal is paid out too rapidly it droops from the orifice of the burner and produces a large or, at any rate, a long flame, which is held to interfere with the sharpness of the picture projected on to the sheet of sensitive paper. This objection is correctly stated; when a flame is large, or long, or broad, it is not so well adapted for purposes requiring optical accuracy as one that is as nearly as possible a luminous point. But the remedy is exceedingly simple, and consists of the preventive means obtained by so regulating the propulsion of the riband as to reduce the flame to a minimum, and of the *curative* means secured by interposing a piece of metal (if necessary with a small aperture in it) so as to prevent any of the light from the long drooping incandescent riband having access to the condenser of the enlarging lantern.

The mere flickering of the light is of no consequence whatever in the obtaining of a sharp enlargement. If the precaution above indicated be adopted the flickering or unsteadiness of the light will in no wise displace the enlarged image on the screen, and so long as its *position* remains undisturbed the variation in its luminousness is a matter of no consequence whatever.

With the view of ascertaining the effect of a very short exposure in the production of an enlarged negative from a small transparency, we made the light of our magnesium lamp more powerful than we usually prefer employing it, and gave an exposure of six seconds on a wet collodion plate, which we remembered was that given by Dr. Monckhoven at the meeting of the Photographic Society when trying a similar experiment. The light had evidently been too powerful; for, even with such a brief exposure, the negative was very much over-exposed. It is probable that with an exposure of between three and four seconds a properly-exposed negative would have been obtained; but, as we have stated, the light was more powerful than we prefer when employing it on ordinary occasions. We have found, however, that a strong light is much better than a weak one —not merely because it reduces the time of exposure, but more especially because a number of thin ribands of magnesium yield a much steadier light than if only a single strand were used. In mere steadiness, apart altogether from intensity, a great power resides in the plurality of the ribands; and as the danger of their going out is materially lessened, they may be propelled from the burner at a very slow rate, and thus permit the securing of that desideratum—a flame of small size.

We stated at the commencement of this article that we had been engaged in experiments with a new species of enlargements which we thought would be much used. A short time since Mr. Sanford, of Red Lion-square, showed us an exceedingly brilliant enlarged print on albumenised paper, which he stated had been obtained in the following manner:—

A sheet of albumenised paper, salted with iodides and bromides instead of the usual chloride, was sensitised by being brushed over with a forty-grain aceto-nitrate of silver solution. The brush employed for this purpose was that so well known to old calotypists as a Buckle's brush—that is, it consisted of a tuft of cotton wool inserted in the end of a glass tube. In the meantime a thin negative had been placed in a magic lantern, illuminated by a Solomon's magnesium lamp, and the focus having been previously adjusted, the sensitive sheet of paper was suspended on the image board by some suitable pins. The magnesium was now ignited, and an exposure of fifteen seconds (a quarter of a minute) given, after which the sheet of paper was laid down on a table face up, and the edges tucked up so as to form an extemporised tray. On the face was poured some saturated solution of gallic acid (about three to four grains to the ounce), which was spread over the sheet by a bent glass rod. In a brief period of time the image began to appear, gradually acquiring more and more force and detail. When the details were deemed to have been sufficiently brought out, a little aceto-nitrate of silver was added to the gallic acid on the print, which now acquired a very deep tone. The picture was then washed and fixed in hyposulphite of soda. In this way was obtained an enlargement which is one of the finest developed pictures that we have ever seen.

Mr. Sanford is now engaged, we understand, in the manufacture of this paper, and we believe that those who like sharp and brilliant enlargements upon albumenised paper, but have hitherto been deterred from producing them by the want of a solar camera, will find in the process here indicated a simple, cheap, and very rapid method of producing them. We have tried the process with much success, and are happy to have the opportunity of informing our readers of it, even at the eleventh hour of the present year.

ACID IN DRY PLATES.

A great deal has been recently written by Mr. Sutton, in his little photographic treatise and in a contemporary journal, on an alleged fact discovered by him, namely, that to obtain the maximum of sensitiveness in bromised dry or wet plates alkalinity of the chemicals is necessary in every stage of the operations. Ever since the assertion was made I have always entertained suspicions of its accuracy, my opinion being based on a general sort of experience to the contrary; but, of late, having entered more particularly into an investigation of the matter, I feel myself in a position to demur altogether to the conclusion involved.

For instance, I do not find it makes any appreciable difference, either in the sensitiveness of bromised films or in the clearness and vigour of the negatives, whether we use an acid, a neutral, or a slightly alkaline sensitising solution. On the other hand, some advantage really does accrue from using a nitrate bath acidulated with nitric acid, inasmuch as this particular acid, for some reason unknown to me, seems to possess the power of rendering the soluble bromide enclosed in the collodion more easily convertible into the sensitive kind, and of materially shortening the time of sensitising. All the free acid thus introduced is afterwards washed away, and cannot interfere with development.

The washing waters, we may reasonably presume, are not acid. Therefore no free acid exists in the film immediately before saturating it with the preservative or *organifier*.* Now, whether the organifier be neutral gum, slightly alkaline gelatine, or slightly acid tannin, the sensitiveness of the films, which have been otherwise similarly prepared, appears to me to be absolutely identical, if we employ an alkaline pyrogallic developer to bring out the image.

But, when using these different organifiers, I notice a marked diversity in symptoms during development, and in the character of

* "Organifier," a word invented by Mr. Sutton, more nearly describes the true function of what we have been in the habit of calling the "preservative," which is a misnomer. Henceforward I shall always adopt the word "organifier" in the sense now used, till we can find a more significant term.

the negatives. Gum is conducive to softness of image; but, on the other hand, it is apt to cause blistering of the film. Alkaline gelatine makes the collodion adhere to the glass with great tenacity, but it sometimes requires skilful "dodging" during development to prevent too much fogging. Tannin is more easily managed than either of the other two, and, when the exposure has been well timed and the development properly carried out, does not, as some assert, give rise to *hard* negatives.

Again: we hear it pertinaciously asserted that free acid in a dry or wet film gradually eats out or destroys the latent image impressed by light in the camera. My experience tells me such is not the fact. We all know how, after a longer or shorter time, the latent impression does merge into a state in which it is not amenable to the action of acid or alkaline developer; but I believe free acid in the film has nothing to do with the matter. A few facts bearing on the question may help us to elucidate, or rather find out, the cause of the mystery.

1st. In the earlier days of photography, when the dry waxed-paper process was all in vogue amongst amateurs, I was one of its most enthusiastic disciples. These papers were sensitised in intensely acid solutions of nitrate of silver, most of which acid was, however, subsequently washed out. But when we wanted the sensitive papers to keep for a longer time than usual, the final washing water was always impregnated with a little acetic acid. Yet I never could find any marked difference between a negative developed one day or two months after exposure, provided the papers were in the meantime kept dry and confined to a minimum of circulation of air. Then, again, with the intensely acid oxymel organifier of Llewelyn I could keep the plates very well for a month or more after exposure and before developing them.

2nd. Experiment shows how, in the common wet processes, it is easy to destroy an undeveloped camera image by washing off the free silver nitrate from the collodion film and then treating the latter with a weak solution of iodide or bromide. Such a changed film may, after washing, be again immersed in a silver nitrate bath for a short time and another different camera impression taken. On development no trace of the first image will be apparent. In fact, invisible images, all developable, can, by these means, be multiplied to any extent and successively obliterated on a single plate; the only one finally capable of development being the one last impressed, and that must be brought out before the film is again washed with a soluble iodide, bromide, or other haloid salt.

From these and similar experimental evidences with which photographers are familiar, *free acid* is clearly not the canker which begins to eat out and finally to destroy the latent image after it has been once impressed. The soluble iodide or bromide in the film is the true cause, if all the free silver nitrate be chemically changed or mechanically removed.

It is important, therefore, in cases where a dry or wet sensitive plate containing no nitrate of silver and a little soluble haloid salt has to be kept for some time before development, to exclude the film as far as possible from aqueous vapour or contact with moisture; also (and this applies to all sensitive silver media) from air which may be impregnated with substances having a great affinity for silver and its compounds, such as sulphur, &c.

Not to occupy too much space by adducing multitudes of illustrative and confirmatory facts, I may assume the following propositions to be almost, if not altogether, conclusively demonstrated:—

1st. In those wet or dry photographic processes *wherein an acid developer with nitrate or other soluble silver salt is used*, some free acid is also an essential either in the collodion or sensitising bath, unless both these are entirely free from organic compounds having an affinity for silver.

2nd. In the wet or dry processes, *wherein an alkaline developer without a soluble salt of silver is used*, soluble bromide takes the place of acid and is essential to successful development. But a little acid in the film seems to do no harm in respect of rapidity of exposure, provided a little more alkali or alkaline carbonate is added to the pyrogallic developer.

The above observations were sketched out before I had read the very interesting letter, in last week's Journal, from your Philadelphia correspondent, Mr. M. Carey Lea. His experience about acid or alkaline organifiers for alkaline development is altogether in accordance with mine. Like him, I do not see any essential relationship between alkalinity and sensitiveness. I am sure nothing of the sort exists. But, in regard to the comparative sensitiveness imparted by the compound organifiers about which Mr. Lea speaks and gives his experience, I cannot offer a decided opinion from not having tested them sufficiently. In arriving at a conclusion depending upon probabilities, his opinion is likely to be correct. GEORGE DAWSON.

ON THE PRODUCTION OF NEGATIVE *CLICHÉS* FOR THE CARBON PROCESS.*

WHEN the system of a double transfer is employed for producing an image by the carbon process a direct image is obtained, the relative positions of the parts being the same as in the original; but when the single process of transfer is employed by applying it immediately upon paper, the proof obtained is reversed, and there is an opportunity of utilising the simplicity of the Johnson process *direct* upon paper—that is, of suppressing the intermediate transitory vehicle while obtaining images in their true position.

Many means have been proposed for that purpose, and M. Marion has published a note relative to pellicular negatives, the object of which was to indicate a means of forming by the carbon process *clichés* which could print a positive on either the one side or the other.

M. Teissiere and myself, at the Photographic Society of Marseilles, have indicated, as the most simple means of reversing of the *cliché*, the exposing in the camera of the sensitive layer of collodion at the back instead of exposing it in the usual manner. But this means, though so simple, and the value of which has since been demonstrated, is only applicable to negatives to be yet made; and, as to those which exist, it would be well if we were able either to reverse them or to multiply them, so as to render them suited to the new process of carbon printing. We have tried to obtain carbon *clichés*, and the following are the facts furnished by experiments.

The negative to be reproduced is exposed to the light three times the usual time required for furnishing a good image to be viewed by reflection. It is exposed in contact with paper prepared with a mixture as follows:—

Water	100 parts.
Gelatine	10 ,,
Lamp black	2 ,,

This mixture is put upon the paper, and the layer which covers it has the thickness of about half a millemetre. It is sensitised with one and a-half per cent. of bichromate of potash; after which an unpolished plate (stearined) is introduced, and they are applied one upon the other. When taken out of the bath they are pressed in the blotting-paper and left to dry, after which the mixture is separated from the glass. Thus a layer is obtained the surface of which is perfectly plane, exempt from all the unevennesses which in the paper with the mixture affect the form of the grain, and are an obstacle in obtaining absolute fineness in the proof.

Before employing the mixture thus smoothed, its surface must be cleaned with cotton steeped in alcohol, in order to remove the stearine, which would otherwise prevent the water from wetting the mixture. That being done, before or after the exposure, the impressed mixture is put into water, and taken out as soon as it is extended upon an unpolished stearined glass. The development takes place as usual, and when once the image is developed, when all excess of black has disappeared, several layers of gelatine, consisting of—

Water	100 parts,
Gelatine	10 ,,

are poured upon its surface so as to obtain a definitive layer, which, when dried, is of the thickness of half or three quarters of a millemetre. When left to dry it is placed horizontally, and sheltered from all dust. As soon as the bed is fixed it is treated with alum, so as to prevent the film from being affected by humidity. As a matter of course, the frame intended to enclose the original negative should be placed at the back of the *cliché*.

When the gelatine is perfectly dry the pellicular positive is easily removed, care having been taken to draw a knife all round it, deep enough to reach the unpolished glass. I do not understand why plates of metal rather than glass are recommended; for the glass, by reason of its transparency on the one hand, enables us to see the image when it appears, and on the other affords such facility for cleaning that it must be infinitely superior to the metal. The positive pellicle, when obtained, is preserved, and is ready for being transformed into one or several negative *clichés*, the operations being as follow:—

On the side of the pellicle which should adhere to the glass a paper containing a mixture with the proportions above indicated is applied in the manner before stated. The positive serving as a *cliché* should be encircled by a thin opaque margin. The exposure should be thrice as long as is required to produce an ordinary impression.

After printing one or more negative proofs, they are applied under water upon many or one polished glass plate previously well cleaned. When the adhesion is perfect, after having been about a quarter

* Read at a meeting of the Marseilles Photographic Society, December 6, 1869.

of an hour out of the water, the usual development is proceeded with in hot water, and when that is finished it is treated with alum, and left to dry on the ulterior gelatine bed. Varnish may be used, but it is not necessary, as the proof adheres to the glass so firmly as to resist strong rubbing.

By this means negative reversed images are obtained capable of furnishing carbon images directly. The negatives being applied upon glass are thus kept more rigid than if they had been pellicular. They will stand frequent use better, and, in case of accident, the pellicular positive will enable you to obtain one or more fresh negatives.

You may have read M. Marion's note on this subject, but it appeared to contain indications which were too vague to be of service to learners. My endeavour has been to present it in a clearer and more practical manner. LEON VIDAL.

DESCRIPTION OF AN EFFICIENT APPARATUS FOR ENLARGEMENTS.*

I NEED not dilate upon the value of enlargements, nor need I point to the perfection which may be imparted to them in efficient hands. This was demonstrated at the last meeting of this Society, when Professor Piazzi Smyth showed us exquisite examples magnified from ten to twenty diameters, not only without perceptible loss of definition, but really with additional definition; for much that was invisible to the unassisted eye before enlargement became quite easily visible by it after the picture had been enlarged.

We may assume, then, as a certainty, that if the object to be enlarged be carefully prepared for that purpose, twenty diameters is a possible quantity without much loss of definition; and, if so, then we are not far from the amount shown by the enlargement from a *carte* head to life-size, which is practically what photographers engaged professionally demand.

The most usual methods hitherto adopted to effect this object has been to construct a large camera with all the necessary adjustments—bellows body, screw, dark slides of a huge size, &c., &c., unless one or other of the methods of artificial lighting were used, or such a cumbrous and troublesome thing as the solar camera with a heliostat, &c.

The method I propose to bring before you to-night is simply a reversion to two of the earliest forms of the camera obscura; the first being, as I suppose, a darkened chamber, and the second the conversion of the chamber or camera itself into an operating room. The appliances are very simple, and the arrangements easy in the extreme.

A room is chosen where there is a clear skyward exposure, and, if possible, with water and a sink or developing tray with waste pipe, &c. This room should not be less than thirteen feet long, but it would be better if it were longer. The first preparation is to darken the window, making the room quite light-tight. A square opening is then made with a grooved or rabbetted edge to make it also light-tight. This is to be made of the size of the largest negative or positive to be worked with. A board is now hinged or otherwise made fast to the opening at the proper angle to catch the skylight free of obstructions, and an ordinary camera (altered as afterwards shown) is fixed to the sloping board with the back of it turned to the light. A light frame to hold the negative or positive is now constructed. Generally the focussing glass frame will do if the glass be removed, and adapters for the different sizes of negatives made to fit within it; or a dark slide, with the back and front shutters removed, will also answer quite as well. The camera is reversed on its own base board, and the sliding or screwing part which usually holds the negative made a fixture; while the front part, which usually holds the lens, is made to move in and out, so that we can focus with it the shorter of the conjugate foci of the lens. Sliding fronts, to move both horizontally and vertically, are also necessary in order to give the power of bringing the centre of the lens opposite the centre of that part of the negative we may wish to select for enlargement; as, for instance, one head out of a group, or a figure from a landscape, &c. A clamping screw, to fix it to the sloping board at the window, completes that part of the apparatus.

At the other end the open-angled part, left between the window and the plate-holder, is completely closed in, and that half of the arrangement is also finished.

It only remains now to provide an appropriate receiver for the enlarged image, and it is done in this way:—A stout easel, composed of two uprights with a couple of cross-bars top and bottom, made flush and parallel—six feet high by two feet three inches wide is a good size—hinged back legs made to the exact fixed angle of the first part of the apparatus, and firmly attached to a base to which is fastened two wheels; grooved screw pulleys of about two inches or so in diameter answer admirably. These are fastened to the base below the front part of the easel. The back part rests on the ground, acting as a break to prevent it moving if necessary, and by raising that part the front wheels act. Wooden rails are now made to fit the wheels and placed on the floor, so that the easel can move along backward and forward to any distance to or from the small camera fastened to the window. A frame or rest is constructed to slide up and down the easel, and capable of being fixed at any part, and the apparatus is complete. The frame is made like a flush panelled drawing board, but instead of the panel a piece of finely-ground glass is inserted, through which the focus is first got; in fact, the best way to work it is to go behind it, take the two back rests in hand, and move the instrument backward or forward, observing the focus through the glass. It is a focussing glass, and the easel is practically the back part of the camera.

One little help, however, should be added for fine work—the lens should be fitted with a yellow glass cap, in order that the image may be focussed direct on the sensitive surface, whether that be an iodised plate for a positive or negative or a paper picture for development. In this way the most perfect focus can be obtained. Provision is also made for clamping the easel part when the focus is obtained; but this is not essential, as its own weight keeps it steady. The whole apparatus is before you for examination.

A much greater refinement on this simple and cheap apparatus has been constructed—which is still cheap, although dearer necessarily than the other—by which the class of negative which contains four or any greater number of proofs on the same plate can be used equally with the single negative. To effect this a frame or carrier is made similar to the one before you, by the aid of which any part of any negative can be brought opposite the centre or best part of the lens to be used. The lens is also fitted to similar movements, so that it is comparatively a simple matter to set the particular part of the negative you need opposite the centre or best part of the lens. The other arrangements are identical, with the exception that, as there is no fixed small camera, only these two plate and lens-holders, a light-tight cloth is so fastened to the apparatus that when the arrangement is complete it is passed over, and all light, save what comes through the picture and lens, excluded.

Arrangements are also made by which the lens-holder in both cases takes a variety of lenses to suit the different classes of work.

The large focussing glass is best made by rubbing chalk all over the surface of a finely-ground glass, and wiping it off again with a dry cloth. This enables the operator to see the image either through the glass or on it; but, in all cases, the final focus should be determined on the sensitive surface itself by the aid of the yellow glass cap.

No other method that I know of gives so perfect a command over every size or kind of enlargement. It is suitable more especially for photo-crayons (as they are called), as they can be exquisitely vignetted by interposing an opaque screen with the proper opening in it; and the developing room, being also the camera, makes the whole thing very complete, and especially very comfortable, as, on the very dullest days it is possible to work with this apparatus, thus rendering artificial light unnecessary. W. H. DAVIES.

* Read at a meeting of the Edinburgh Photographic Society, December 22, 1869.

A PHOTOGRAPHIC JOURNEY THROUGH THE HIGHER HIMALAYAS.*

By S. BOURNE.

I AM now using a varnish recommended to me by Mr. Wilson, consisting simply of unbleached lac dissolved in alcohol of ·820°, with a little sandarac, in the proportion of one drachm to an ounce of lac, added to toughen it. This gives a varnish so hard that it is like enamel; it will stand exposure *for hours* to the *hottest* sun of India without showing a trace of stickiness, and I firmly believe it will not crack. During the present monsoon I have purposely left negatives on a shelf in a damp room, but though they have now been so standing for two months each negative is still sound and whole.

But to return from this necessary digression. My friend, the Doctor, tired of waiting for my operations on the Pass, had gone on one march in advance, promising to wait at some more convenient place till I should rejoin him. Seven miles below the Pass we came to the bed of the Chandra river (the Chenab of the Plains) by the left bank of which the path now lay. The valley was closely hemmed in by rocky precipices and barren hills, and the heat again became

* Continued from page 614.

oppressive. During a long march of fourteen miles I stopped only to take two pictures—one of the end of a glacier which poured through a dip in the ridge and came down almost to the margin of the river; the other was a view down the valley, embracing some large granite boulders, which had been torn from the rocks above, and some precipices on the other side of the river. The road was a terribly rough one—a continuous climb over stones and rounded boulders over which the waters had rushed and rolled in some previous age. On every side the mountains were barren and rocky, without a tree, and scarcely vegetation of any kind to be seen—a wonderful change from the fertile valley and hills of Kulu. Snow rested on most of the summits, and innumerable glaciers filled up the hollows and ravines which separated one from another. We were now getting beyond the influence of the monsoons, although clouds still hovered on the crests and ridges of the mountains, and I experienced one smart shower on this march, the last I had for many a day. I was well tired when, as darkness approached, I came up with the Doctor, pitched amongst acres of stones on a spot of utter desolation near the great Shigri glacier.

Next day we had this glacier to cross, and a very rough, tough piece of work we found it. Those of my readers who have traversed the glaciers of Switzerland would scarcely recognise as glaciers those so often met with in the Himalayas. You fancy that you are simply crossing a mass of stones and boulders shattered and fallen from the surrounding mountains, until you suddenly come to a gigantic fissure or small lake revealing walls of solid ice many feet in thickness. This glacier was four miles across, and, I suppose, ten or twelve long, and yet was completely covered with loose stones, some of them of great size. The fact of these masses of stones and boulders being found on the top of the ice miles away from the foot of the mountains, and in such positions, some of them being most delicately poised, is convincing proof of the theory of glacier movement. As the Doctor pointed out at the time, these stones could never have fallen so far from the mountains, and especially could never have lodged themselves in such peculiar positions, and must therefore have been carried down by the movement of the glacier itself.

In order to give an illustration of this I took a picture when about half-way across, having for a foreground one of the miniature lakes set within its icy walls, some of the curiously-lodged stones of which I have spoken, and a background of snowy mountains. The scenery all around was very wild and barren, and the muddy waters of the Chandra river rolled down a valley as destitute of vegetation as the pavements of a London street. I could not help stopping two or three times to get views of these wild and barren places, the fine snowy peaks towering around and the river enabling me to add some elements of beauty to these pictures of desolation.

At our next halting-place we encountered the first real difficulty of our journey. Our tents were pitched on the dry part of the bed of a torrent, a stream of considerable width, and a large body of water which rushed down from the snows immediately above. We were surprised to find here an English sportsman, an officer of the 60th Rifles, returning from a shooting expedition in the high mountains, and who informed us that he had penetrated, by stealth, far into Thibet. He was encamped on the opposite bank, and, as we could not then cross the torrent (which could only be done in the early morning before the sun had melted the snows), we exchanged names written on a piece of paper, which, being tied to a stone, was thrown across. He was a big, powerful fellow fully six feet in height, and in throwing his stone across it unfortunately hit one of my servants on the forehead and knocked him down, and very nearly knocked the life out of him, but he recovered.

Early next morning this gentleman first crossed over to our side on a small pony, which he then made over to us to take back to the village from which he had brought it. As the torrent was increasing in force and volume every minute no time was to be lost before crossing; but the Doctor distrusted the pony, and thought he should be safer on his own legs with a native holding each hand. He stripped, but the first touch of the icy water (it had only just emerged from a glacier) made him cringe. I urged him to take the pony, but he still refused, and plunged boldly into the torrent. By the assistance of the natives he got across with much difficulty, but he will not forget fording that stream as long as he lives. He sat down on the bank, his limbs so benumbed that, notwithstanding the application of rough towels and all the rubbing of the natives, it was some time before he felt the use of them again. I resigned myself to the pony, and crossed dryshod without difficulty. This torrent is generally crossed by a snow bridge a short distance above, but this had lately melted away.

The road, for a few miles further, still kept company with the Chandra river, when presently turning to the right we bid adieu to its muddy waters and crossed the Kunzam Pass, 14,931 feet elevation. There was now no snow on this pass, and at the top we found some grassy table-land and several large flocks of sheep brought here to graze in the summer months. I obtained one picture here of a fine range of snows on the opposite side of the valley we had just quitted.

A steady descent of some eight or nine miles brought us to the village of Losar, comprising a few dirty huts with still dirtier inhabitants of the Tartar tribe, and situated in a desolate valley, which could scarcely grow sufficient grain to supply the village. The walls of the huts were made of mud and whitewashed; the roofs were flat, and owed their power of keeping out rain (if they did keep it out) to a thick layer of bramble or brushwood. The women had long, coarse black hair, divided into innumerable little plaits, which hung down their backs, and they were profusely ornamented with bracelets of shells and necklets of amber and turquoise. They were very strong; some of them acted as our coolies, took up the heaviest loads, and jogged off with them without thinking apparently that they were heavy at all.

We halted a day here that I might varnish my negatives (not an easy operation in a tent), and make room in the plate-boxes for others. I took a picture of the village and the valley in which it was situated, also one of a mountain hard by, exhibiting some curious contorted strata. I regret that I did not get a group of the people, but they fight shy of Europeans, and it is difficult to get them to sit, and still more difficult to make a pleasing picture without something better for a background than I found here.

Shortly after leaving Losar we crossed the Spiti river by means of a bridge made of twisted twigs or thin sticks; then a short march, presenting nothing picturesque, brought us to our next encampment at a small village called Kiota. The river here flowed over a broad gravelly bed in many little separate channels, and its banks, the height of which was some ninety or hundred feet, presented a strange appearance. The action of the rains had washed away the soft alluvial deposit, which apparently had once formed the bed of a lake, into innumerable pointed pillars, standing sometimes singly, sometimes in groups, some of them having large stones balanced on their narrow points, looking as though they would topple over at any moment. An illustration of these singular formations will be found in Sir C. Lyell's work on geology.

While I stopped to take one or two pictures of these curious phenomena, and the Doctor was hammering away looking for fossils, our ponies, which we had hired from the village, quietly walked across the river and up the steep bank on the other side, and when they were wanted we saw them grazing comfortably on the other side, perfectly safe and out of reach. We had, therefore, to take to our feet again as usual, and trudge along the shaly side of a steep mountain, on the narrowest of tracks, and in heat which, reflected from the burning rocks, was like the heat of a furnace. It was a great relief to emerge at length on an open grassy plateau and find breakfast awaiting us, after which a slight descent brought us to the village of Kibber, which, in the style of its houses and inhabitants, resembles Losar.

Before reaching this village we passed through a singular gorge, at the bottom of which a torrent rushed in partial darkness, and which was so deep that, on looking up, the sky could only just be seen through the narrow chink. We were told afterwards that a still more remarkable gorge on the same stream was to be seen a few miles higher up.

(To be continued.)

SIR GEORGE HARVEY ON THE INFLUENCE OF ART AND SELECTION OF ARTISTIC SUBJECTS.

At a recent meeting of the Royal Scottish Academy, when the President, Sir George Harvey, was presenting the prizes awarded to the students of the academy, he made some admirable observations on the influence of art and on other cognate subjects, which, although addressed to young artists of the pencil and brush, will prove equally valuable to those of the camera; for, as he observed, they are "words which, if well considered, may prove of some use to all who purpose following the fine arts as a profession:"—

A room hung round with pictures is a room hung round with thoughts, each painting being a volume of art work always open to the eye, and through the eye to the mind, suggesting ideas, pleasant or otherwise, according as the mind of the painter has been influenced in giving form and substance to the shadowy brood of his imagination. Unlike books, which may be opened and perused, closed and put away at pleasure, pictures, and statuary not less, remain always present to the view, and the ideas they embody are stimulants of thought to those whose mental

cultivation enables them to appreciate such communings with nature as by the artist are in this way brought under their consideration. Art products, as a rule, ought to yield an amount of pleasure over every other emotion, and subjects, chosen from whatever source, furnish their lesson with twofold force when the primary thought or groundwork is by association or intrinsic interest agreeable, pleasant, or instructive, and where the meaning of the work is clear as to design, and, in regard to form and colour, an object to look upon with delight.

When a subject for representation has been selected, it is of the first importance that a distinct perception of its leading features should, as it were, be seen by the eye of the mind—it ought to have a real presence, about which the fancy may be allowed to play, so as to look upon and examine it from many sides. After this, the preliminary sketch, when made, may be put aside for a while, to see whether it does not lose by keeping somewhat of that charm of fresh suggestiveness to which its first conception gave birth. Should this ordeal be sustained, an amount of confidence may be cherished as to its having in possession elements of a nature which, by earnest painstaking, may result in work of which the workman shall not need to be ashamed. Some painters begin to paint before they have themselves arrived at a distinct idea of what it is they desire to realise. They cover their canvas with masses of dashing but meaningless colour, in the hope that from this chaos some form of order and beauty may ultimately spring. This obviously must prove a vain hope, for a process so vague and uncertain can in the result prove only weak, incoherent, and quite wanting in that evident completeness of purpose shown where there has been throughout the process of production a manifest effort towards the embodying of a thought clearly present to the mind from the commencement of the work. Some subjects there are belong to a class which ought to be avoided as one would avoid sin. I refer to such as have in them elements essentially painful, offensive, or disgusting, and which no amount of skilful art can ever render otherwise than unpleasant to the view. Some such productions we have seen from the hands of men of undoubted genius and unquestioned practical skill, yet which of us would choose to have always present to his view representations of a nature owing their inspiration to details derived from the shambles, the dissecting-room, or to haunts of vice, the mere suggestion of whose atmosphere and surroundings breathes only that of deepest moral pollution. As subjects for pictorial embodiment scenes of this nature are not merely unfit, but ought to be avoided as unwholesome, unprofitable, and altogether wanting in those qualities with which art, wholesome and invigorating, ought ever to hold communion.

You will reasonably ask of me—What, then, are the sources furnishing materials from which we, as art students, are to draw supplies for our art work? To this I would reply—The field is boundless: it is the world, where every man may find enough to satisfy the craving of a hungry soul, provided always he bring with him the power of perceiving, appropriating, and digesting what may be seen growing plentifully all around. This capacity genius has, and through it spiritually discerns the relation which thoughts existing in the mind have to things in the world around. In giving to these a form and a presence peculiarly their own he brings into existence an ideal creation, literally quite unlike, yet vividly suggestive of, that which in semblance it seems to be. This endowment is not given equally to all, but each according to the measure of his ability has to show how he has employed that which has been entrusted to him by the Divine Giver; and whatever medium the artist may choose in giving expression to what he has to tell, still the stream of his thought must flow, or seem to flow, from a pure fountain, otherwise sooner or later it will be made apparent that bad pictures, like bad books, are doomed to be hustled out of sight, as things the good sense and sound feeling of mankind will not permit itself to tolerate.

The Chinese have a theory that authors of books receive in the future state reward or punishment according to the amount of good or evil their works continue to produce in the world they have left. Where this influence is beneficent, joy comes to the soul which originated the source of pleasure; but where it is otherwise, authors are made to bear an amount of suffering corresponding to the amount of evil their writings have given birth to. And which of us, judging as men judge, can say that reward or retribution coming in this way is either logically or morally otherwise than just? The youth of the present generation enter upon a large inheritance, not only of a public educated to the appreciation and enjoyment of works of art in a measure far exceeding anything in the past, but they also are heirs to the experience of a century in all that relates to the various methods of using the materials necessary to the production of works of art. The wise and proper use of this experience will tend to relieve the mind of the fears of disappointment and chagrin at seeing the result of much labour and thought show symptoms of decay even in the lifetime of the artist. Such of us as recollect the influence of one great mind in the early portion of this century will unite with me in lamenting that his beautiful paintings should in several cases have shown symptoms not only of decay but ruin, and all from the use of one pernicious substance, beautiful in its newness as the syren, but as deceitful and cruel. When we think of Wilkie, do we not lament that art so perfect as his should, in any instance, have proved so perishable, and all, as I have said, from one seductive but deceitful pigment used in their production. I do not speak of all Sir David's works, but of such only as came from his hand when he laboured under the unhappy fascination of asphaltum, leading, besides himself, many charmed workers in his following, with, I regret to say, in many instances the same sad result made manifest after a period of years, for, tried by time, nearly all the works in which this material has been used have been found more or less wanting in that quality of permanence which is so desirable in all works of this nature.

The use of varnish by unskilful meddlers—particularly carvers and gilders in country places—has also had most disastrous effects when applied to works such as I have referred to, the material being generally of the commonest kind, and applied without knowledge and without stint, tears to pieces in a short time the most carefully-prepared work in this way, which it is often sickening to contemplate. But this is just one of the griefs painters have to lay their account with; for the moment a work leaves their hands and passes into the possession of another, control over it ceases, and without check or hindrance it may be used, as I have sometimes seen, so as to perfect the destruction of the picture within a very few years. I would, therefore, caution my young friends as to the use of all such substances, and would recommend—from what I have myself endured—to avoid them by all means, and to choose as materials the simple and old-established pigments, oils, and varnish, and of the latter to use just as small a portion as need be; and, indeed, the less the better. By this means, with ordinarily fair usage, such as I regret to say is not always measured out in their preservation, there will yet be room for a reasonable hope that works of the present day will remain as proofs of their authors' ability as long as, in the nature of things, objects of this description can be expected to last. I may here mention that there has just been placed in the National Gallery, for a limited time, an exquisite picture of pastoral life by Wilkie, painted about fifty years ago. It is in the most perfect state of preservation, and looks quite untouched since it left the painter's hand. Throughout this lovely work bitumen has been freely used—the background is composed of little else; but besides, as I have the best reason for knowing, the same substance has been more or less mixed with all the colours, even with the whites, throughout the picture, which, moreover, has the look of having been finished without what is technically called glazing. Entire as this work now is, I feel assured that, were it but to receive one coat of varnish, the asphaltum painting would speedily give way, break up, and end in ruin, as, it is to be deplored, other works similarly produced have done. This unhappy result would certainly occur, because from sad experience we now know that though bitumen, used by itself, will remain an indefinite length of time uninjured; yet, if either painted over with another pigment, or varnished, neither the paint nor the varnish will assimilate with the bitumen, and so between them they drag it to pieces, no matter how long the time may be which has elapsed since the first coat was laid upon the picture.

Contemporary Press.

NEW AMERICAN STUDIOS.

[PHILADELPHIA PHOTOGRAPHER.]

INSTEAD of following up the description of portrait studios this month, we will digress a little and proceed to describe an establishment devoted entirely to the production of out-door views, *i.e.*, that of Messrs. Kilburn Brothers, Littleton, N.H.

We have frequently alluded to the excellent stereos. produced by these gentlemen, and, having become much interested in their progress and success, took great pleasure, a few days ago, in visiting their mammoth establishment, which is much larger than we had expected.

Their building is three stories high. The lower floor is divided into four rooms. The back one, facing south, has four windows, at which the printers are stationed; next to it is the silvering-room; next, the toning-room, in which the fuming-box is also placed; and the front room is the wash-room. In the latter there are eight or more tanks, five and a-half feet long, by eighteen inches wide, and five inches deep. These tanks are placed in rows of two each—each row a few inches lower than the one above it, so as to give a fall to the water. They are fed with water by a constantly-running mountain spring. The water enters at the end of the upper row, passes through down into the next, and so on to the last, and finally out at the waste-pipe; so it will be seen that it is constantly running and changing, and the prints thoroughly washed by the purest of water.

A one-story building at the side of these rooms is stored with wood, which, we are assured, is largely needed during the cold winters they have in New Hampshire.

The second floor is entered from the street, and the front room, handsomely lighted by two large show-windows, is used as a sales-room, and is handsomely furnished with fine glass-cases, &c. Back of this, at one side, is a room where the manufactured slides are kept, and where a table is placed for the use of customers when selecting them. At the back of this is a large and convenient double sky and side light, where groups, pictures of flowers, birds, &c., are made; and at the side

separated by a stairway, are a stock-room for the storage of supplies, packing, &c., and the dark-room all conveniently arranged. At the back of all these is the winter printing-room, *i.e.*, a room where the windows are inclosed to protect the printers from storm and cold.

The third floor, back end, is devoted to printing, the same as the first and second, and the rest of the floor is a general work-room, where the paper is cut, prints dried, cut out, mounted, rolled, titles printed, and spots touched out. All the rooms mentioned are conveniently large, well lighted, and admirably arranged, and so that everything is cleanly and nice.

The most of the work is done by young ladies, there being only one male assistant in the establishment.

Having seen their full force at work on a bright day, we will briefly describe their proceedings as near as we can remember.

The negatives are made by Mr. B. W. Kilburn, and stored in small boxes of about one hundred each. The negatives being made, then the next step is to mark a base line along the lower part to guide the printer and mounter. The albumen paper is laid, face down, and with a measure of proper size, is marked on the back into fifteen parts of proper size for the printer. The paper is then taken to the silvering room and handed to two youg ladies to sensitise. They have a huge pan of solution, at one side of which, next to the manipulator, is fastened a glass rod one inch in diameter. The paper is floated, and, as it is raised from the solution, is drawn over the glass rod, which takes off all superfluous solution admirably, and runs it into the pan. Strips of wood lie near by, with a clip fastened to each end. The sheet is hung in the clips, and the strip hung across parallel bars over a heated pipe to dry. Scarcely a drop of solution falls after the sheet is drawn over this rod, and thus much silver is *saved* without infringing any patent. After the paper is dry it is placed in the fuming-box, and, when properly fumed, is cut into pieces as before marked out, and these pieces are furnished to the printers as they want them. The young ladies who print are seated at the windows. On a table before them are two covered boxes, one for paper and one for the fresh prints. Each printer runs from nine to twelve negatives, according to quality. They never touch a negative with the finger-nail, but use a camel's-hair blender to raise the corner of the paper when they wish to examine or remove the print. The prints are taken from the printers, then they are washed, toned, and fixed systematically and quickly in the usual way and thrown into the washing-tanks before described. The prints are usually washed all night. When removed from the tanks they are hung on lines to dry. Instead of hanging lines across the room, to the permanent annoyance of all passing to and fro, they have a double, square, light framework, hinged at the top, spread out at the base, and there connected by canvas, making a triangle shape at the ends; and across these frames the lines are hung at proper distances apart, and on these lines are hung the prints to dry. The canvas serves to catch the drops, thus keeping the floor clean, and to keep the frames from spreading out too far. When not in use, the frames are closed together, and placed on one side out of the way. We have never seen a more convenient plan than this for drying. The prints, when dry, are then carefully examined, and imperfect or torn ones thrown out. They are then cut out for mounting. Messrs. Kilburn Brothers have recently adopted Bergner's print-cutter as the most rapid for cutting out their prints, and recommend it very highly. They have several of them. The prints cut out are then passed to the mounters, and are mounted in the usual way with starch. After they are mounted, the prints are rolled, the titles are printed on them by the "Novelty" hand-presses, and then are ready for market.

The majority of the negatives are of views in the wondrous White Mountains, our visit to which will make another chapter hereafter. A constant flow of orders comes in upon these gentlemen, and they are always behind, though their average production is 1,200 prints per day. Their work deserves all the success they get, and we are glad to see them prosper. Their establishment is a model one. Everything works happily, like clockwork, and well. Having visited the great White Hills with the indefatigable photographer himself, his work now has a new charm to us, and we can see new beauties in it every time we look.

PINHOLES.

[Philadelphia Photographer.]

Much has been said about "pinholes" and the various modes of producing them, but I have observed one not very unfrequent cause of the trouble that I do not remember to have seen mentioned by any photographic or other publication I have read, which is this: using an alkaline bath with an acid collodion, and, *vice versâ*, causing effervescence to take place in the film. I have seen these markings cover a plate with countless numbers of a starlike form, varying in size from that of the head of a pin down so small the eye could scarcely detect them; but it does not follow that marking should always be *starlike*. When caused by want of harmony between the collodion and bath, the violence of the action and the character of the collodion film will modify their appearance very much; if the bubbles form upon the surface of the film only, they will not look like those formed within the film or beneath it, accumulating with force enough to break out, exploding, as it were, that portion of the film obstructing its escape; but, where surface action only has taken place, the bubbles will mostly be released when the plate is taken from the bath, and the subsequent action of light and developer will disclose markings analogous to "freckles" in chemical effect; or, if more vigorous, clear spots of a round or oblong form, showing that the film ceased to sensitise as soon as the bubbles began to form. Similar clear spots may occur by small particles of air adhering to the film when plunged into the bath. If many of my "disciples of the black art" would study their "pinholes," I opine they will sometimes discover that I have indicated their true cause. In correcting such differences between the bath and collodion I prefer to work with the bath, as it is much easier to manage than collodion.

I do not suppose these ideas are new, as others must have observed the same things, but you are at liberty to use them as you think most profitable. F. M. Spencer.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
Jan. 5th	Edinburgh	Hall, 5, St. Andrew-square.

EDINBURGH PHOTOGRAPHIC SOCIETY.

This Society held its third meeting of the session at 5, St. Andrew-square, on the 22nd inst.,—the President, Sheriff Hallard, in the chair.

The minutes of the previous meeting were read and approved of.

A paper was read by Mr. W. H. Davies, *Description of an Efficient Apparatus for Enlargements.* [See page 628.] During the reading of the paper the various pieces of apparatus were exhibited and explained.

The Chairman (in opening the debate) stated that the subject of enlarging, save with the lantern for exhibition purposes, was one with which he was not practically acquainted; he would, therefore, call upon some of the gentlemen present who had had experience, more especially with this particular form of apparatus and method of working.

Mr. Lothian stated that he had been in the habit of using almost all the ordinary methods of enlargement, and knew practically their good and bad qualities; but he had to say for this that it was at once the simplest to manage and the best in action that he had ever tried. In reference to a question put by a member as to the stopping down of the lens, he (Mr. Lothian) further stated that, practically, in enlarging there was no stop needed, provided the lens used was at all a good one.

Mr. Dallas explained the method of using the last-mentioned portion of the apparatus in Mr. Davies's communication, showing the perfectly parallel motion got by the action of the sliding bars on the base moving both ways, and the ease with which the centre, or, indeed, any part of a negative, could be brought in front of the centre of the lens by the peculiar action of the carrier. He stated that, although he had not yet had an opportunity of trying it, he had no doubt that it would fulfil all that was claimed for it.

Mr. Peat, in a few humorous remarks, said he wondered that Mr. Dallas should trouble himself with a new enlarging apparatus when he was so well able to take the pictures the full size at once.

Mr. Ross said that he had at one time used an apparatus which was lighted from the zenith, but he found that method very slow; the sloping method was decidedly quicker—why, he did not know.

Mr. Bow stated that, most probably, that arose from the amount and density of the atmosphere, which was greater looking towards the horizon than towards the zenith.

Several other members spoke on the subject before it was closed.

A number of prints taken by Herr Albert, of Munich, and sent for inspection by Mr. G. W. Simpson, of London, were then exhibited and much admired. A considerable number of copies of a vignetted card were also sent for distribution among the members, which was done. In the course of examination of the specimens, a question was asked by a member as to whether anything was known as to the method of production of these pictures.

The Secretary stated that a rough outline of the method had been published, and was something llke the following :—A very thick plate of glass waa taken, say from ⅝ to ¾ of an inch; this was coated with a pretty thick coat of gelatine and a bichromate, say of potash or ammonia, and this was insolated until it was quite hard. A second coat of the sensitive gelatine was then poured over the first one, and this was dried in the dark, after which it was printed under a negative. When sufficiently printed it was removed to the dark room, and the whole of the soluble bichromate washed thoroughly out of it. After drying this was inked in a similar manner to a lithographic stone. This was what was known of the subject, and it was by no means so new as might have been expected, as he (the Secretary) had tried the same idea in 1862, during a series of experiments on photolithography, and had published this observed fact in The British Journal of Photography in April of that year. He knew that others had also done somewhat in the same direction—notably Mr. M'Craw. He might further state that one of their members, Mr. McGlashon, was on the continent at that moment learning the details of the process.

The CHAIRMAN said that, having heard the explanation of their Secretary, he would be glad to hear the opinions of any other gentlemen who had worked in this or any of the various modes of carbon printing. Judging for himself, he did not think these prints so fine as good sliver prints, although they were very good.

Mr. NEILSON said much nonsense was uttered about the instability of silver printing. He had a book of Mr. D. O. Hill's photographs, which were as good as the first day, although they could not be less than twenty-five years old.

Mr. ROSS said that those negatives were strong and dense; the prints were equally so, and that was the secret of good silver printing combined with careful manipulation. Prints from weak negatives faded very easily.

In reply to a question, it was stated that the present number of impressions capable of being taken in a day was between 120 and 150, which meant that number of impressions from a given size of plate, but which contained eight plates *carte* size.

Mr. W. D. CLARK stated he had applied to see whether they could print by the process commercially, and the answer he got was that they were not prepared to do that, but they would teach the process to any one. He (Mr. Clark) stated further that there seemed to be always a difficulty with these new processes; they were always *going* to do, but never doing.

Mr. M'CRAW said that some years ago he tried the method, or one similar to it, but the results were not satisfactory, as, after a copy or two had been taken, the fine detail began to "ink up" (as the printers called it), and the half-tones came out, at last, quite black, so that he abandoned the method.

Several portraits of the members were then presented to the album, and six stereographs of the great whale which had been stranded in the Frith of Forth were presented in the name of Mr. Douglas, of the Vineyard, Kirkaldy. They showed the operation of flenching and cutting up the huge brute, as well as the interesting calf whale got in it.

Formal votes of thanks to the gentlemen who had contributed to the meeting concluded a very interesting evening.

PHOTOGRAPHIC SOCIETY OF MARSEILLES.

A MEETING of this Society was held on the 6th instant,—M. Teissiere in the chair.

Several members exhibited the results of their trials with the carbon process. The want of a reliable photometer formed the subject of a protracted conversation; after which,

M. VIDAL asked leave to read a communication relative to the formation of negative *clichés* for the carbon process, reproduced from original negatives. [See page 627.] In support of his communication, M. Vidal exhibited some negatives obtained in the way proposed, also positive proofs from them, and, for comparison, positive proofs of the original negatives. The difference existing between these two series of proofs was a loss of fineness in the carbon *clichés*, but it was very trifling, and M. Vidal showed by what means he hoped to produce a more complete identity.

M. POITEVIN observed, *apropos* to this, that by employing a process which produced a negative direct from a negative, there would be the advantage of having but one cause of loss instead of two; the operation would also be twice as simple as the ordinary one. This process would be that which consisted in the employment of a black powder on the surface of a plate covered with a mixture of sugar and bichromate of potash, previously exposed under a negative.

M. VIDAL said he would make a trial of this mode of forming negatives second-hand. In order to render his explanations as clear as possible, he (M. Vidal) executed before the meeting the development of a negative from a carbon pellicular positive, and afterwards the development of a positive intended to furnish a fresh negative.

These experiments were followed with great interest.

The CHAIRMAN thanked M. Vidal for his communication. He acknowledged the utility of the method of printing direct on gelatine paper negatives obtained by the camera in the ordinary way. He was also of opinion that this method of multiplying negatives might be of great service; but he recommended, as he had previously done, the printing of negative proofs in the camera by placing the collodion bed in the frame behind. That means of reversing the proof appeared to him the best, as it required no new operation and occasioned no loss in the value of the image.

M. Henri Pelissier presented, in support of the Chairman's statement, some negatives obtained in the manner indicated by him, together with a frame constructed for the purpose and wherein the sensitive collodion could be placed at the back. In this frame the sensitive plate could be substituted for the ground glass plate, and put in its identical position whatever the thickness of the glass employed. The frame was also furnished, at its centre, with an eyeglass, by the aid of which, and without the ground glass, the thinnest object could be placed mathematically in position.

The Chairman having thanked M. Pelissier for his communication, the meeting terminated.

Correspondence.

Foreign.

Paris, December 27, 1869.

THE "Wandering Photographer" continues his letter thus:—

"There, now; I have had my say! I will finish my ramble through Bordeaux. As I said before, the work is what we should call in England 'middling.' I went into a photographic stock shop and found the owner very communicative. He gave a very doleful account of business, and things were nearly at a stand-still. He allowed me to look over several albums filled with portraits taken by the leading house of Bordeaux, and he also confirmed me in my opinion by saying that they were very far from what they should be. After leaving this gentleman I continued strolling for some time up one street and down another, looking out for photographs and photographers. Of course there was a good display of the former in the booksellers' windows; in fact, a great many other shopkeepers combine the selling of portraits of celebrities of the day with their regular business. Disderi had some effectively-coloured portraits of actresses, &c. There was no lack of photographs of episodes in the dreadful Pantin tragedy—Troppman side by side with his victims—sickening sights, which would be better kept from public view. I also noticed some very cleverly-coloured portraits by a Bordeaux artist; but, as in these the photographs were completely covered, I do not class them as photography proper. The prices attached to the photographic cases seemed to be extremely low. On some of them, and those the best turn-out in the town, were, 'First picture 1f. 50c. (1s. 3d.), or three for 2f. 50c. (2s.).' The portraits exhibited by Charles and Armand pleased me most. On turning the corner of the theatre I found myself on the fair-ground. It was the fair time, of which event I will send you a description shortly; suffice it for the present to say there were no less than twelve photographic *ateliers* built up. I was soon in amongst them."

There will be another opportunity for the English to show the strides they have made in portraiture and in all that they were said to be behindhand in in our art, since the Universal Exhibition of 1867—as the French Photographic Society announce an exhibition for 1870, to be held in the Palais de l'Industrie, as usual. The success of that held this year was great, no less than 20,000 persons having examined the collection. The French Photographic Society offer for next year an inducement for photographers to exhibit in the shape of medals and honourable mentions, which will be awarded as a special jury may determine.

The Exhibition will open on the 1st of May, at the same time as the Exhibition of Fine Arts; and all portraits, &c., for exhibition must be delivered *free*, at the Palais de l'Industrie, Porte No. 1, from the 1st to the 10th of April at the latest. All the contributions of exhibitors will be hung or exhibited by the officers or *employés* of the society at a uniform charge of ten francs (8s.) per square mêtre. Persons wishing to exhibit should give notice before the 15th of March, 1870, and state the space they desire to occupy. As before, all letters respecting the Exhibition should be addressed to M. Laulerie, 9, Rue Cadet, Paris.

I do hope that English photographic portrait artists will take the pains, trouble, and expense of exhibiting their best productions in Paris—compete on their own ground with their French *confrères* and find their proper level. Let it be seen at the Paris Exhibition of 1870 that the English artists have profited by the lessons of 1867, and the discussions thereupon, which have not yet ceased; let them *show* that which they say they have realised, that they can now take their stand in any exhibition of foreign photographic portraits. Do not let all the boasts of what Englishmen can do in the way of learning lessons and profiting by them, which appeared in the pages of photographic journals, be mere words; let the artists come out strong here, and let their faith be shown by their works. There is time for preparation, and notice of the Exhibition has been thus early given so that anything choice already accomplished may be retained in view of next May. The Exhibition in London was said to be a success; let the best things shown there be sent here, and better still if they can be accomplished.

The production of oxygen gas on an industrial scale is a *fait accompli*, for we see the tumbrils of the Oxyhydrogen Gas Light Company rolling along the streets of Paris every day, conveying metal reservoirs of compressed oxygen to the consumers of this gas. The theatre of the Gaité is the largest consumer. The outside is illuminated every night by a few magnesian and zirconian lights interspersed among the gas jets with a very good effect; the scenes in the interior owe many of their beautiful effects to the oxyhydrogen, magnesian, or zirconian light. Other theatres and places of amusement use the oxygen gas to add to their attractions in the way of intensifying the combustion of something, to put it in a semi-scientific way. The illuminated advertisements are also consumers of this gas.

These advertisements are to be seen in many places on the Boulevards, where there is a good position for stationing a magic lantern and screen on the second or third floor of a house. There the *entrepreneurs*—chiefly, I am told, photographic artists out of employment—instal their magic lantern and apparatus, and having prepared a quantity of slides in the form of advertisements of various houses, proceed to exhibit them to the gaping public. It is astonishing what crowds do surround these exhibitions, and waste their time in watching the change, either sudden or dissolving, from an announcement that at a certain place they give back

the money if the goods do not please on trial to the advertisement of the best shop for watches. The cost to the advertisers of these luminous advertisements is five francs per night, and the cost of the slide extra. The slide is a photograph, is taken from a sketch made on cardboard, and printed from the negative as a transparent positive. It is generally coloured, and sometimes moving effects are attempted; these, of course, are extras.

Well, these exhibitions use up oxygen, and magnesian cylinders, too, I am told, and it is said the showmen and proprietors generally make a "good thing" of it by making it as bad as possible for those who have been unfortunate enough to supply them with the necessary lanterns and apparatus, and pocketing the proceeds of the advertisements.

The oxygen of the Oxyhydrogen Light Company is manufactured from manganate of soda, as already described in your pages. A substitute for this product is proposed by M. Delaurier, viz., manganate of lime. This compound is easily formed by heating a mixture of oxide of manganese and lime or chalk in powder. It is insoluble in water, and is formed more readily than the manganates of soda or potash. It may be used for furnishing cheap oxygen, and as a powerful oxidising agent for laboratory purposes. Oxygen can also be obtained from it by pouring sulphuric acid upon it. The manganate of lime may be made very cheaply by utilising salts of manganese, which are waste products in several manufactories.

I finish the last letter of this year by noting a curious fact. The flame produced by burning alcohol containing *chloride* of sodium decomposes physically the colours thus:—Red appears black; orange, white; yellow, white; green, black; blue, dark blue or black. *Iodine* in alcohol gives the following results:—The flame makes red appear brown; orange, deep yellow; yellow, light straw; green, blue; blue, deep blue. What will a bromide flame give?

The winter is on here in full vigour—snow, cold, and accompaniments. A very happy and prosperous new year to all your readers!

R. J. Fowler.

Home.

THE PRODUCTION OF PRINTING SURFACES.

To the Editors.

Gentlemen,—The particular method of producing enamels known as the "dusting-on process" (and a more abominable name it would be difficult to conceive of, although it is expressive), suggests to me a method of producing engraved surfaces for printing which I do not think has been observed, or, if observed, *published* by others.

When a plate has been sensitised by means of a mixture of gelatine, honey, and bichromate of potash, after exposure under a positive, some parts (those on which the light acted) are hardened, or, so to speak, resinified; the other portions are tacky in the inverse ratio of their exposure to light.

The usual course of action is now to apply, by means of a soft brush, some metallic oxides which, adhering to the blacks of the picture, will be vitrified when exposed to heat.

What I propose to do is to apply very finely granulated zinc, or indeed any other metal, to the exposed surface, and when by this application the picture has been properly developed—that is, when the blacks of the picture shall be formed of an aggregation of particles of pulverised metal—take an electrotype cast from this surface. The resulting cast will be a *facsimile* of the original plate in reverse; that is to say, the whites of the picture will be represented by a smooth surface of copper, while the blacks and half-tints will, in turn, be represented by a granulation more or less deep, according to the action of the light.

As I shall not have an opportunity of putting my theories into practice for the next fortnight, I should like to hear the opinions of any fellow-reader respecting the feasibility of the method of producing a printing surface now pointed out.—I am, yours, &c.,

December 27, 1869. Geo. Markham, M.D.

MONCKHOVEN'S NEW ENLARGING APPARATUS.

To the Editors.

Gentlemen,—Allow me to ask you, without any beating about the bush, what is there in Dr. Monckhoven's light or his enlarging apparatus that every reader of your Journal does not already know?

You yourselves say that the enlarging apparatus is merely a magic lantern, and I don't think I shall get much credit for originality if I say that this instrument, even when it has a wooden instead of a tin body, is very well known in this country. This portion of his invention, with all due respect, we shall, so far as novelty is concerned, place on one side.

What remains? Magnesium *versus* calcium, or magnesia instead of lime! Has this substitution never before been heard of? Have you yourselves never before published it? Has Signor Carlevaris never sensationalised it? Has it never been mentioned in connection with the name of Tessie du Mothay?

I am alive to the importance and the justice of giving to every man his due; but I should like, before deciding to whom to give honour in the case now before us, to ascertain what position Dr. Monckhoven claims in respect either to the application of the magic lantern for enlarging, or the oxyhydrogen light with a magnesia cylinder for lighting it.—I am, yours, &c., An Old Photo.

December 28, 1869.

THE PHOTOGRAPHER TO HIS MISTRESS.

Within the camera of my breast,
On my excited heart,
In love's collodion is impress
Your charming counterpart.

The lenses of my longing eyes,
With achromatic ray,
Focussed your image where it lies—
Fixed ne'er to fade away.

Your glorious orbs' actinic beam,
With living chemic glow,
Flashed thro' me as the lightning's gleam
Doth thro' far ether flow.

With brighter light than ever sun
Shone on the zone called tropic,
Your form shines there, you lovely one!
'Tis life—'tis stereoscopic!

Of silver there's no iodide,
So sensitive to light
As I—'twas nearly I who died
When first you met my sight.

But, ah! alas! when I, too bold,
Did my fond love avow,
You spoke in words of freezing cold
That make me shiver now.

And as I urged my tender suit,
I thought your temper placid;
I seemed to eat the dead sea fruit—
Drink pyrogallic acid.

The negative you then imprest
Was stronger than a hint;
So positive it was expressed,
I feel I ne'er shall print

Fair copies of your charming face,
In somewhat smaller size,
Wherein those features I could trace
That above all I prize.

I scarcely know what I can do
To soothe my bitter grief;
No comfort even can I view
In "Woodbury's relief."

So if you still will be my foe,
Embittering my path,
I'll wash out the last trace of woe
In a hyposulphite bath.

J. B. K.

Miscellanea.

A New Subject for a Carte—*The Daily News* says that the she-monkey brought from the East by the Empress of the French has begun to pay the penalty of the greatness which has been thrust upon it. No less than fifteen photographers, who are all announced as "devoted to the reigning dynasty," have applied for the honour of perpetuating the features of this new member of the Imperial House. If the right should be accorded to any of them, we shall not only pity the poor little quadruman the torture of having to sit still for its portrait, but we may also inspect with some interest the series of portraits of the Imperial family which may appear in shop-windows and in albums. Will the series hereafter be held as complete without the picture of this female monkey, which is now the talk of Paris, and which, now that the Emperor's faithful dog is mentioned no longer, is more identified with the dynasty than any other living thing which is not of its blood?

On Skies and Clouds.—On the subject of "manufacturing" skies and clouds in photographs, the *Saturday Review* takes occasion to express its dissent. "The point involved is whether the real sky which nature prints shall pass as good enough, or whether a special performance shall be expressly got up, and then pieced on, with the end of making the product more marketable. The latter course is advocated by the author, but we need scarcely add that his plea is, not the profit of merchandise, but the interest of art. Yet, whatever be the plea, imposition, though unintentional, is the inevitable consummation. Apparently with the best possible motives, people of this way of thinking justify the taking of one photograph for foreground and mountains, and another for the sky; then the two are joined together, and the deliberate falsification of nature pleases the public, and admits of ready sale. We happen to write with portfolios before us containing several hundred photographs purchased in the chief cities of Europe. And the result of the practises which we have described is to throw discredit on, and in some degree to render worthless, these transcripts, which otherwise would be of unspeakable service to students. Our position is this, that the paramount value of photography consists in its literal and uncompromising truth as far as it goes, but that in express art qualities the process must ever remain inferior to engraving and painting, and that, when "pictorial effect" is sought, nature has to give place to the contrivance of some third-rate artist who seeks his bread in the drudgery of a photographer's office. Let us give one or two examples from plates before us. From Venice we have a photograph of one of the finest equestrian statues in the world—that of Colleoni by Verrocchio, standing before the Church of S. Giovanni e Paolo. And what has the trade photographer, wise in his generation, done? Why he has boldly blotted out, in accordance with our author's recommendation, the sky printed by the sun, and has employed a better artist than the sun to patch in against the figure a clear white background, which falsifies by the facile sweep of the pencil the sky outline Verrocchio had modelled. The effrontery of photographic practices would seem to be limited only by the consideration of what will pay. In Verona, some years since, we purchased views picturesque and anti-

quarian got up by some brilliant Frenchman, who by cunning art had discomfited the native practitioners on the spot. The skies exceed our author's most sanguine expectations; they are for dramatic effect worthy of the stage, and any local angularity of hill or obnoxious peculiarity of building gives place to a Parisian's idea of what photography should attain in the way of "pictorial effect." Our third example, taken from a capital series of Italian photographs is the famous Roman bridge at Narni. When we obtained this impression the photographer in Rome remarked that he had been particularly fortunate in the effect. The hills, with the convent thereon, which rise above the river, are thrown into distance by quite a poetic haze, while the arch and piers of the old bridge approach the eye in bold relief. But we have been since informed that this fortunate atmospheric phenomenon, this poetic haze, existed only within the photographer's private parlour; in other words, that the negative had been doctored for the sake of "pictorial effects." It is almost superfluous to point out how, for any historical, archæological, or real artistic end, photographs thus tampered with lose the worth which attaches to trustworthy records. And it is obviously useless to protest against the dealings of shopkeepers when we see counters thronged by American and other travellers ready to expend hundreds of francs on goods thus forced up to the selling standard. In Venice it is amusing to observe the fierce war waged between two chief photographers. The one placards the walls with advertisements of the wonders accomplished by his "notable angle of ninety degrees;" the other prints at the back of each cardboard mount a notice that he will return the photograph to the purchaser if it be not found superior to photographs produced elsewhere. That English houses do not as yet practice "pictorial effects" to the same perfection may be ascribed to lack of skill; certainly ambition to do a roaring trade is not wanting. We imagine, however, that the photographs taken from the "National Portraits" exhibited at South Kensington are not tampered with. It was a good sign that certain heads which did not come out well in the printing were withdrawn, and perhaps a yet better sign that others still retained are sufficiently bad to appear honest. What we wish once more emphatically to repeat is this, that photographs ostentatious of "pictorial effect" are open to suspicion, and that it is the untouched photograph, left just as the light of day prints it, which has value for men of science and art. A photograph, like a witness, should be sworn to tell the truth, the whole truth, and nothing but the truth.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

J. King.—Of the two lenses the triple will be the more useful.

Arthur.—A very red print may be obtained by giving the surface of the paper a wash with a solution of chloride of lime.

Michael Crowe.—Although we have read the account of the telescope, we have, like yourself, quite failed to understand its construction. As it is described it is sheer nonsense.

Alpha.—Try the effect of immersing the prints in a weak solution of bichloride of mercury. If by this treatment they are not improved we do not know what else to suggest, unless it be to put them in the fire.

C. A. H.—The developer will flow easily over the glycerine plate if you immerse it for one or two seconds in water. When we practise the glycerine process and experience the difficulty mentioned by you, we invariably find that the immersion described effects a cure.

James A. Corston.—Try the following experiment:—Excite the plate in a slightly-acid bath, rinse it, then apply the gum. Try also the following:—Excite the plate, wash it *thoroughly*, and dry by means of a strong heat. Expose both for the same length of time, and then proceed as you have indicated in your letter.

J. M.—We had an article on the subject alluded to in the spring of last year. A very good phosphorescent sulphide may be obtained by strongly heating, in a covered crucible, sulphate of barytes previously made into a paste with a solution of gum tragacanth. In about half-an-hour a whitish product is obtained, which should be reduced to a fine powder and preserved in a well-stoppered bottle.

A Friend.—Do not apologise; it affords us pleasure to render service to our readers. But we cannot assist *you*, at least until we know something of the paper that you have been using. From the symptoms described, the sensitising bath would seem to be too weak. Ascertain its strength, and, if necessary, add more silver. Should it prove to be sufficiently strong, send us a sample of the paper.

George Ross.—1. There is no work published on the touching or spotting of negatives. Anything that is known on the subject will be found in some of the former numbers of this Journal.—2. Try the following:—Apply a hard lac varnish to the plate without heat, and, when cold and dry, work upon it with a soft black lead pencil until you have obtained the effect desired, after which warm the plate and varnish it in the usual way.

A Member of the Photographic Society.—As a member, you ought to have given utterance to your sentiments at the meeting, for which abundant opportunity was afforded. Dr. Monckhoven made no claim for any special novelty in his light; why, for that matter, both chloride and carbonate of magnesia have been patented in this country above three years ago, and if you look back you will find full particulars of it published in previous volumes of this Journal.

S B.—The simplest method by which to produce a raised surface for printing is to coat a plate of glass with bichromated gelatine, and, when dry, expose it under a negative in a bright sun if possible. Now immerse it in water for a short time, by which the portions protected from the light will swell and stand above the surface. From this picture in relief either take an electrotype or a cast in plaster, and reproduce it in stereotype metal.

*** Extreme pressure on our time previous to going to press compels us to postpone till next week replies to various communications received at a late hour.

Cartes and Other Photographs Received.—First of all, a few *cartes* by Mr. Watmough Webster are deserving of special notice for their exceptional excellence. Our readers are already acquainted with Mr. Webster as an able writer on at least one branch connected with the chemistry of our art-science; and, from private correspondence and from the pictures before us, we know him to be no less "at home" in æsthetic feeling and in the practical application of art to photography. ——We are much pleased at the rapid progress Mr. M. Row has made, as evinced by the very excellent specimens we have just received from him, and we are glad to find that at the late Falmouth Exhibition the award of a medal for his productions testified that the jurors there entertained the same opinion. As we have in our possession some of the *first* as well as the last photographs taken by Mr. Row, we are in a most favourable position for noting the progress he has made.

"Lichtdruck."—Some specimens of this method of printing which we have received from Mr. C. F. Jessen, of Bradford, the English agent for Ohm and Grossman, the inventors, impress us very favourably with the capabilities of this new process. Several months ago some of the Continental photographic journals were illustrated by a similar process of printing introduced or invented by Herr Albert, of Munich; but, whether or not it has so happened that we have been fortunate in the case of "Lichtdruck" to obtain exceptional specimens, and equally unfortunate in the opposite direction with respect to those issued by Albert, we cannot say. Certainly, in delicacy and gradation, the specimens of "Lichtdruck" are slightly better than those of Albert. In connection with the invention of the process—for both appear to be worked in a similar way—we have received copies of a mass of correspondence between the rival inventors on the subject, which we shall wade through and, if possible, give in our next week's issue, together with other information on the matter.

LONDON GAZETTE, *Friday, December* 24.

Partnership Dissolved.

E Moira and E. Haigh, Lower Seymour-street, Portman-square, photographic artists.

METEOROLOGICAL REPORT,

For the Week ending December 29th, 1869.

Observations taken at 406, Strand, by J. H. Steward, Optician.

These Observations are Taken at 8.30 a.m.

Dec. 1869.	Bar.	Thermometer.				Wind.	Rain Inch.	Remarks.
		Max.	Min.	Wet.	Dry.			
23	29·84	44	34	38	40	NNE	—	Fine
24	30·00	—	27	37	39	NE	—	Fine
25	—	—	—	—	—	—	—	
27	—	40	—	—	—	—	0·03	
28	29·95	33	22	—	25	NW	—	Fine
29	30·22	—	23	—	31	W	—	Overcast

CONTENTS.